FROM DUST TO TRUST
ENVIRONMENTAL PEACEMAKING IN NORTHEAST ASIA

By

Michal Vodrážka

THESIS

Submitted to
KDI School of Public Policy and Management
in partial fulfillment of the requirements
for the degree of

MASTER OF PUBLIC POLICY

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ABSTRACT

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Northeast Asia is one of the least institutionalized regions in the world, where regionalization is hindered by distrust between the states, competition for regional rivalry and a major military build up. At the same time, it suffers from severe environmental degradation that has often transboundary impacts and could lead to worsening of the existing tensions. The concept of environmental peacemaking that perceives environmental issues as potential for cooperation rather than a threat to peace is introduced as a possible way of improving relations in the region. Mechanisms of environmental peacemaking are elaborated, and a case study of regional cooperation on yellow dust storms is presented, with attention paid to collaborative efforts on both state and non-state actors' level. Finally, game theoretical insights are used to recommend a policy that would achieve more stable and effective regional cooperation on yellow dust and desertification in the future.

Dedicated to Yang Jeonglim

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TABLE OF CONTENTS

LIST OF FIGURES

ABBREVIATIONS

ADB – Asian Development Bank

DSS – dust and sand storms, also referred to as yellow dust or yellow dust storms

IEA – international environmental agreement

FAO - Food and Agriculture Organization of the United Nations

KFEM – Korean Federation for Environmental Movements

KMA – Korean Meteorological Administration

KOICA – Korea International Cooperation Agency

NGO – non-governmental organization

ODA – official development aid

PM10 – particulate matter 10, measure of quantity of solid particles smaller then 10 μm in the air, one of the main indicators used for measuring presence of dust and other airborne pollutants

PRC – People's Republic of China

TDGM – Tripartite Director General Meeting on Dust and Sand Storms. TEMM created this institution to oversee and implement joint research and mitigation efforts concerning yellow dust.

TEMM – Tripartite Environmental Minister Meeting – annual forum of environmental ministers from Korea, China and Japan

UNCCD – United Nations Convention to Combat Desertification

UNEP – United Nations Environment Programme

I. INTRODUCTION

"Arms competition and armed conflict may stimulate an ethos that is antagonistic towards cooperation among nations whose ecological and economic interdependence requires them to overcome national or ideological antipathies." The Bruntland report, 1987

The quote from the Bruntland report was referring to what we now know was the last high point of the Cold War arms race between the two superpowers. However, it could have been easily written today to describe the situation in Northeast Asia.[1] The majority of the countries in Northeast Asian region enjoyed the benefits of the world's most rapid economic growth, but at the same time suffered consequences in the form of severe degradation of their environment. The region is also one of the least institutionalized in the world, due to remnants of Cold War tensions, legacies of colonialism, and regional rivalry between stagnating Japan and a rising China.

While most of the attention, both scholarly and media, is reserved for the two flashpoints of Taiwan and Korea and for the (future) impact of rising China, the worsening condition of the environment and transboundary effects of pollution might increase the tensions and distrust in the region even further. A short list of the most pressing ecological concerns includes resource depletion; air, water and marine pollution (all closely connected to the types of fossil fuels that are used for supplying energy for the region's swift economic growth); and the disposal of radioactive and other wastes (see Schreurs and Hyun 2007: chapters 3, 4, 5, 6). For example, the declines in fish stocks in the regional seas caused increasing competition for this dwindling resource and "led to some of the most serious military disputes seen among the nations of the

[1] Northeast Asia is used here as a term for the region comprising of Japan, China, South and North Korea and Mongolia. Russian Far East is not considered in the following discussion.

region in the past half century," and are these are in turn interconnected with the unresolved territorial and exclusive economic zone disputes such as the one concerning Dokdo that continue to periodically re-appear and worsen the relations between the states (Schreurs 2007: 120). Addressing any of these environmental problems effectively will require inter-state cooperation and efforts on all sides to attempt to find remedies for what are ultimately common problems. But unfortunately this is not happening, in large part due to the competition for regional leadership and pervasive, historically based mistrust. According to Drifte (2002: 14- 17) regional rivalry "works against Japan being supported by China in taking environmental leadership in East Asia… instead, China is inclined to perceive Japan's environmental leadership as yet another indication for Japan trying (again) to dominate the region," with the outcome being a very low level of environmental cooperation in the region, in fact so low that regional efforts' results "seem almost insignificant in view of the scope and speed of transboundary degradation."

Obviously, this is not a satisfactory state of affairs, and one is tempted to simply add it to the other, more traditional causes of regional tensions and conclude that East Asia is not only "riper for rivalry" then ever before, but on course to become even more so in the future. But resignation is not the only option. Reviewing the causes and effects of regional tensions, Park (2005) called for "an alternative approach or paradigm [for] the post-Cold War Northeast Asia, where the specter of power politics and military rivalry over contending national interests has increasingly loomed large on the horizon." The aim of this paper is to put forward a case that deepening environmental cooperation in Northeast Asia represents such an alternative approach to regional international politics that has the potential to change the regional trajectory, and outline how it could be reinforced further.

First part of this paper serves to documents that the unsettling trends identified by Park (2005), particularly that the high and rising arms spending by the Northeast Asian states aiming to expand their power projection capabilities is continuing unabated. In the meantime, the perennial issues of history of Japanese imperialism and territorial disputes have not been addressed. The need for alternative approach to the regional politics is still essential. Second part shortly reviews the theoretical development of the concept of environmental peacemaking. Particular attention is dedicated to the mechanisms through which environmental cooperation can foster more cooperation, predominantly on other environmental issues but with possible spillovers into other areas, generate more trust between the states in the process, contribute to the creation of trans-societal linkages in the region, and eventually "[transform] the state institutions away from a zero-sum logic of national security and towards norms of accountability, participation and cooperation" (Conca and Dabelko, 2002: 228). It is this transformation of state that can be the answer to Park's call for changing the regional policymakers' perspectives.

In order to see whether the beneficial dynamics identified by scholars of environmental peacemaking is taking place in the region, a case study of regional cooperation regarding sand dust storms follows in the third part. This particular transboundary environmental issue was chosen because it is the most pressing environmental issue for South Korea that has pursued it in many regional and international forums, and at the same time is a severe domestic problem for China as well. Moreover, some scholars have singled out yellow dust as a case where environmental cooperation could take place more easily then in other areas. Final reason for selecting yellow dust case was that its eventual mitigation (from the point of view of non-source countries, i.e. Korea and Japan) cannot be reached without a close cooperation with China, and could be greatly hastened if their considerable financial, scientific and technical resources were

deployed in China in order to stop or even turn back the human induced desertification that is behind the recent increases in the occurrence of the dust storms in the region.

Ultimately, the case study reveals that the mistrust and predominance of national interests managed to slow down even this promising example of regional environmental cooperation, and thus diminish its peacemaking prospects (at least for the moment) as well. On the other hand, the case study also shows that yellow dust led to an unusual level of mobilization and international cooperation between NGOs in the region. Final part uses game theoretical insights to recommend a policy that would ensure more stable and efficient cooperation on the yellow dust issue in the future, and serve to increase the benefits of environmental peacemaking in the region, and alleviate the damage that the region's inhabitants suffer from the yellow dust.

Schreurs (2007: 266, 272) sees Asia as "ripe for greater environmental cooperation," and contends that "how deep the cooperation goes depends on the level of political will exhibited by governments, industry networks and civil society in the region and the availability of financial and technical assistance". Hopefully, this paper can help convince regional policymakers that giving environmental peacemaking a chance and dedicating more efforts and resources towards realizing its benefits represents a sound policy with a potential to transform the international relations in, and future of, the region.

II. RIVALRY IN NORTHEAST ASIA CONTINUES

In the few years since Park's (2005) paper was written, the worrying trends identified are continuing unabated. Realism is the prism with which regional policymakers perceive the

international politics, and increasing military power and power projection capabilities remains a priority, without regards for the security dilemma that is thus being perpetuated. Even such figures as the late progressive president of Korea Roh Muhyon did not resist the temptation of improving national security through expanding military capabilities. The modernization plan launched by his administration in 2006 sought to "increase significantly its military spending by approximately 10 percent a year between 2008 and 2020—with a focus on 'force improvement projects,'" together with a shift from army to navy and air force, due to the "future strategic uncertainty in Northeast Asia" (Feffer 2009b: 2-3).

