

Regional Environmental Security Complex Approach to Environmental Security in East Asia

Geun Lee (Seoul National University)

1. Environment and Security Nexus

Recent efforts to expand the concept of security to the area of environment have generated diverse attempts to define the term “environmental security” in both academic and policy circles. The attempts to define and conceptualize environmental security, however, created more conceptual and policy confusion rather than providing well-tuned analytical frameworks and policy recommendations.¹ One reason for such confusion lies in the inherent vagueness of the very security concept. Traditional security studies have regarded security as pertaining normally to physical inter-state conflicts and balance of power politics (and its variants). But if one turns one’s attention to the higher or lower levels of analysis than the level of the nation-state, the referent objects for security studies become much broader and amorphous. For instance, at the individual level, human security applies not only to physical safety of each individual against bullets and missiles, but economic well-being, cultural integrity, psychological stability, or human rights as well. In this case, states—often considered as guardians of their people—can also be a security threat encroaching upon human rights or economic well-being of some segments of their people. Again, if one takes a global level of analysis, security based on national sovereignty gets increasingly entangled with security based on global interdependence or networks. Threats to global village come occasionally from one’s own nation, and oftentimes, not from ubiquitous bullets and bombs, but from financial speculations and burning of fossil fuels.

In general, the concept of security has been narrowly defined in the traditional security studies as physical safety of sovereign states from foreign threats and at the same time, security studies have been overwhelmingly dominated by the realist school of thoughts that takes nation-states as sacred pieces on a global chess-board.

¹ Within the same context, Daniel Deudney argued, “if we begin to speak about all the forces and events that threaten life, property and well-being (on a large scale) as threats to our national security, we shall soon drain the term of any meaning.” See Daniel Deudney, “The Case Against Linking Environmental

But as illustrated above, security can also become mental happiness, ecological harmony, or market stability depending upon what one thinks of one's state of real security is. As Stephen Walt well showed, threat is also in the realm of perception and subjective judgement.² Therefore, security defined as the complete absence of threat from any source is a socially constructed concept.³ The concept of security is contextual, and can be located on varying points of a wide spectrum.

If a security analysis on any issue areas is based on contextual variables, the analysis often loses rigor and clear logic to make well-designed policy recommendations to security policy makers. Again, if policy recommendations are made in an area other than the traditional security issue area without well defined concept of what security is, it would be very difficult to attract the attention of the policy makers. Accordingly, well designed analytical frameworks, and persuasive definition of security are necessary in order to make effective non-traditional security policy inputs to the government, especially in those countries where governments place highest policy priorities on military security and economic development.

Taking these problems into consideration, many environmental security specialists have tried to develop rigorous analytical frameworks and persuasive definitions of what environmental security is. In the late 1980s, the environment as a security issue began to achieve heightened saliency with the publication of many promotional articles in renowned policy journals.⁴ Recent proliferation of discussions ignited by that promotion in the late 1980s depart significantly from state-centered approach and emphasize security consequences of environmental issues on individuals, groups, ecosystems and the globe.

Generally speaking, recent discussions of environmental security hold that "human induced environmental degradation and scarcity pose fundamental physical threats."⁵ However, scholars differ in their interpretations of precisely what that

Degradation and National Security," *Millennium*, vol. 19, No. 3 (Winter, 1990)

² Stephen Walt, *The Origins of Alliances* (Ithaca, N.Y.: Cornell University Press, 1987)

³ On social construction of international relations and international security, see, Alexander Wendt, "Constructing International Politics," *International Security*, (Summer, 1995), pp. 71-80; Peter Katzenstein ed., *The Culture of National Security* (Columbia University Press, 1996); John Gerard Ruggie, "What Makes the World Hang Together? Neo-Utilitarianism and the Social Constructivist Challenge," *International Organization*, vol. 52, No. 4 (Autumn 1998), pp. 855-886.

⁴ Terriff, Croft, James, and Morgan cite the following as the promotional articles in the late 1980s. Jessica Tichman Matthews, "Redefining Security," *Foreign Affairs*, (Spring 1989), pp. 162-77; Norman Myers, "Environment and Security," *Foreign Policy*, 74, (Spring 1989), pp. 23-41; David Wirth, "Climate Chaos," *Foreign Policy*, 74 (Spring 1989), pp. 3-22; Neville Brown, "Climate, Ecology and International Security," *Survival*, 31 (November/December 1989), pp. 519-32. Cited in Terry Terriff, Stuart Croft, Lucy James, and Patrick Morgan, *Security Studies Today*, (Polity Press, 1999), p.117.

⁵ *Ibid.*, p. 118

entails and therefore developed their own distinct approaches to link environment and security. The range of views or approaches can be broken down into the following categories

1. environmental scarcity as a cause of political instability and conflict⁶
2. environmental degradation caused by the conduct of or preparation for war
3. environmental degradation as a threat to human health and human well-being
4. environmental degradation infringing on sovereignty⁷

Roughly, the first two categories tend to deal with only those environmental issues that have military consequences or implications, and the last two categories include broader environmental issues that may or may not draw attention from the military. Yet, the difference in selection criteria between the two categories is not very clear since those environmental issues of little current military significance can in the future be potential causes of military conflicts and again, some environmental degradations may not be taken as threats to human health and well-being if people cannot afford to pay attention to such issues. In this regard, selection criteria are judgemental. R.T. Maddock therefore suggests 4 rule-of thumb criteria in selecting environmental security issues: 1. it is extensive, rapid and sustained; 2. there is a high degree of real incompatibility between the attainment of ecological and other important values; 3. the real and monetary costs of attaining an acceptable trade-off between the conflicting objectives are large and/or increasing; and 4. it interacts in a negative way with other structural or political weaknesses within states, which leads to social turbulence.⁸

Although the 4 rule of thumb criteria may be a starting point for conducting a research on environmental security, from a policy perspective, one important element is still missing. That is the question of “who legitimizes the rule of thumb criteria, who decides whether a certain environmental issue meets the criteria, and who makes

⁶ This view or approach has largely been taken by the so called Toronto group led mainly by Thomas Homer-Dixon. In fact, those works that try to reveal the nexus between scarcity and conflicts have taken major portion of “mainstream” environmental security studies until recently and ignited quite intensive scholarly debates in many security studies journals. See Thomas Homer-Dixon, “On the Threshold: Environmental Changes as Causes of Acute Conflict,” *International Security*, vol. 16, No. 2 (Fall 1991), pp. 76-116; *Environment, Security, and Violence* (Princeton, N.J.:Princeton University Press, 1999); Thomas Homer-Dixon and Jessica Blitt eds., *Ecoviolence: Links Among Environment, Population, and Security* (Rowman & Littlefield, 1998); Colin Kahl, “Population Growth, Environmental Degradation, and State-Sponsored Violence: The Case of Kenya, 1991-93,” *International Security*, vol. 23, No. 2 (Fall 1998), pp. 80-119. For a comprehensive review of the literature on the subject, see Nils Petter Gleditsch, “Armed Conflict and the Environment: A Critique of the Literature,” *Journal of Peace Research*, vol. 35, No. 3 (1998), pp. 381-400.

⁷ Ibid., p. 118

⁸ R.T. Maddock, “Environmental Security in East Asia,” *Contemporary Southeast Asia*, Vol. 17, No. 1

policy decisions to effectively handle the environmental threats.” To satisfy these questions, while roughly incorporating above selection criteria, it is quite useful to bring the state back to the central stage in discussing environmental security and assign the state a role of making judgements and designing policy responses.

Within this context, in this paper, environmental security is defined as "state's protection of the people from environmental threats and threats of environmental origin." The main actor for providing security to the people is the state because I assume that environment becomes a security issue when environmental problems force the state to use extraordinary measures to handle them. Environmental threats, therefore, are regarded as environmental problems that could justify and mobilize “the use of extraordinary measures by the state to handle them.”⁹ Threats of environmental origin pertain more to the traditional security issues of inter-state conflict, civil strife, or military mobilization. Environmental issues producing conflicts (mostly out of access to valuable resources problems) between various actors within or between states can also justify and mobilize the use of extraordinary measures by the state. Therefore, the selection criterion in this paper is that environmental issues that could justify and mobilize the use of extraordinary measures by the state to handle them are environmental security issues.

2. Analytical Framework: Regional Environmental Security Complex

Most environmental security issues are not restricted to a certain region because the workings of environment pertain frequently to the global ecosystem as a whole. However, environmental problems or concerns of trans-boundary nature that go across no more than a certain regional boundary should be tackled at the regional level. Moreover, due to the likelihood of creating the “tragedy of the commons” when the global, rather than regional, ecosystem is involved, practically states need to divide up the global commons into a few regional units to increase the effectiveness of managing trans-boundary environmental issues.¹⁰ Two criteria can be applied in

(June 1995), p. 25.

⁹ This definition is borrowed from the works of Barry Buzan, Ole Waever, and Jaap de Wilde. See their book, *Security: A New Framework for Analysis* (Lynne Rienner Publishers, 1998).

¹⁰ Assuming a limited carrying capacity of a commons, rational, egoistic people tend to exploit the commons creating tragedy of destroying the whole commons. For a detailed explanation of the tragedy of the commons, see Garrett Hardin, “The Tragedy of the Commons,” *Science*, 162, (December 13, 1968), pp. 1243 – 1248. UNEP’s regional seas program is a good example of dividing up the global commons into regional commons in order to effectively manage the ocean.

adopting a regional approach to environmental security. First, threat perception level on specific environmental issues must or will be high at a region while low at other regions. Second, international cooperation at the global level may or may not be necessary but international cooperation within a region is imperative to effectively solve the environmental problem. The connotation of the second criterion is that a non-cooperative state can deliver harm or negative influence to other states in the region and may raise inter-state tensions.

Then how do we define a region? Defining a region has been a complicated and never-ending debate for social scientists. Regions can be identified at one end of the spectrum by simply including and excluding certain nations and physical territories, while on the other end of the spectrum, they can be defined as subjective (cognitive) regions where people belonging to the region have a “we” feeling. However, from a state-centric, and policy perspective, it would be desirable if countries have a practical definition of a region that will help the states solving the problem of regional environmental security. In other words, a region should be defined in the way through which a state can identify what kinds of policy options are available and feasible. Therefore, in this paper, a region is defined as a rough geographical space on the globe where interdependence of environmental consequences among states is high. Therefore, if environmental problems or activities related to environment in a certain country cause either positive or negative externalities in other countries, a region is a set of those countries connected through externalities of environmental problems and activities.¹¹