A peek inside Roh's realist mindset was possible in 2007, at a launch ceremony of Korea's first Aegis destroyer, when he commented that "At the present time, Northeast Asia is still in an arms race, and we cannot just sit back and watch," referring to Japan's five deployed Aegis destroyers and China's construction of four similarly advanced 7 000-ton class destroyers (Korea Herald, 2007). Of course, it is exactly this kind of attitude that is responsible for sustaining security dilemmas. Never mind that Korea can never compete successfully in an arms race with its two bigger neighbors. Yet, its acquisition of weapon systems capable of projecting power far behind its borders is disturbing even for its formal allies, as Japanese analyst Takahashi (2007: 140) documents:

"If the ROK develops its navy and air force without expansion of the strategic horizons from Northeast Asia to the Asia-Pacific, the operation area of the modernized navy and air force will be assumed to be in Northeast Asia. This will cause concern in Japan that these modernized forces are actually deployed 'against' Japan."

Economic situation eventually forced president Roh to slightly reduce the planned increases to 8% in 2006 and 8.8% in 2007-8, and his successor Lee Myungbak further reduced them to 7.5% (Feffer 2009b: 3). This, however, did not prevent South Korea from raising its imports of major

conventional weapons by 61% higher in the 2004–2008 period compared to 1999–2003, and become the world's largest importer of major conventional weapons in 2007 and 2008 (SIPRI 2009).

Looking at the other participants in the regional arms build up, China remained the world's largest arms recipient, although the volume of its imports has declined dramatically since 2007 (SIPRI 2009). China announced a construction of a mid-sized aircraft carrier, and is building a fleet of five 8,000-ton class nuclear-powered attack submarines, each equipped with new nuclear tipped ballistic missiles with a range of 7200km, thus expanding its nuclear deterrent abilities. This is certainly an important development, as China did not have the submarine part of strategic triad before. China has also increased the number of submarine patrols recently. It conducted 12 patrols in 2008,

"constitut[ing] the highest patrol rater ever for the Chinese submarine fleet. They follow six patrols conducted in 2007, two in 2006, and zero in 2005. China has four times refrained from conducting submarine patrols since 1981, and the previous peaks were six patrols conducted in 2000 and 2007 … Chinese patrol rate is higher than that of the Russian navy, which in 2008 conducted only seven attack submarine patrols, the same as in 2007" (Kristensen 2009).

It's no surprise that it didn't take long from this increase in submarine activity to a tense situation to develop. In March 2009, an unarmed U.S. submarine surveillance vessel was harassed by Chinese ships as it was collecting information close to a Chinese nuclear submarine base at Hainan island, and a few months later, in June 2009, a Chinese submarine collided with an underwater sonar array towed by a U.S. destroyer. China is increasingly seen as challenging U.S. naval presence in South China Sea and around Taiwan.

Taiwan, that has to fear most the increase in Chinese military power, has managed to secure a 6.5 billion dollar U.S. arms deal (including theater missile defense system) at the end of the Bush's

presidential term in October 2008. This led to vocal mainland protests and suspension of China-U.S. military talks.

Japan, of course, has not stood idly by. On the contrary, it continues on its unsteady path towards "normalization." As far as naval power is concerned, it upped the regional ante by launching its first aircraft carrier since the Second World War. It classified the vessel as a "helicopter-carrying destroyer dedicated to anti-submarine warfare (ASW) and humanitarian/logistic support" for political reasons and compliance with the article 9 of Japanese constitution that prohibits offensive weapons. In fact, the ship could, apart from helicopters, launch vertical lift jet fighters, such as Harrier or F-35. Once again, we can trace the arms race dynamic in this case:

"Japan's decision to build an ASW pseudo-carrier was partly motivated by the growing Chinese submarine force. China has acquired eight Russian-built Kilo-class diesel subs over the past 10 years, and recent intrusions into Japanese waters by Chinese submarines have unnerved Tokyo" (Minnick 2008).

It is a finishing touch that the carrier was given a name - Hyuga - previously used on an Imperial Japanese Navy battleship that saw action in the Second World War.[2] Apart from Hyuga, Japan also launched its biggest post-Second World War submarine and continued acquiring missile defense capability. Moreover, as Samuels (2007) argues, it also expanded its naval capabilities further through the modernization of its Coast Guard. Feffer (2009a) sums up Japan's capabilities in this way: "Tokyo has built the fourth most powerful military in the world with Asia's strongest navy."

The issue of piracy around Somalia's coast afforded the three main competitors in the regional arms build up a chance at putting their blue water capabilities to a cooperative use. China's People's Liberation Army Navy dispatched two warships to Horn of Africa in January 2009,

[2] On the positive side, Hyuga is the first Japanese "destroyer" to have a female crew member.

Japan followed with another two destroyers in March and South Korea sent a single destroyer in April. As much as this seems to embody a use of armed forces in a way that does increase security for all concerned (and the world at large), Clulow (2009) notes pessimistically that it actually “represents the export of a traditional East Asian rivalry to a new part of the world.”

North Korea, while prevented from joining the fray with and ambitious naval program of its own due to the sorry state of its economy, has at least continued with developing its nuclear and missile technology, managing a successful nuclear test and a somewhat less successful long range missile launch in 2009.

Outside of the area of arms acquisition in the region, only two incidents will be mentioned to show that the traditional divisive issues are continuing to poison the relations in the region. First, illustrating the unrelenting importance of history in Japanese and regional politics is the Toshio Tamogami case. Tamogami, chief of staff of the Japan Air Self-Defence Force, was sacked in November 2008 after he won an essay competition with an entry called "Was Japan an Aggressor Nation?" that completely rejected the Japanese war responsibility, thus “rais[ing] awareness of the presence of extreme nationalist ideas in the Japanese military establishment” (Penney, 2009). Second case concerns long standing territorial dispute between South Korea and Japan over Dokdo islands. U.S. was briefly drawn in the dispute in 2008 when the U.S. Board on Geographic Names labeled the rocks as having ‘undesignated sovereignty,’ leading to a strong South Korean pressure to reinstate the previous status quo of, which President Bush has later done by an executive order. Also in 2008, Korean ambassador was recalled to Seoul after Japanese labeled Dokdo as a "disputed land" in its educational handbook for teachers.

It is clear that traditional regional disputes remain unaddressed and still are a source of powerful emotions. Moreover, whether or not actually called an "arms race," the status quo in Northeast Asia comprises of a number of states that have high military spending and aim at acquiring new military capabilities in the near future. So far, the economic downturn has failed to change the dynamics. Even in the best case scenario, meaning that none of the new weapon systems is ever used in an actual armed conflict in the region, the high and rising military spending incurs significant opportunity costs on the states involved, and do absolutely nothing to disperse the distrust and lingering suspicions about others' ultimate objectives. Is there a way that the resources of the states could be directed that would actually provide some tangible benefits, including more security and improved relations in the region? The following section will introduce the concept of environmental peacemaking and describe the two mechanisms through which environmental cooperation can improve the strategic climate between the states and eventually even transform policymakers' perspectives on international relations.

III. ENVIRONMENTAL PEACEMAKING AND ITS SPILLOVER EFFECTS

According to Buzan (1997: 7), environment entered the security discourse in 1960s, when scholars first pointed out that "humankind was transforming the natural environment from a background constant into a foreground variable." This concern was two pronged: about preserving the state of nature as it was before human activity disturbed it, and about the implications of people exceeding the capacity of ecosystem to support it. Buzan himself argued

for widening the concept of security, but was skeptical about possibility of coherent conceptualization of environmental issue (1997: 9).

Until fairly recently, environmental issues figured in international relations predominantly in the form of environmental conflict theory. This theory claims that increasing resource scarcity and environmental degradation contribute to violent inter- or intrastate conflict. Hagmann (2005: 6) gives an overview and critique of the discourse. He identifies a volume edited by Arthur Westing in 1986 as an early example of an “attempt at extending conventional security thinking to include other issues such as environmental change and resource depletion” that "mobilized academic and political stakeholders alike.” Indeed, just one year later, in 1987, the report Our Common Future (usually referred to as the Bruntland report) “called for a broader conception of security that included instability caused in part by environmental factors” such as climate change, loss of arable land, fisheries, and water, and served as legitimizing this new avenue of inquiry into the sources and causes of conflict (Dabelko, 2008: 34 - 35). In the early 1990s, focus of the research turned to “demonstrating and typifying causal mechanisms between resource scarcity and physical violence” by examining cases of what were suspected to be environmentally induced conflicts, and later to the use of quantitative models and to the refining of existing environmental conflict models (Hagman 2005: 9).