How do we measure the level of interdependence? That depends either on the scientific analysis of the workings of the environment in that particular region or on saliency of certain environmental issues in those countries. Scientists would possibly reveal how closely anthropogenic environmental problems are interlinked with one another within a certain region. However, oftentimes, scientific revelation may not contribute much to raising the level of threat perception unless the issues are salient enough to attract people’s general concerns. Therefore, public awareness of the environmental problems is very important in actually measuring the practical level of interdependence. In addition, since not all environmental issues have the same degree of interdependence among states, region is an issue-dependent concept. For example, while trans-boundary air pollution in Europe involves only a few countries in Europe, global warming covers every state on the globe. In this paper, I see East Asia, as a

¹¹ A similar approach to region is developed by Patrick Morgan. See "Regional Security Complexes and Regional Orders," in Patrick Morgan ed., *Regional Orders* (Penn State Press, 1997).

whole rarely constitutes a region. Rather, there are sub-regions in East Asia in terms of variety of environmental security issues, and they are Northeast Asia and Southeast Asia respectively.

The analytical framework of this paper is based on the regional security complex theory with some modifications to accommodate environmental problems in the region.¹² As noted above, what I would call a regional environmental security complex is a set of the states whose environmental problems and efforts to solve them have either negative or positive externalities to each other. The security complex can take various forms. They are:

- (1) "latent regional environmental security complex" where the threats are perceived only at the level of the regional ecosystem alone (in other words, in the world of natural science or social science only);
- (2) "balance of interests system" where the states' stance toward environmental problems are determined only by the assessment of each country's environmental security threats (i.e. ecological vulnerability, or conflicts over resources) and the required costs to abate the particular environmental problems.¹³ Here, the state is assumed to make autonomous decisions, and if there arise conflicts of interests among states over salient environmental issues, tension may increase among them;
- (3) "regional regime" in which the states resort to regional institutional measures to tackle the environmental security problems, and finally
- (4) "regional inter-subjective community" where regional environmental security problems are intersubjectively regarded by the states as their own common problems.

The four different types of regional environmental security complexes represent a normative ordering of ideal types in which security is most well served at the last ideal type and worst served at the first one. However, the ideal types often coexist with one another depending on issues or effectiveness of regional regimes. The implications of each complex on regional security are as follows: With regard to a certain environmental issue, if threats are perceived only by the experts, and their policy recommendations are not heard by the policy makers, environmental crisis may take place all of a sudden. If states cannot react promptly with extraordinary measures, the crisis will generate damages to economic and human well-being of the

¹² On regional security complex theory, see Ibid.

¹³ In understanding international cooperation over environmental issues, Detlef Sprinz and Tapani Vaahtoranta developed an interesting framework from a realist perspective focusing on ecological vulnerability and abatement cost. See Detlef Sprinz and Tapani Vaahtoranta, "The interest-based explanation of international environmental policy," *International Organization* vol.48, No.1 (Winter 1994), pp. 77-105.

population. Moreover, if the crisis is of nature that increases access problems to valuable resources, physical conflicts within or between states may result. Security is not effectively served by the states since they are ill-prepared to environmental threats and may react too late after crises cross threshold point of inter-state conflicts or fatal damage to the population. However, when crisis actually takes place, the possibility of cooperation between experts and policy makers is likely to increase as the state realizes political cost of ill preparation. In addition, following the crisis, states are likely to securitize the particular environmental issue.¹⁴ It is likely that this type of regional environmental security complex may develop where regions are composed of states that are occupied with other fundamental issues of state survival and prosperity such as overcoming territorial conflicts, poverty, social instability and so forth. Therefore, stable modern sovereign state system should be well established in the region in the first place before the regional environmental system can move up to higher types of regional environmental security complexes. Otherwise, states would not have enough capacity to pay attention to important environmental issues.

When states act and react only by economic and political calculations of their interests, even though environmental threats are perceived by some states, the threats cannot be countered effectively if countries causing negative externality do not cooperate out of narrow self-interests. If the threats develop into crises, the likelihood of tension between the states is quite high since countries will finger-point each other when scientific data are uncertain. However, if negative externalities are intertwined across varying environmental issues among countries in the region, there is a possibility for the involved countries to begin considering regime formation or international cooperation. Even if negative externalities are not densely intertwined, countries may try to solve the problem by relying on Coase theorem if aiding to the causing countries is cheaper than resolving the problem independently at home. Often times, however, self, myopic interests of this kind hinder international cooperation as countries do not share common interests. Again, when crisis actually takes place, states are likely to securitize the particular environmental issue. If a region contains enemy states, it is likely that balance of interests system would develop. In addition, it is also imaginable that environmental threats could be intentionally created out of strategic calculations. Unless environmental threats evolve into shared common interests of the states in a region, balance of interests system would hardly ensure environmental security in the region. Moreover, even if shared interests exist among the states in the region, if the states do not trust each other out of various reasons such

¹⁴ On the concept of securitization, see Buzan et al, *Security*

as historical track records, unstable and opaque leadership, or dominance of environmentally insensitive interest groups in the domestic politics, balance of interests system would not help a lot in ensuring environmental security of the region.

Yet, balance of interests system is highly amenable to changing perception of national interests within each country's domestic politics. For instance, with regard to environmental threats, countries recently tend to change their definition of national interests as more and more people become environmentally sensitive and as Green Movement gains influence. When, for various reasons including securitization of environmental threats, such concepts as sustainable development or energy conservation take larger portion of national interests of each country in the region, negative externalities may gradually disappear without hard bargaining among states. Therefore, balance of interests system based on self-interests may not always be unstable in serving environmental security of the region. In fact, transition to regional inter-subjective community may begin by redefining national interests domestically by each country to include sustainable development as a key component of national interests.

Regional regimes, if effective and binding, would serve the security of the region better than the previous two security complexes because countries share common instruments to deal with environmental threats. But effectiveness of regional environmental regimes varies depending on political will of participating countries, institutional design of the regimes, and seriousness of environmental issues for which regimes are created. In fact, regional regimes can be created when states still act and react according to assessment of ecological vulnerability and abatement cost. Sometimes regional regimes are just outcomes of diplomatic and bureaucratic competition and thus overlapping regimes may exist without synergistic linkages among them. In addition, regional environmental regimes are mostly specific to environmental problems without considering security implications. Therefore, tension management mechanism, early warning system, or crisis management system are not normally or clearly included in the regimes. However, once regimes are created, it may also function as a bestower of authority, as a learning facilitator, as a role definer, and as an agent of internal realignment. Therefore, under certain conditions, regimes could by themselves enhance their own effectiveness.¹⁵ In addition, as states increasingly securitize environmental threats, regional environmental regimes will function for the security goals as well.

¹⁵ On this issue of regime effectiveness, see Oran Young ed., *The Effectiveness of International Environmental Regimes* (MIT Press, 1999).

Both international cooperation through regional regimes and redefinition of national interests may strengthen countries' inter-subjective understanding of regional environmental security as their own. Furthermore, if countries in the region develop and share cognitive "we" feeling, and tend not to clearly distinguish territorial borders among themselves in the environmental issue area, it may be possible that countries in the region would regard environmental security threats to a few countries in the region as threats to all of them. At the moment, the construction of regional inter-subjective community is a remote possibility and quite ideal. However, as shown in the recent discussion on security community in the traditional security issue area, construction of environmental security community may be somewhat easier than the construction of traditional security community because issues can be much less conflictual. If states pay more attention to environmental problems, it may not be impossible to construct such a community in the environmental security area.¹⁶

3. Environmental Security in East Asia

In this section, I will briefly describe environmental security situation in East Asia in line with my analytical ideal types. As mentioned before, region is an issue-dependent concept, and not all environmental problems create security threats in the region. Therefore, I select a few prime environmental issues in the region, and divide the whole East Asia into two sub-regions of Northeast Asia and Southeast Asia, as most of the selected environmental problems do not cover all of the East Asian countries while influencing the sub-regions respectively.

(a) Trans-boundary Air Pollution in Northeast Asia

Air quality in Northeast Asia is characterized by high sulfur dioxide and suspended particle concentrations with the exception of Japan where the sulfur dioxide concentration is relatively low.¹⁷ A critical question related to trans-boundary air pollution in Northeast Asia is what fraction of acid deposition in a

¹⁶ On the discussion of security community, see Emanuel Adler and Michael Barnett eds., *Security Communities* (Cambridge University Press, 1998).

¹⁷ Sahng-Gyoo Shim, "Transboundary Air Pollution in the Northeastern Asian Region," a paper presented at International Workshop on Environmental Peace in East Asia, Seoul and Wonju, Korea, (July 5-7, 2000)

certain country is caused by local emission and what fraction is due to transported pollutants from other countries. In this region, China emits most of sulfur dioxide and a major fraction of nitrogen dioxide. And since the prevailing wind in the region except summer is westerly, air pollutants emitted from China are expected to reach Korea, Japan and the North Pacific (and even to North America).¹⁸ Although reliability of data for China is low, emissions of SO₂ and NO_x in China as of 1994 was 31,220,000 and 9,700,000 tons per year respectively. Korea accounted for 15,00,000 and 1,258,000 as of 1996, and Japan, 986,000 and 1,935,000 respectively. Reliability of data for Korea and Japan are quite high.¹⁹

Specialists' estimations of sulfur of Chinese origin depositing in Korea and Japan are varied depending on their estimation techniques and seasons. But at least more than 13% of sulfur deposition in Korea is accounted for emissions from China,²⁰ and reflecting seasonal changes, influx from China can also be far more than the emissions from Korea.²¹ In the case of Japan, estimations of Chinese contribution of sulfur deposition in Japan ranges from 3.5% to over 50%.²² It is believed that drastic increase of Chinese low quality energy consumption is creating rising negative externality to Korea and Japan. Chinese government is not officially acknowledging these results. But, since China's coal consumption is expected to double the level of 1990 by the year 2010, sulfur influx from China to Korea and Japan is likely to increase. Therefore, as long as China places highest priority on rapid economic development without considering negative externalities it entails, trans-boundary acid deposition would cause serious inter-state conflicts especially when public awareness in Korea and Japan increases.²³

Another trans-boundary air pollution problem in Northeast Asia is "yellow sand dust," transported from dry areas of inner China and Gobi desert to Korea and Japan. It takes about one or two days for the yellow sand dust to reach Korea through the westerlies, and during the spring time, it causes severe respiratory and eye troubles. What is worse, air pollutants and heavy metals produced through the process of rapid industrialization of China also travel with the yellow sand dust.²⁴

¹⁸ D Jacob, J.A. Logan, and P.P. Murti, "Effects of Rising Asian Emissions on Surface Ozone in the United States," *Geographical Research Letters*, 26, (1999), pp. 2175-78.