A radical departure from this conceptualization of links between environment and conflict was undertaken by Conca and Dabelko in 2002, when they coined the term “environmental peacemaking” in a volume with the same title that they edited together. They reversed the concept of environmental security as it was understood until then, and instead of focusing on whether environmental degradation can lead to conflict examined a number of cases in order to find whether regional environmental cooperation can serve as a catalyst for regional peace and

stability. Their goal was to convince states and other actors "who have not been aggressive about environmental cooperation to be somewhat more so, by pointing to credible possibilities of peacemaking spin-offs, if they are willing to act to realize them" (p.15). They outlined two mechanisms how environmental peacemaking could promote peace that are working on different levels, and stressed that both must be employed simultaneously.

First, on the inter-state level, regional environmental cooperation leads to the changing of strategic climate by "transforming the more immediate problems of mistrust, uncertainty, suspicion, divergent interests and short time horizons" that characterize conflict-prone situations by enabling and fostering "trust, transparency and cooperative gain" between the sides, lowering barriers to cooperation on other issues (p. 10). The key is the nature of environmental cooperation, as the inescapable reality of environmental interdependence leads to "long-term need for iterated interaction [that] can be used as the basis for confidence building rather than merely engendering conflict" (Dabelko 2008: 41). In order to maximize peacemaking potential of environmental initiatives, environmental concerns that "engage the sustained attention of state actors on the highest level" should be chosen for environmental peacemaking (p.222 ~223). Although this kind of cooperation may be more difficult to achieve, its transformative impacts on the strategic climate would be bigger.

Second, regional environmental cooperation allows the creation and strengthening of trans-societal linkages among non-state actors cooperating outside of formal channels, leading to the emergence of a "shared collective identity within which violent conflict becomes inconceivable," and eventually to the transformation of "opaque, security-minded institutions" of the states themselves (p.10). In other words, it eventually leads to what Park (2005) called for: the "states

and their policymakers switch their realist assumptions [and] redefine their [myopic] self-interests."

With regard to the issue of environmental cooperation initiating this transformation of "state institutions away from a zero-sum logic of national security and towards norms of accountability, participation and cooperation," Conca and Dabelko identified two tendencies in their case studies. The states were either "forced to or [chose] to embrace … 'sovereignty bargains,' in which aspects of autonomous control are ceded in favor of the benefits of functional cooperation," or there was "a lingering mentality of realpolitik, paranoia and related competitive efforts to control information," and sometimes both contradictory tendencies were present simultaneously (p. 228).

Although Conca and Dabelko remained cautious about the potential of environmental peacemaking, they stressed the usefulness of the concept in the closing chapter:

"We cannot conclude that environmental cooperation causes peace. We remain convinced, however, that certain forms of environmental cooperation could be extremely useful tools in the hands of peacemakers. ... The key is not environmental cooperation per se, but rather specific forms of cooperation that are designed to build a habit of cooperation, transform interstate bargaining dynamics, and deepen peaceful trans-societal linkages conducive to peaceful cooperation (2002: 230)."

Carius (2007) further elaborated how environmental cooperation - what he termed environmental peacebuilding - contributes to conflict prevention and enhances cooperation between states. He points out that the unique characteristics of common environmental challenges can function as a beginning for dialogue between conflicting parties even when other issues cannot sustain an ongoing dialogue and produce cooperative solutions. Hostile relationships can be transformed when distrust, suspicion, and divergent interests are replaced with a shared knowledge base and common goals due to common environmental challenges. Like Conca and Dabelko, he highlighted the longer horizons and involvement of other societal actors that characterize

environmental cooperation: “the solutions to transboundary environmental problems require a long-term perspective, encourage participation by other non-state actors such as local and nongovernmental organizations and thus help to build administrative, economic, and social capacities for action” (p. 63).

While Conca and Dabelko see some minimal level of inter-state cooperation as a basis for emergence of trans-societal linkages, Carius directs attention to the cases where dialogue is difficult to initiate through official political channels, but where “social interest groups can use [the] mutual ecological dependence to facilitate cooperation across territorial borders” (p. 63). Another distinctive quality of environmental cooperation he emphasizes is its less contentious character vis-à-vis other mutual dependencies. Where economic and financial interdependence can also lead to unequal distribution of its outcome and result in polarization, “environmental cooperation is a serious option for building cross-border collaboration at a level removed from the narrow and frequently divisive sphere of economic relations,” has often win-win character and “can provide initial impetus for broader cooperation between conflicting parties” (p. 64-65). Carius concedes the predominance of foreign and security policy considerations over the environmental ones, but maintains that environmental peacebuilding “could still be a part of a comprehensive regional strategy for building and consolidating peace together with promoting cultural, economic, and social development” (p. 66).

To sum up, the concept of environmental peacemaking was theoretically developed recently and is supported by some empirical evidence, mainly from water cooperation (such as water basin management agreements) and nature conservation (establishing peace parks) case studies. Environmental cooperation can, through building of trust, transparency and initiating and fostering habit of cooperation between the states lower barriers to cooperation on other issues. It

has to be noted here that the spillover effect into other, non-environmental issues is usually very limited. Environmental cooperation also engages non-state actors in cross-border activities resulting in capacity building and creates common bonds that transcend economic polarization and state centered identities. Ultimately, it can even lead to the transformation of national security state and its foreign and security policies.

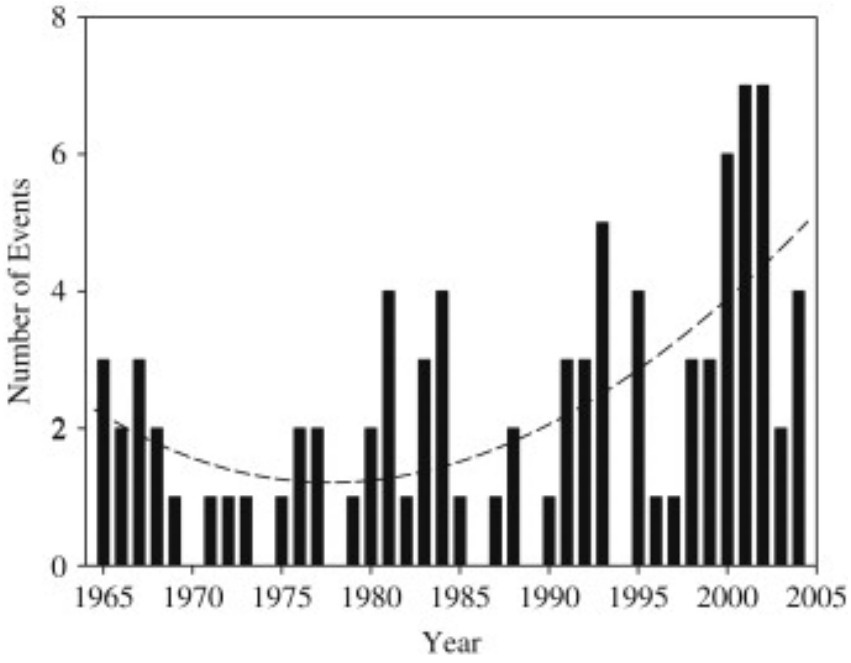
The following part of the paper presents a case study on environmental cooperation in Northeast Asia, in order to explore whether the beneficial dynamics identified by scholars of environmental peacemaking is present in the Northeast Asian region. The yellow dust issue was chosen because it does engage the attention of states at the highest levels, is the most pressing transboundary environmental issue for South Korea and in fact the region as a whole, and cannot be addressed comprehensively without close cooperation with China. First, the origins, trends and impacts of yellow dust are explored, and following that the regional reaction on the inter-governmental and trans-societal levels is examined.

IV. YELLOW DUST: ORIGINS, TRENDS AND IMPACTS

Yellow dust, also known in the North East Asian region as *hwangsa* (in Korea), *kosa* (in Japan) and *shachenbao* (in China), is the name given to the massive dust storms that occur when large quantities of sand from the deserts in China and Mongolia are picked up and carried by westerly winds toward Pacific, with severe socioeconomic impacts on, and public health consequences for, hundreds millions of people. Since the 1950s, the frequency of Asian dust storms has increased five times, while their intensity has also grown (APCN 2005: 2). To illustrate the increase in

occurrence of dust storms, following graph charts the “yearly variation of Asian dust events observed in Seoul during the years 1965–2004, with the dashed line in the figure indicating linear regression of the observed dust events” (Kim 2008).