¹⁹ Sahng-Goo Shim, "Transboundary Air Pollution in the Northeastern Asian Region," p. 20.

²⁰ R.L. Arndt and G.R. Carmichael, "Long-range Transport and Deposition of Sulfur in Asia," *Water, Air and Soil Pollution*, 85, (1995), pp. 2283-2288

²¹ K.C. Moon, Y.P. Kim, and J.H. Lee, "Long-range transport of air pollutants in Northeast Asia," *NIER Report*, 1998.

²² Sahng-Gyoo Shim, "Transboundary Air Pollution in the Northeastern Asian Region," p. 23.

²³ China is not immune from its own emission of sulfur dioxide either.

²⁴ <http://www.moenv.go.kr>

As the visibility and effect of this problem is much more direct to general public than acid deposition, people increasingly demand governmental measures to induce Chinese cooperation in solving the problem.

(b) Marine Pollution in Northeast Asia

Marine pollution occurs in an area of overlapping and contended maritime jurisdictions, which hinders and complicates joint environmental management. Semi-enclosed East Asian seas are therefore subject to the effects of chemical pollutants including hydrocarbons, heavy metals, industrial and agricultural chemicals, radionuclides, sewage, heat wastes, oil spills, and many other materials.²⁵ Issue-wise, two of the potential conflict areas in Northeast Asia are ocean waste disposal and nuclear waste disposal.

Landfill and direct discharge into rivers and coastal seas have been used until recently to dispose of waste simply because they are cheap.²⁶ However, due to increasing premium of land and the quantity of waste material, China, Japan, South Korea, and Taiwan started to consider and use ocean dumping as an alternative method. South Korea and Japan have established and used dump sites in the East Sea (Sea of Japan), which are located in areas of overlapping claims, and it is expected that the use of ocean as dumping sites by other Northeast Asian countries would increase.

Nuclear waste disposal has been a sensitive political and environmental issue in Northeast Asia since the revelation of the fact in 1993 that both Russia and Japan have dumped large quantity of radioactive waste into the East Sea. The former Soviet and Russian Navy was reported to have dumped decommissioned nuclear reactors and vast amount of nuclear waste into the East Sea, and Japan also admitted that Tokyo Electric Power Company dumped about 9,000 tons of radioactive waste into the East Sea every year.²⁷ South and North Korea strongly protested the dumping by Russia and Japan, and many civilian organizations in Japan and South Korea organized protest movements.

²⁵ Peter Hayes and Lyuba Zarsky, "Regional Cooperation and Environmental Issues in Northeast Asia," 1993, p. 5, <ftp://ftp.nautilus.org/napsnet/papers/hayes1093.txt>

²⁶ Mark J. Valencia, "Northeast Asian Marine Environmental Quality and Living Resources: Transnational Issues for Sustainable Development," 1995, at <ftp://ftp.nautilus.org/aprenet/Library/Papers/marinenvy>, p. 6

²⁷ Ibid., p. 7

Geographically, the Yellow Sea shared by Korea and China has suffered the most from marine pollution. Industrial facilities located on the coastal lines of both China and Korea are the main sources of coastal pollution of the Yellow Sea. Not only land based sources of marine pollution such as industrial wastewater and domestic sewage, but oil spills discharged from trading ships also account for rapidly increasing contamination of the Yellow Sea. The Yellow Sea is already known as one of the seven “dying seas” of the world.²⁸ The East Sea (Sea of Japan) has been suffering mostly from industrial waste dumping and oil spills. Although the condition is not as bad as that of the Yellow Sea, due to large industrial dumping of Japan²⁹ and heavy vessel traffic, the East Sea has been continuously contaminated. In January 1997, the breakup of a Russian oil tanker off the Japanese coast resulted in serious damage to Japan’s sensitive fish and aqua-culture breeding grounds. The incident developed into an inter-state dispute between Japan and Russia as arguments raged about who should accept the blame for the disaster.³⁰

In Northeast Asia there was little early concern about marine pollution problems. One of the first major incidents to draw attention to marine environmental degradation in Northeast Asia was the dumping of radioactive waste into the East Sea in 1993. As noted above, this generated enormous concern among the general publics and sub-national actors in Japan and South Korea. Domestic environmental groups, local governments, and expert groups in both countries formed a loose movement.³¹ However, while the dumping issues lent some impetus to regime formation activities in the region, there still is little interest in marine environmental degradation in general, evidenced by little new coverage of the issue from the mass media.³²

(c) Deforestation in Southeast Asia

²⁸ Shin-wha Lee, “A New Agenda for Security: Environmental Conflict and Cooperation in East Asia,” in Kwang Il Baek ed., *Comprehensive Security and Multilateralism in Post-Cold War East Asia* (KAIS, 1999), p. 152

²⁹ Ibid., p. 152

³⁰ Alan Dupont, “The Environment, Conflict and the Security of East Asia,” a paper presented at International Workshop on Environmental Peace in East Asia, Seoul and Wonju, Korea July 5-7, 2000, p. 7.

³¹ Hyon-Jin Kim, “Marine Environmental Cooperation in Northeast Asia,” a paper presented at the ESENA Workshop on Energy-Related Marine Issues in the Sea of Japan, Tokyo, Japan, 11-12 July, 1998, p. 3.

³² Ibid., p. 3

In general, deforestation increases the likelihood and severity of natural disasters as well as food and water access problems. If the natural disasters and access problems have trans-boundary implications, they may develop into inter-state conflicts. A typical example of this deforestation-security nexus was shown by the choking smog that enveloped large areas of Southeast Asia in the latter half of 1997 and early 1998 as the result of unusually severe forest fires on the Indonesian islands of Sumatra and Kalimantan. The haze affected the health of at least 20 million Indonesians and strained relations between Jakarta and its ASEAN neighbors.³³ Although fire is an intrinsic part of the life-cycle of Indonesia's forests, the haze in 1997-1998 has an anthropogenic origin. Following Indonesian government's decision to increase palm-oil production significantly, people, and especially MNCs accelerated destruction of forests for clearing land for palm-oil plantations. Forest burning is the cheapest and quickest method, and the forest burning in 1997 coupled with a severe drought caused by the El Nino and the presence of carcinogenic particles in the smog developed into one of the severest environmental problems of the Southeast Asian region.³⁴

The fires spread out of control and prevailing winds carried a cloud of dense pollution to neighboring countries causing record high levels of atmospheric pollution in Malaysia and Singapore. As the smog worsened, Malaysia's opposition leader, Lim Kit Siang, moved an emergency motion and Malaysian Environment Minister criticized Indonesian officials for their lack of effective action. Singapore's Environment Minister also politely expressed discontent with Indonesia's ineffective control measures.³⁵ Severe forest fires may recur in Indonesia unless Indonesia changes its way of development, and the resulting haze would continuously generate political tensions between Indonesia and its neighboring countries.

As noted, deforestation is a major cause of soil erosion, farmland loss and poor water quality generating natural disasters and resource access problems. Since nearly 50% of Southeast Asia's original forest cover has been destroyed, and the rate of deforestation in East Asia is the highest in the world,³⁶ the possibility of inter-state conflict especially on haze, and access to food and water need to be controlled in advance.

(d) Air and Marine Pollution in Southeast Asia

³³ Alan Dupont, "The Environment and Security in Pacific Asia," *Adelphi Paper 319*, (IISS, 1998), p.11.

³⁴ Ibid., p. 12

³⁵ Ibid., p. 13

One of the major environmental problems that accompany rapid industrialization is air pollution as a byproduct of increasing energy consumption. Rapid increase of energy consumption without due control of the fuel quality and consumption process generates increasing amount of SO₂, NO_x, and CO₂. China and several ASEAN countries being regarded as in the take-off stage of economic development reveal such a problem. Moreover, East Asia is projected to account for more than 50% of the world's incremental increase in carbon dioxide and sulphur dioxide in the near future.³⁷

Emissions of air pollutants from China, Thailand, Malaysia, and Indonesia have been increasing very rapidly, and due to high population density and adjacency of the countries in the region, emissions from these countries will spill over to other countries.³⁸ However, reflecting prevailing westerlies and different levels of pollution control in Southeast Asian countries (including China), advanced countries like Singapore and countries located in the east will be more susceptible to the problem. However, for trans-boundary air pollution to develop into a matter of serious political disputes in Southeast Asia, public awareness of the problem should also increase to the level of industrialized countries.

Most of Pacific Asia's major cities are located in coastal areas or adjacent to river systems that drain into the sea. With the expansion of the cities, coastal regions are stripped of their protective vegetation and increasing amounts of untreated industrial and human waste are pouring into river estuaries and coastal waters. Serious marine pollution is being found in the Gulf of Thailand, Manila and Jakarta Bays, the South China Sea, and the Mekong Delta. The over-use of chemical fertilizers to improve crop yields and the rapid increase of marine traffic have contributed to contamination of Yellow, East and South China Seas.³⁹ It was reported that in the mid-1980s, at least one third of China's coastal waters contained significant levels of cadmium, mercury and heavy metals, and that the situation has worsened since.⁴⁰

³⁶ Alan Dupont, "The Environment, Conflict and the Security of East Asia," p. 7.

³⁷ Gautam Kaji, "Challenges to the East Asian Environment," *The Pacific Review*, vol.7, No.2 (1994), p.211.

³⁸ Sunwoong Kim and Yoshio Niho, "Regional Environmental Cooperation in East and Southeast Asia," *Pacific Focus*, Vol..X, No.2 (1995), p. 160.

³⁹ Dupont, *The Environment and Security in Pacific Asia*, p.15.

⁴⁰ Vaclav Smil, "Environmental Problems in China: Estimates of Economic Costs," *East-West Center Special Report*, No. 5 (April 1996), p. 28, cited in Dupont, *The Environment and Security in Pacific Asia*, p.15.

In the heavily trafficked Malacca Straits, governments are concerned that a major oil spill could seriously disrupt or even close the Strait. A large scale spill and subsequent closure of the Strait would have devastating environmental and economic consequences for the contiguous states of Malaysia, Singapore and Indonesia, and also for the broader region, as a high percentage of inter-regional trade goes through the Strait.⁴¹

Given high population density, adjacency of the countries in the region, and expansion of the cities, marine pollution will likely become a matter of inter-state conflicts in Southeast Asia in the future. Since marine pollution leads to the deterioration of marine resources, it will also create resource access problems causing fierce competition among the states in the region to gain more out of finite resources.