Figure 1 Occurrence and trend of yellow dust events in Seoul, Korea 1965 - 2004



Source: Kim 2008

The increase in frequency predicted by the linear regression above was borne out by reality since 2004, as this quote from Chosun Ilbo (2008) documents:

“Sandstorms hit the Seoul area for three days in 2003 and six in 2004, but since 2005 they have plagued the capital for 11 to 12 days per year. According to the KMA, yellow dust was detected for a mere 3.9 days on average each year during the 1980s. That figure increased to 7.7 days during the 1990s and to 12.8 days in the 2000s.”

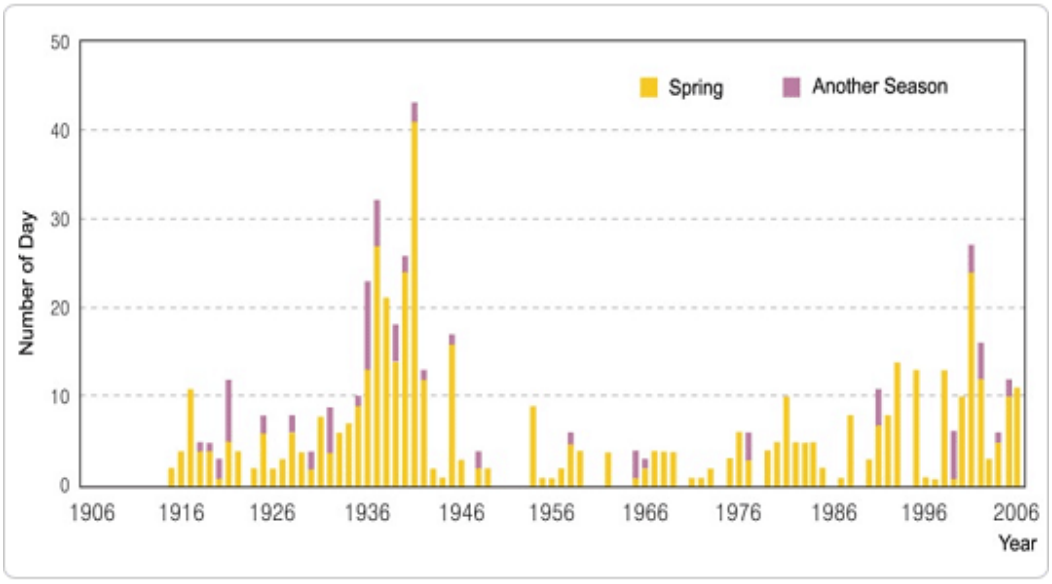
This recent increase in occurrence and severity of the dust storms is linked to anthropogenic changes in northern China and Mongolia, specifically to overgrazing, deforestation, and water diversion to farmland and reservoirs that lead to land degradation and ultimately to desertification (Chen et al. 2009, Brettel 2007, Yamamoto 2007).[3] These recently desertified lands are the prime cause of the recent increase in dust storms. Although the Chinese government dedicated tremendous resources to address the problem, with the first programs starting in the late 1970s, it has so far been unsuccessful in halting the spread of deserts and resulting increase in yellow dust storms (Chen et al, 2009: 415), while Mongolia simply lacks the resources to address the problem at all.

Moreover, some environmental trends suggest that the incidence of yellow dust storms will keep increasing in the future, the efforts to curb them notwithstanding. Obvious candidate is the global warming effect that "increases temperature, and defrost soil early in the spring," but also the "over-consumption of water [that] decreases the ground water level and makes the surface soil loose and dry" (Guo et al. 2005: 2). Unfortunately, the impact of the unsustainable use of ground water in the water scarce northern China is not limited to furthering desertification. It will also make stopping or reversing desertification even harder in the future, as re-vegetation, on of the primary means of combating desertification, requires a great quantity of ground water that is at the moment already (over)used for agriculture. An example of what might be the consequence of conflicting uses for too little water is described by Wu et al. (2008: 855): a village in China where the decline in the water table "in the period 2001-2005 due to the over-pumping for agriculture" led to drying up of some of the previously afforested areas around the village.

[3] The specific contributions from different human activities are disaggregated in Futrell (2007), who cites a 2003 Chinese analysis that attributed "over-cutting for firewood (32 percent of total anthropogenic desertification); overgrazing (28 percent); over-cultivation (25 percent); and the construction of industrial projects such as mines and oil felds (9 percent)."

Interestingly, when the yellow dust phenomenon is put into longer historical context it is apparent that a major increase in frequency has happened roughly sixty years before recent increase. Following graph, from the Korean Meteorological Administration, shows the occurrence of yellow dust events in Seoul from 1910 to 2006 (during Korean War years, 1950 – 1953, no data was recorded).

Figure 2 Occurrence of yellow dust events in Seoul, Korea 1915 - 2006



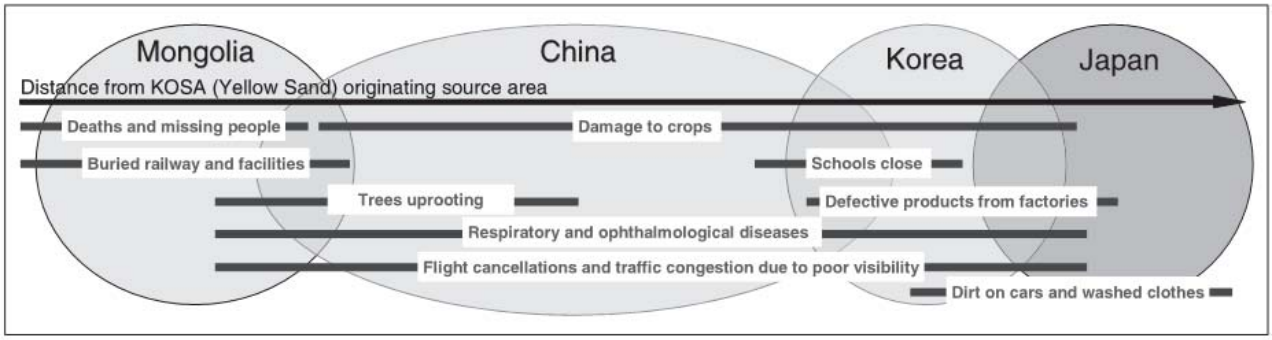
The occurrence of dust event days in Seoul from 1915 to 2006.

Source: Chun and Cho 2003

It is clear that the number of events was higher in the late 1930s than in the recent times. This is attributed to a period of warm weather in Northeast China in the 1930s and 1940s (Chun and Cho 2003). Taking an even longer time horizon, Chinese expert Lu Juntian from State Climatic Center stated that “There have been five periods with high frequencies of sand storms in China over the past 1 700 years, with each period lasting about 90 years,” and that China is probably about to enter a new period of frequent sand storms (China peoples daily, 2000).

The type and degree of damage inflicted by the yellow dust varies along the path as the dust storms travel (see figure 3 below).

Figure 3 Types of damage caused by yellow dust in different countries



Source: Yamamoto 2007

In the source areas of China and Mongolia, yellow dust takes the form of severe dust storms that are able to cover landscape with so much dust that it damages (or even causes collapse of) buildings as well as buries roads and railways or fells electric poles. The moving mass of dust also knocks down trees, damages greenhouses, and buries fields, orchards and livestock causing losses in agriculture. To imagine the tremendous havoc a single major storm can cause, consider the extent of damages from a storm that took place in March 1993 and ravaged four northern Chinese provinces. According to the Chinese Academy of Forestry Sciences, it led to deaths of 85 people and injured 264 more, destroyed 4400 homes, killed 120 000 heads of livestock and ruined 5.7 million acres of crops (Futrell 2008). Estimated direct damage totaled 560 million Yuan, or about $64 million at 1993 exchange rate (Yamamoto 2007: 50). More recently in Mongolia, a severe storm in March 2002 storm covered 67% of the total territory of Mongolia,

killing 3 people and 53 000 heads of cattle, damaging 83 houses, and destroying 24 communication lines and 6 power towers. The direct economic loss was calculated to be in excess of US $2 million (Enkhbat and Gurdagva: 2007).

The impacts of yellow dust differ in the non-source countries, Korea and Japan, depending on the distance from the source regions. As (South) Korea[4] is closer to the source regions than Japan, the socioeconomic impacts are more severe there. They include losses due to closed schools and airports, additional costs on manufacturing due to more frequent exchanges of filters, higher number of defective products or even suspension of operations in semiconductor and other manufacturing plants that require clean, dust free air for operation, and extra washing of cars destined for export markets awaiting loading in ports. Apart from closed airports, which happen only rarely, other costs in transport include for example more frequent cleaning of airplane engines. Finally, there are losses in agriculture due to crop damage, and in food processing due to the extra washing of produce.

There are also worries about the possible public health impacts of yellow dust. Apart from "increased incidence of eye, nose, and throat irritation and asthma," there are worries "about the development of pneumoconiosis, a non-industrial version of silicosis, putting citizens at greater risk of tuberculosis, heart disease, and lung cancer" due to the long term inhalation of the fine quartz dust particles (Futrell 2008). As the dust is blown over North East Asia, it picks up pollutants (heavy metals such as lead, cadmium, arsenic, iron, and manganese, and other toxic

[4] North Korea, of course, is even closer than South Korea, and impacts are therefore bound to be more severe. Information is, as usual, scarce. One of the few available pieces of information was reported by KBS radio in 2006: "North Korea says the incident (sic!) of yellow dust storms has grown dramatically since 2000, damaging the nation's public health, agriculture and economy. An almanac published by the North's official Korean Central News Agency said … that the higher frequency of the yellow dust phenomenon decreased sunlight exposure ten percent and dropped the average daytime temperature two or three degrees."

chemicals like sulfur and dioxin) from Chinese industrial regions. This polluted dust then increases pollution levels and raises health hazards from inhaling it in the places where it settles:

Korean and Japanese scientists have studied the concentration levels of these and other metals before, during, and after dust and sand storms from China, finding concentration levels dozens of times higher than normal. Korean scientists now maintain that dust and sand storms raise mortality rates from cardio-vascular and respiratory causes, and may even damage human DNA through oxidative damage (Futrell 2007: 59).

Finally, additional health risks stem from the ability of dust to carry fungi and microbes, leading to the danger of transboundary spread of diseases.

An example of an effect of a severe yellow dust storm that took place in the spring of 2002 on Korea follows. The storm caused the density of dust, measured as PM10 (particulate matter of the size of 10 micrometers), in Seoul to reach 2 266 µg/m3, resulting in the first issuance of a school closure order, shutting a total of 4 949 kindergartens, elementary, middle, and high schools. Additionally, poor visibility caused the cancellation of 102 flights, and precision equipment factories had to be shut down. The government advice to limit staying outside notwithstanding, hospitals saw a sudden increase in patients with respiratory, dermatological, and ophthalmological problems.

Japan, being the farthest from the source regions, is affected the least, mostly in the form of air pollution from particulate matter (i.e. fine dust suspended in the air), poor visibility that interferes with air transportation, and dust particles sticking to cars and washed clothes. Obviously, the need to wash cars more often is not going to mobilize the population to such a degree as the graver effects yellow dust has elsewhere in Northeast Asia, leading to a lower level of public interest in the issue then in China and Korea (Yamamoto 2007: 50).

The combined economic impacts of all these various impacts on the region are, unfortunately, not yet clear. Using only direct costs means, of course, considering only a small portion of yellow dust's overall impact. According to Asian Development Bank study (ADB 2005) "indirect costs of damages by DSS are believed to be in the neighborhood of 4.5 times more that of the direct costs," and "the costs of damages associated with DSS in PRC alone are estimated to range from US$70 million to US$239 million per year." The estimates cited by ADB seem to seriously underestimate the total economic impact. As Guo et al. (2005) explain, systematically evaluating the whole socioeconomic impact of yellow dust is difficult and was actually not yet conducted in China. Ai (2004), using input-output model, estimates the total economic impacts of yellow dust on Beijing region alone, in the year 2000, to be around US $1.68 billion, equaling 2.0% of Beijing's GDP in that year. The few other estimates that have been made also go into billions. According to the United Nations Environment Programme (UNEP), the Asian dust storms account for a combined economic loss of US$6.5 billion a year (APCN 2005: 2). The state-sponsored Korea Environment Institute has a more pessimistic view: annual economic damage to South Korea alone is between US $4.47 billion to $5.86 billion (roughly 0.46% to 0.6% of 2007 GDP), and up to 165 South Korean die with as many as 1.8 million falling ill every year (Reuters 2007). Similar figure was reached by South Korea's Business Institute of Sustainable Development that put the cost in lost productivity that occurred in 2007 as a result of yellow dust from China at $5.5 billion (Snyder 2008: 9).

Clearly, yellow dust is a serious transboundary environmental issue in Northeast Asia. Although the total impact remains as of yet unquantified, they are in any case severe. Combined with the tendency of dust storms to intensify in both frequency and scale, yellow dust represents one of

the most pressing environmental challenges in the region, particularly for South Korea. Next part will examine the inter-governmental responses to this environmental issue.

V. INTER-GOVERNMENTAL RESPONSE TO YELLOW DUST

Due to its transboundary nature and rising impacts, yellow dust led to bilateral and multilateral cooperation among countries in the region. Before examining what the states attempted and achieved, a brief review of theories of international environmental cooperation and their applicability to regional air pollution issues, of existing transboundary air pollution regimes, and of the literature that already analyzed the Northeast Asian cooperation on yellow dust is in order.

In the most general terms, the explanations of interstate environmental agreements, or what are called environmental regimes, fall into three broad categories (Ringius 2001: 7-9). First is the power based approach, based on the realist paradigm that explains the emergence of regimes as acts of the hegemonic powers and changes in the regimes as a result of shifts in the power capabilities of states. The second, interest based approach, posits that self-interested states are maximizing their returns in the process of bargaining that creates or modifies the regimes. In the case of environmental regimes, states conduct a costs benefit analysis of "ecological vulnerability and economic abatement costs" that then defines their interests and environmental foreign policies, and eventually the success or failure of environmental regimes (Kim 2007: 442). Finally, the knowledge based approach reasons that states need specific knowledge in order be able to define their interests and preferences that they will subsequently pursue through negotiations, and therefore the non-state actors able to supply such knowledge play a vital role in

regime creation. These non-state actors are usually conceptualized as epistemic communities – "knowledge based transnational networks of specialists" (ibid.).

When it comes to the specific issue of regional environmental agreements addressing transboundary air pollution, the power-based approach does not seem to have much explanatory power. The air pollution is a direct by-product of economic development and rises with economic growth. Therefore a modern hegemon, whose power is derived from its economic might, would under the assumptions of power-based approach oppose a formation of a regime limiting air pollution, as it would weaken its power capabilities and hegemonic position. An example is the U.S. refusal of the Kyoto protocol. Therefore, the power-based approach is not very useful for explaining the regimes that were actually created, particularly as one of them involves a hegemonic power – the U.S itself (see below). Indeed, Kim (2007) does not even mention the power-based approach as a possible explanatory framework in his comparison of European and Northeast Asian cooperation on transboundary air pollution in the form of acid deposition, and uses only the interest based and knowledge based approaches in his analysis.

Currently, only two international regimes addressing transboundary air pollution exist (Schoenbaum 2006: 212-214). First one, the Acid Rain Program between the U.S. and Canada took ten years to negotiate and was finally initiated in 1991. Its provisions include reduction of, and caps on, the acid rain causing emissions, and a bilateral monitoring mechanism. Second one is the European Geneva Convention on Long-Range Transboundary Air Pollution from 1979. In this regime, a permanent body to monitor compliance was set up, and the successes include progress from non-obligatory to binding protocols setting reductions, including an "innovative critical loads approach which sets different reduction targets for different areas based upon actual

mapping of sulfur oxide deposition patterns and sources" to protect health and environment "without entailing excessive cost" (p.214).