(d) Resource and Energy related Problems in East Asia

At the center of environmental conflicts both within and between states lie the limit of earth's carrying capacity, and peoples' or states' competition to have more access to limited amount of resources being depleted. Therefore, two problems need to be dealt with to prevent such an environmental conflict from occurring. One is overpopulation and the other is the "tragedy of the commons." Against this backdrop, demographic trends in East Asia do not bode well for the environmental peace of the region. Populations in East Asia that already accounts for one third of global population are substantially increasing. By 2025, it is projected that East Asia will have about 2.5 billion people⁴² and increasing number of these people are destined to live in large cities. If over-crowding in East Asia passes the threshold point of the capacities of the natural resource base to sustain it, and the capacities of governments and other institutions to accommodate it, population growth will ultimately generate social and political conflicts especially during periods of economic volatility and recession. Overpopulation diminishes the capacity of governments to provide adequate levels of food, water and other necessities of life by reducing arable land and adding to pollution and environmental stress.⁴³ However, resource mobilization and organizing ability of discontented people will ultimately determine whether or not resource scarcity will turn into violent conflicts

⁴¹ Dupont, *The Environment and Security in Pacific Asia*, pp. 15-16.

⁴² *Concise Report on the World Population Situation in 1993: With Special Emphasis on Refugees* (United Nations, 1994), pp. 12-13.

against their own governments.

The tragedy of the commons problem generally occurs where common resources are left to be extracted by self interested actors. Obsessed with rapid industrialization, developing countries in particular tend to exploit once-considered inexhaustible resources, committing depletion of natural resources. A typical example is the declining stocks of fish in East Asia. The Pacific Ocean has served as a major source of protein for East Asians. More than half of the world's fish catch is taken in Asian waters and China, Japan, South Korea, Thailand, and Taiwan are among the top ten fishing nations in the world.⁴⁴ The Pacific Ocean is already showing signs of environmental stress from the effects of over-fishing, and coastal pollution. Unless checked, this would ultimately create scarcity problems causing many Asian nations to compete for remaining fish stocks. Competition for scarce resources often ends up with intensification of tensions among involved actors. It is expected that similar tragedy of the commons problem may occur in other resource areas such as forests, fresh water, clean air, and energy. If overpopulation and tragedy of the commons problems are coupled together in East Asia, it is very likely that environmental conflicts will be a serious security issue in the region.

Energy demand in Asia has increased enormously as the countries in the region grow rapidly, generating increases in energy use by industry, transport, and household sectors. Although the Asian financial crisis in 1997 temporarily dampened economic growth and energy demand in the region, according to one post-crisis estimate, primary energy demand in Asia will increase at an annual rate of 4-5% until 2010.⁴⁵ Since Asian countries are relying heavily on coal and oil to meet their energy demand, such environmental problems as acid deposition and emission of greenhouse gases are already quite rampant in the region. Furthermore, given growing dependence of East Asia on oil imports from the Middle East,⁴⁶ disruption of oil supply from the Middle East would have big impacts on the economies of East Asia. If East Asian countries try to transform their energy supply structure into nuclear, they will also have to deal with safety and potential nuclear proliferation problems. Considering the inter-connectedness of the energy issue in East Asia with

⁴³ Dupont, "The Environment, Conflict and the Security of East Asia," p. 4.

⁴⁴ *Far Eastern Economic Review*, March 13, 1997, pp. 50-51.

⁴⁵ D. Yergin, D. Eklof, and J. Edward, "Fuelling Asia's Recovery," *Foreign Affairs*, (March/April, 1998), p. 38.

⁴⁶ In 1997, 76% of total Asia-Pacific crude oil imports came from the Middle East. Lyuba Zarsky, "Energy and the environment in Asia-Pacific: Regional cooperation and market governance," in Pamela Chasek ed., *The Global Environment in the Twenty First Century* (United Nations University Press, 2000), p. 278.

wider inter-regional and global security issues as noted above, it would be inappropriate to deal with such energy related environmental security in East Asia within a narrowly designed regional security complex framework.

4. Regional Environmental Security Complexes in East Asia

A brief analysis of the environmental issues in East Asia in the preceding section suggests that negative externalities caused by anthropogenic environmental problems of East Asian countries do not normally extend to the wider area of East Asia as a whole. Rather, externalities tend to be limited to narrower sub-regions of Northeast Asia and Southeast Asia. If externalities extend beyond the sub-regions at all, they become inter-regional or global issues as in the cases of energy security and global warming.

(a) Regional Environmental Security Complex in Northeast Asia

Northeast Asian Regional Environmental Security Complex (RESC) is discerned in the areas of trans-boundary air and marine pollution as industrial activities of China, Korea, Japan, and Russia all affect each other's environment negatively. However, sensitivity of each country toward environmental threats vary among regional states. In the case of acid deposition, Japan and Korea are much more sensitive to the problem than China and Russia are. Three factors are involved in determining different levels of sensitivity. First, as the direction of prevailing wind is eastward, countries located on the eastern part of the region tend to become more susceptible to the trans-boundary air pollution. Second, different levels of industrialization and public awareness of the problem affect the level of sensitivity, since threat is a matter of perception and social construction. People and the governments of the developing countries tend to place highest priority on rapid economic development and lack enough resources to be allocated to environmental protection. For that matter, people would try to stand environmental difficulties rather than take them as threats. It seems that Korea and Japan are gradually approaching the point where people take environmental problems as serious threats to their everyday lives while China and Russia are still lagging quite behind. Third, environmental threat perception is partly event- and education-driven. When a big environmental accident happens, revealing dangers of environmental problems to the

public, people generally become concerned about that particular environmental issue. In Northeast Asia, acid deposition has not attracted the attention of any serious news media as any dramatic accidents are yet to take place.