Turning to the literature pertaining to the Northeast Asian yellow dust cooperation, two scholars have recently examined the issue and made somewhat different predictions for the future. Drifte (2003) has covered the issue of monitoring and mitigating yellow dust just to the moment of its multilateralization when South Korea managed to put it on the agenda of the annual Tripartite Environment Ministers Meeting (TEMM) between Korea, China and Japan. In general, Drifte sees the nascent environmental cooperation in the region as a hostage to the rivalries between the states and particularly hampered by the quest for regional hegemony that is taking place. For Japan, environmental official development aid (ODA) is a way of improving its relations with neighbors and a tool for its aspirations to regional leadership. China wants to maximize the benefits it receives from ODA without binding agreements, and is opposed to Japan becoming environmental leader of the region. Korea, once again the "shrimp between the whales," is limited by the meager resources it can deploy in support of its regional diplomacy, but at the same time exposed most to the yellow dust, so it became the "most eager promoter of regional approaches… in order not to be totally sidelined" (p.7). Drifte concludes that although environmental cooperation on regional level "is very much dependent on the general climate of regionalism in Northeast Asia … the inescapable need to address transboundary pollution at [regional] level (for physical circumstances as well as resource limitations) can promote regionalism and provide a learning environment" (p.17).

Brettell (2007: 98-104) is more optimistic. She investigated both the bilateral and multilateral cooperation up to the year 2006, judged China to be a "willing participant" in the development of yellow dust monitoring network, and stated that this is not surprising given that "efforts to

mitigate the dust storms overall do not conflict with China's development goals and to some degree even contribute to China's political goals in Inner Mongolia and Xinjiang." On the other hand, she notes that Chinese authorities remain very sensitive about in-depth, in-country research into the causes of grassland degradation and dust storm formation. But the fact is that the development since 2006 is more of a mixed bag, and her optimistic view was not completely borne out by reality, as the following detailed description of the regional cooperation will show.

Bilateral cooperation preceded multilateral in the region. First, though, China's resistance to identifying yellow dust as a regional problem had to be overcome. China is extremely sensitive about being viewed as the major source of transboundary pollution and of any infringement into the setting of its political and economic priorities that might result from this, and accordingly "Chinese scientists have for a long time disputed that the sand originates from China" (Drifte 2003: 13 - 15). Therefore, first bilateral initiatives were aimed at promoting research into the causes and movements of dust storms and taking form of joint monitoring, helping to form a clearer understanding of the problem before more robust cooperation could take place.

The Japanese Environment Ministry started helping China with monitoring in 1996, when a monitoring station was established at the Sino-Japan Friendship Center for Environmental Protection in Beijing. From 1998 joint monitoring has been conducted in Ningxia, complemented by sampling in Dunhuang and the Taklimakan desert from August 2000, and this was crowned by an agreement on research into the formation, transport and effects of sand storms in October 2000 (Drifte 2003: 10). This led to the establishment of a monitoring network in northeastern China (six stations) and Japan (three stations) in February 2001, with continuous monitoring throughout the year and the data sharing through the internet on real time basis (ADB 2005).

Korea was no less involved then Japan in the early stages of bilateral cooperation with China. Its first project was initiated in 1996, lasted until 2002 and concerned joint research of prevention and control of desertification. It continued by experimental revegetation projects using drought resistant trees and grasses on two sites in western China from October 2002. Larger scale afforestation projects were initiated in 1998 when the two countries agreed to pursue cooperative projects in China for combating desertification. In October 2000, the Korean side set aside US$ 5 million for the next five years for support of the afforestation efforts in western China. Korea International Cooperation Agency (KOICA - Korean ODA agency) was put in charge of implementation, and supported tree planting programs on almost 10 000 hectares in five different areas suffering from desertification by providing a little over half of the required budgets (see figure 4 on next page). Additional afforestation project, whose roots lie in an offer made by Kim Daejung in November 1998, started near Beijing in 2001.

Figure 4 Korean afforestation projects in China, 2001 - 2005

Target area		Area (ha)	Period	Budget (thousand US$)	
				Korea	China
Desertification prevention	Tongliao, Inner Mongolia	3, 000	'01 ~ '05	1, 000	720
	Baiyin, Gansu province	1, 540	'01 ~ '05	1, 000	1, 880
	Tulufan, Xinjiang province	1, 200	'01 ~ '05	1, 000	800
	Pingluo, Ningxiahuizu province	1, 000	'03 ~ '05	1, 000	about 500
	Xiuwen, Guizhou province	2, 728	'03 ~ '05	1, 000	about 1, 000
Miyun reservoir water conservation forest, Beijing		500	'01 ~ '03	1, 000	870

Source: Youn 2003

The multilateral (in fact trilateral) cooperation was initiated through a regional environmental ministers' meeting after a consistent Korean pressure to address yellow dust as a regional problem. Although the first TEMM took place in 1999, the yellow dust issue was not addressed at all until the 3rd TEMM in 2001, where "the Ministers agreed on monitoring through remote sensing equipment, training and research, but no monitoring was concretely undertaken" (Drifte 2003: 10). The absence of any tangible efforts before 2002 can be by and large ascribed, as Drifte noted, to the Chinese efforts to avoid being seen as responsible for the dust storms. Indeed, as a 2002 Chinese newspaper article heralding the signing of a regional cooperation deal explains, "China has not introduced the issue to the TEMM by insisting that it is a natural disaster, and Japan, which has relatively lesser damage than South Korea, has been passive to this issue" (China peoples daily, 2002).

It is probable that the record breaking dust storms of 2002 helped to change Chinese leadership's mind about the benefits of international cooperation. Additional reason might be that China launched its national forecasting and early warning service for severe dust storms in 2001 and Korea followed suit in 2002. The incentives of obtaining foreign technology and knowhow (China) and data needed for forecasting (Korea) thus played a role, too.

It is important to understand the crucial role that the access to Chinese yellow dust monitoring data plays in this case study. As a study by ADB (2005) explains, although all the countries in the region are members of the World Meteorological Organization (WMO) network and "have agreed to a free and unrestricted international sharing of meteorological data and products," these "are far from being adequate to analyze and predict a complex phenomenon like [yellow dust]," and besides supply data mostly from urban regions that are not very helpful at forecasting yellow

dust movements. On the other hand, real time data[5] collected in the source and transportation route regions are "essential for early warning services," as they allow both immediate improvement in the precision of forecasting like "predictions about [yellow dust] paths, transit time, duration and severity as well as the geographic extent," and long term improvement of the forecasting models through their comparison with accumulated data.

The 4th TEMM in April 2002 represents a major breakthrough and the beginning of some important developments. First, the three countries agreed to establish a joint yellow dust monitoring network, where "South Korea was to receive Chinese government yellow dust monitoring data, collected from 25 ground observation sites, 1 ground radar base, and 3 satellites, on a real time or slightly lagged basis, to allow precise forecasting of the storms and their routes and thus be able to issue warning in advance and minimize damage" (China Peoples Daily, 2002).

Second deal reached at 4th TEMM was a decision to strengthen the bilateral cooperation between China and Korea by launching the Korea-China Joint Monitoring Network for Sand and Dust Storms. The two countries agreed to work together to launch a joint sandstorm monitoring network of five stations to be operated during the dust storm season from February to May, splitting the costs of $1.2 million equally. Three stations were to be placed in the source region of eastern China (Jurihe, Tongliao, Yushe) and two (Huimin and Dalian) in the dust storm paths.

Last but not least, the three environmental ministers decided to involve international organizations in the process of coping with the challenges arising from sandstorms. Thus in June 2002 the three governments, joined by Mongolia, another country suffering from the dust storms

[5] The methods used for measuring dust concentration and movement are visibility range, TSP (total suspended particulate) which is a measure of quantity of particulate matter of any size in the air, PM10 concentration that measures quantity of dust particles smaller then 10 µm in the air, and LIDAR (light detection and ranging), a kind of radar that provides vertical profile of dust cloud from surface up to 6km in the atmosphere.

and a major source of them, requested assistance of the Asian Development Bank, United Nations Environment Programme, UN Economic and Social Commission for Asia and the Pacific, and the UN Convention to Combat Desertification (UNCCD) to jointly develop an expanded version of a regional technical assistance program already in place for China and Mongolia. Financing was obtained from ADB and Global Environment Facility and implementation commenced in 2003 with the aim of promoting the establishment of a regional cooperation mechanism for the prevention and control of dust and sand storms in the region.

In the yellow dust season immediately following 4th TEMM, in March 2003, the three countries undertook the first joint monitoring of the movement of the yellow dust, sharing data from 12 locations that included Beijing and Dunhuang in China, Seoul in Korea, as well as Fukuoka and Nagoya in Japan, and using them for improved forecasting. But just one year later, in 2004, Korean Meteorological Administration (KMA) had to resort to sending one of its meteorologists to China to get access to the yellow dust data. KMA spokesperson explained that "China has built up sand dust observation networks, which send data only to the Chinese Meteorological Bureau. Since the data on sand dust is not available in Korea, a Korean forecaster has been sent to China to secure the appropriate information and send it back to the KMA" (KBS 2004).

In March 2005, the five observation posts from the China-Korea joint monitoring network were finished and started supplying data to Korea. This success led to a furthering of the bilateral cooperation when in June 2005 the respective ministers of environment signed another agreement, Ground Monitoring and Information Exchange for Dust and Sandstorms, aiming to expand Korea's access to Chinese data further. China was to provide Korea with yellow dust data from 6 out of its 43 observatories specifically set up to measure the dust, located both near the origin areas and on the dust's transport routes toward the Korean Peninsula. The data was to

be shared from first through email with a four hour lag, and after necessary modifications real time sharing was to start in 2008. Korea was to invest US $ 563 000 through KOICA to develop the system, and China to take care of the operating costs (MOE 2005: 42).

In the meantime, the involvement of international organizations in the regional cooperation produced results in early 2005, when ADB published its Regional Master Plan for the Prevention and Control of Dust and Sandstorms in North East Asia. It was composed of two components: "a phased program to establish a regional monitoring and early warning network for DSS[6], and an investment strategy to strengthen mitigation measures to address root causes of DSS in source areas" (ADB 2005). At 7th TEMM in October of the same year the three countries expressed the will to develop the both the early warning network and recommended demonstration projects.

Meanwhile, Korea continued to expand its bilateral cooperation with China. In spring 2006, Korean Meteorological Administration announced its plans to extend the Korea-China Joint Monitoring Network for Sand and Dust Storms project by building five more monitoring stations in China, bringing the total to 10.[7]

By January 2006, following the ADB master plan, a "total of 19 monitoring sites, 15 sites in China and 4 sites in Mongolia, have been established [and operative] with financial support from the government of Japan" (TEMM 2009: 66). In order to start the regional network envisioned

[6] DSS stands for "dust and sandstorms," and is equivalent in meaning to yellow dust. As every country has a different name for the phenomenon, a neutral term had to be agreed upon. DSS is now used by governments and international organizations, while media tend to use the traditional names.

[7] Moreover, KMA even decided to try to involve North Korea by proposing a construction of two automatic stations in the areas of inter-Korean cooperation at Kaesong Industrial Complex and Mt. Keumgang resort. After KMA cleared this plan with the Unification ministry, negotiations with the North took place and their successful conclusion was announced in the spring of 2007. The observation stations were installed later in 2007, but the exchange of data was suspended in 2008 as the relations between the two Koreas worsened. Previously, effort has been made to engage DPRK in the nascent regional cooperation on yellow dust by inviting participation by DPRK in Senior Officials Meeting to prevent and control DSS in Northeast Asia that was held as a special session at the 5th TEMM in December 2003 in Beijing.

by ADB, Japan, China and Korea decided at 8th TEMM (December 2006) that they will start holding Tripartite Director General Meetings on Dust and Sandstorms (with Mongolia's participation) to discuss concrete measures to address the yellow dust problem, including the establishment of a joint research group.

The high point of regional cooperation was reached in January 2007, when the three TEMM states and Mongolia decided to start yet another joint monitoring project to observe and forecast yellow dust movements. This was supposed to become the predecessor of regional monitoring network proposed in the ADB plan, using data from observation sites in all four countries and putting to use the observation sites newly built in China and Mongolia with Korean and Japanese help. Unfortunately, the plan did not get off the ground as planned.

In April 2007, just before the start of a test run of the rudimentary regional monitoring network, China unexpectedly notified Japan and Korea that it refuses to provide data[8] from the observation sites on its territory, citing a recently enacted a law[9] that designated weather observation data as a state secret and prohibited their providing overseas (Yomiuri Shimbun, 2008). This incident led Snyder (2008: 5) to comment that although yellow dust had

[8] In fact, this is not the first time that getting China to share some of its data proved difficult. Recall the South Korea - China agreement from 2005 to establish six yellow dust monitoring stations in central China. When Korea, eager to get the plan of the ground, offered to help finance construction costs in return for real-time data on dust levels and wind movements, "China did not make a formal response to the proposal, citing a time-consuming internal coordination process involving its many different government offices" (MOE: 2006). Eventually, the stations were constructed and data shared from April 2007 on, although they are run solely by the Chinese side, unlike the rest of the joint network.

[9] The new regulation, The Method on Foreign-related Meteorological Exploration and Data Management, was jointly released by the China Meteorological Administration and the National Administration for Protection of State Secrets in December 2006 and took effect on January 1, 2007. It banned foreign-related meteorological exploration stations from military areas and regions that are either closed or crucial to national security and as well as forwarding meteorological data that are deemed sensitive (Epoch Times 2007). Ominously, one of the reasons for new regulation cited by Chinese authorities was a Japanese enterprise collecting meteorological information near a power plant in Xinjiang (Taipei Times 2006).

"until recently been a catalyst for greater cooperation among the respective environmental ministries in Japan, China, and South Korea … [the] cooperation hit a snag earlier this year as a result of the unwillingness of the Chinese government to share meteorological information with Korea and Japan under the pretext that such information was a 'state secret,' inhibiting the capacity of China's neighbors to make more accurate forecasts for how and when the dust might be at its worst."

Interestingly, despite the fact that Snyder's comment suggests that Korea was denied the yellow data as well, this is true only as regards the multilateral joint monitoring project from January of 2007. The new regulation did not affect the bilateral data sharing deals between China and Korea that were concluded earlier, and Korea kept receiving data from the 10 joint observation stations and other Chinese stations as agreed previously without any problems.

The fact that China continued supplying data to Korea, while denying it to Japan and torpedoing the regional network development suggests that national security was indeed just a pretext. The Yomiuri Shimbun (2008) article gives a few hints of what was the real issue. It cited an official from Environmental ministry who indicated that making the data public, not national security, was the real concern: "We heard from the Chinese side that it would be difficult to allow the information to be publicized on the Internet, even if data could be provided for joint research being done for the Beijing Olympics being held this year." Indeed, the Japanese ministry planned to release for public more detailed sand forecasts on its Web site, including observation data about "actual quantities of airborne sand from near ground level up to six kilometers up" in the atmosphere from observation sites including one in Beijing equipped to measure visibility, PM10 concentrations, and vertical profile of dust cloud by a Light Detection and Ranging (LIDAR) sensor. It seems that the real concern for China was the fact that information about air pollution in Beijing, and specifically the levels of particulate matter that were a big issue in the years and months preceding the Olympics, would be available publicly on the Japanese government web

site, and could hamper the Chinese public relations offensive about “Green Olympics” and improvements achieved in Beijing’s air quality.

The snub in April 2007 was, unfortunately, not a single deviation, but rather marked a trend. In May 2007 China followed the refusal to provide data by canceling “a plan to improve its observation network with seven more facilities” that were to be built through ODA from Japan (Yomiuri Shimbun, 2008). In March 2008, as the new dust season started, Japan’s request for weather data for domestic forecasting was once again rebuffed by China. China has not only refused to release its own data, it has also insisted that any findings from joint research be kept from the public, leading the then environmental minister Ichiro Kamoshita to utter in exasperation: “About yellow sand, I am not quite sure how and why it can be regarded as a national secret” (AFP 2008). Note, once again, that this took place in the run up towards the Beijing Olympics.

In the end, Kamoshita’s public calls for access to Chinese data managed to change Beijing’s position. After a meeting between Kamoshita and his Chinese counterpart, head of the State Environmental Protection Administration (SEPA) in April 2008 at Boao Forum for Asia, China announced a turn around in its policy and decided to share data collected through the ADB joint network with Japan (and consequently Korea as well) (JKnews 2008). The sharing would take place through the SEPA website, thus keeping Chinese authorities ultimately in control of which information will be shared.