In the area of marine pollution, the last two factors mentioned above are also applied in determining different levels of sensitivity. Nuclear waste dumping incident drew significant media attention of Japan and Korea making nuclear waste dumping one of top political issues in the region. However, in terms of marine pollution in general, public awareness even in Japan and Korea is not significantly high. For example, surveys reveal only moderate levels of concern by Korean and Japanese publics about marine pollution. While 66% of Japanese and 80% of South Koreans expressed "a great deal or a fair amount of personal concern about the environment," focused concern about marine issues was much lower: 43% of Japanese surveyed responded that they thought pollution of rivers, lakes and oceans was "very serious," and 49% of South Koreans expressed such concern. In Japan only 12% volunteered environmental problems as the most important problem facing the nation, with 9% in South Korea.⁴⁷

In a nutshell, RESC in Northeast Asia in the area of trans-boundary air and marine pollution is at the stage of "latent regional environmental security complex" approaching gradually to "balance of interests system." Although there have been efforts to deal with the pollution problems by establishing regimes such as NOWPAP, ECO-ASIA, or NEASPEC, the efforts have not been well known to top security policy makers let alone general public. Moreover, inter-governmental negotiation processes on regime building in Northeast Asia show a typical example of balance of interest politics. Therefore, it would be fair to say that environmental issues have not been dealt with as a serious regional security threat by Northeast Asian countries. However, as RESC in the region is approaching to "balance of interests system," and as sensitivity is much higher in Japan and Korea than in China and Russia, the potential for inter-state conflict, of which China and Russia are the sources, may become quite high in the near future.

(b) Regional Environmental Security Complex in Southeast Asia

⁴⁷ Riley E. Dunlap, George H. Gallup, Jr. and Alec M. Gallup, *Health of the Planet*, Princeton (Gallup International Institute, May 1993), Figure 1, Figure 3, Table 6, cited in Peter Haas, "Prospects for Effective Marine Governance in the Northwest Pacific Region," a paper presented at the ESENA Workshop: Energy-Related Marine Issues in the Sea of Japan, Tokyo, Japan, 11-12 July 1998, p.

Due to high population density and adjacency of the countries in the region, all Southeast Asian countries are more or less subject to trans-boundary environmental pollution. However, as most of the countries in the region are still at the stage of rapid industrialization except Singapore, environmental issues do not seem to have become a serious matter of political tension yet. However, having experienced the troubles of forest fires in Indonesia, Southeast Asian countries will continue to take the haze as one of top political and security issues in the region. As in the case of Northeast Asia, RESC in Southeast Asia is still in the stage of “latent regional environmental security complex” with some mix of “balance of interests system” in the areas of haze and oil spills. Therefore, regional security implications of the environmental problems are yet to be addressed by accidents rather than security specialists.

5. Conclusion

In East Asia, sensitivity toward environmental problems are relatively low due to lack of public awareness and limited resources to be allocated to environmental protection. Although webs of negative externalities are discerned in both Northeast Asia and Southeast Asia, environmental issues can hardly become security issues in those sub-regions, except in those areas where public sensations were provoked by dramatic accidents. In this regard, RESC in Northeast and Southeast Asias appear to be “latent regional environmental security complex,” where the threats are perceived only at the level of the regional ecosystem alone.

For environmental threats to become a regional security issue, negative externalities need to be not only perceived but also educated. In East Asia, education has been done primarily by dramatic accidents like haze and nuclear waste dumping, to be followed by increased level of public awareness on those particular issues. This pattern is quite dangerous, because threats are perceived only after damage has been inflicted. In addition, even though the level of sensitivity increases generally in the region, countries will have different levels of vulnerability towards environmental threats as they will have different policy priorities and response capabilities in terms of resource allocation to particular problem areas. The RESC analysis tells us that regional environmental threats have not been socially constructed in East Asia yet. It may take many more accidents or many more lives of fish before countries in the region move RESC out of the “latent regional environmental security complex.”

Since environmental problems in the region create webs of negative

externalities, individual countries alone cannot effectively deal with the problems. Otherwise, environmental problems will be a potential source of inter-state conflict. In addition, if the levels of sensitivity and vulnerability are different among regional states, that will also be a source of conflicts. Taking these into consideration, it is necessary to think of ways to transform RESCs in East Asia from “latent regional environmental security complex” at least to “balance of interests system,” in which states in the region will have more or less similar level of sensitivity to regional environmental problems. Then, it would be possible to build a common defense system (regional regime) against anthropogenic environmental threats based on the heightened level of sensitivity toward the environmental threats. If national interests are to be gradually redefined to include sustainable development as one of top priorities, then balance of interests system will also serve to increase inter-subjective understanding of regional environmental security among the states.

From a security perspective, states with high vulnerability will experience serious political instability if environmental threats are not effectively handled in advance. Therefore regime building will need to consider not only preventing environmental disasters but also supporting vulnerable countries if hit by the disasters. Given security implications of environmental problems, regional regimes will need to address not only pure environmental problems but security problems pertaining to tension and crisis management or early warning system as well.