Resolving the issue of national security concerns preventing sharing of the data between China and Japan had allowed the cooperation on the joint research to continue. Unsurprisingly, access to Chinese data remains one of the issues that is continuously addressed at the research working

group meetings. The importance of "sharing relevant necessary information and data" for maximizing the outcomes of joint research was emphasized at the first meeting of the Steering Committee for Joint Research on Dust and Sand Storms in January 2008. And a few months later, in September 2008, during the third Tripartite Director General Meeting on Dust and Sandstorms (a forum created to oversee and implement the joint research in 2006) "Korea suggested that sharing raw data on PM10 among three countries' environmental authorities is important in order to establish a DSS monitoring and early warning system in Northeast Asia, and Japan and China agreed to discuss this issue at the next steering committee meeting" (TEMM 2008). Korean Ministry of Environment gave a cheerful spin to this agreement when it reported that the three countries has agreed "in principle to share raw numerical data on PM10 concentrations among their environment ministries, to review technical ways to share such data, and have detailed discussion for implementation" at the next meeting. This data sharing would allow Korea to access PM10 data from 47 stations (up from 15 that it accesses now through the bilateral joint observation network and existing data sharing agreement), substantially increasing accuracy of its predictions and "contributing to research on the risks of DSS and air pollutants by utilizing such data to calculate the amount of air pollutants coming from neighboring countries to Korea." At the moment, however, it remains to be seen whether it will share the data not just 'in principle,' but in reality as well.[10]

As the above demonstrates, the state of cooperation on yellow dust issue remains ambivalent. China and Korea managed to build and operate a joint monitoring network, although its scope is not considered as satisfactory by the Korean side that continuously seeks to expand its access to

[10] On the latest meeting of the joint research working group in June 2009 that discussed joint research into the dust storm that took place between 29 March and 2 April 2007 and affected all four countries, China reacted to the proposed sharing of data from 2007 by offering its average daily PM10 levels, but has informed that approval of its government is required before this data can be actually shared.

Chinese data. The cooperation between Japan and China was less successful. After Japan upgraded Chinese monitoring capabilities, it was denied the data that it was supposed to get, and had to rely on the insufficient data it can collect from monitoring stations it helped to build in Mongolia and the forecasts of the KMA. Moreover, the Chinese denial to provide data to Japan slowed down the construction and upgrading of the nascent regional network, and highlighted the dangers of sudden changes in China's data sharing policy for the forecasting capabilities of non-source countries. Although regional data sharing was resumed in April 2008, it remains tightly controlled by China, limiting both the joint research efforts and progress toward a genuine regional monitoring network as envisioned by the ADB master plan.

It is clear that Chinese stance is rather more hesitant then what Brettell (2007) described as a "willing participant" that is "much more open about sharing data," and can hardly be labeled as "extremely encouraging." Although cooperation will continue, it is apparent that its scope and speed of progress are far from optimal, particularly due to the slow development of the regional monitoring network and occasional backtracking by the Chinese on the DSS data sharing. This is consistent with the observation by Carius (2007: 71) that:

"successful transboundary environmental projects presuppose that parties will come to an agreement on relatively complex interests. Thus, the hypothetical and oft-postulated 'win-win' situations frequently either do not exist at all or are very difficult to achieve. They are, moreover, subject to conflicting national and sector interests, as well as sovereignty claims. Benefit-sharing agreements often fail in practice because the economic benefits for individual countries are not apparent or otherwise difficult to market politically."

In this case we can identify primarily a conflict of sectoral interests in China as responsible for the failure to share data with Japan in 2007 and 2008. Environmental agencies are usually the weakest of the central bureaucracies, both in developed and developing countries. It is unsurprising that the national security interests and sovereignty issues (if we choose to believe

the official explanation), or of the Chinese leadership's concern to avoid detailed and precise information about just how much dust and pollution was in Beijing's air before the Olympics (as was suggested above), triumphed over the regional environmental cooperation efforts of the Chinese SEPA / Ministry of Environmental Protection.

Moreover, as ADB (2005: chapter 2, p.3) analysis shows, the collection of yellow dust data in China itself is fragmented and there is a lack of cooperation between the various governmental agencies charged with environmental issues in China:

"*There are at least four institutions at the central government level directly involved in DSS monitoring and, to varying extent, forecasting and early warning. These are the China Meteorological Administration (CMA), the State Environment Protection Administration (SEPA), the State Forestry Administration (SFA), and the Chinese Academy of Sciences (CAS).*

All the four institutions have developed their own individual network. However, there is general lack of cooperation among these institutions. It seems that each institution strives to be self-sufficient in data gathering. Data sharing has not been encouraged in the past and much archival material is inaccessible."

Thus, even if some data sharing deals are concluded, like for example the joint Sino-Korean monitoring network between KMA and China Meteorological Administration, these can only supply partial data. The ADB analysis also suggests that any proposed regional cooperation deal must clear a number of hurdles before it is approved, and can become a victim of bureaucratic infighting between different agencies in the process.

National interests of China, Korea and Japan are also somewhat divergent. As was discussed in third part, the effects of dust storms vary according to the distance from source areas. China does not benefit much from improved regional monitoring and forecasting, particularly because its monitoring network was already upgraded through Japanese ODA and the construction of joint

Sino-Korean network.[11] On the contrary, the shared data could be used for research that would show exactly how much are Chinese economic development policies (particularly in the politically sensitive regions such as Inner Mongolia and Xinjiang) damaging to its neighbors (and rest of China itself), and expose Chinese leadership to foreign and domestic pressure to alter them. Indeed, the current DSS research is moving from the issues of analyzing dust storm sources and movements, with typical source areas and routes already identified, to focusing more on the changes in the composition of dust as it travels over Chinese territory, i.e. on the types and amounts of pollution that gets transported and deposited with it across the border. In line with what the interest-based approach to regime formation would predict, China is wary of giving foreign researchers unrestricted access to all its DSS data.

We have to conclude that although the first mechanism of environmental peacemaking has resulted in some intensification in cooperation between the countries, the increase in trust that would allow more cooperation to take place is happening only slowly, and for the most part remains limited to the bilateral, Sino-Korean context. Unfortunately, this is not where the main rift in the region lies, as Sino-Korean relations have warmed considerably since the end of Cold War. In the case of Sino-Japanese cooperation, where environmental peacemaking could deliver most benefits, what looked like an encouraging start towards regional monitoring network was temporarily derailed by national security (or, more broadly national interest) considerations of Chinese leadership.

[11] It has also dedicated considerable domestic resources to improving its dust monitoring capabilities. The number of sandstorm monitoring stations operating in China as of summer 2008 reached 607! Compare this with the 18 stations that currently supply data to Korea, and to the Korean proposal at TDGM to access PM10 data from 32 more Chinese stations.

Clearly, the changes in the strategic climate at inter-governmental level outlined by Conca and Dabelko have not yet fully materialized in the region. On the other hand, we have to highlight the institution that was created as a result of the DSS cooperation, unusual as this is in Northeast Asia. The annual meeting of environmental ministers eventually led to consensus that DSS is the most pressing issue in the region, and to the creation of the Tripartite Director General Meeting on Dust and Sandstorms with a steering committee and two joint research working groups. Thus, both government officials and scientists from the three countries are increasingly in close contact, and this can be seen as the conception of a regional epistemic community[12] that can later influence the policymakers in all the countries and propel the regional cooperation further.

Following part examines the second, trans-societal mechanism of environmental peacemaking that was able to emerge on the basis of inter-state cooperation.

VI. TRANS-SOCIETAL RESPONSE TO YELLOW DUST

We have seen that the inter-governmental cooperation had led to certain tangible results, such as upgrading (and in case of Mongolia, creating from scratch) DSS monitoring capabilities in the source areas, limited data sharing, joint research efforts, together with some afforestation projects aiming at preventing desertification. This part of case study will analyze whether the other mechanism of environmental peacemaking outlined by Conca and Dabelko, the emergence and strengthening of trans-societal links, is taking place in the region. Signs of this taking place would be all the more important in the under-institutionalized Northeast Asia, where narrow

[12] On the importance of regional epistemic community for addressing the issues of transboundary air pollution in the region, and explanation of its lack in Northeast Asia, see Kim Inkyoung (2007).

interests of nation states and historical mistrust prevent international cooperation from taking place and developing common answers to the new, transboundary challenges of the future, and where civil society is considered less developed, with insufficient domestic policy influence and few international contacts and activities.

Typical views of Northeast Asian civil society (and environmental movements in particular) can be summed up as weak civil society evolving from the decades of domination by the powerful state (the cases of democratic Korea and Japan), or co-opted and closely controlled by the authoritarian state (as in case of China), where it is represented by the so-called GONGOs (government organized NGOs). In all three cases, civil society's policy influence remains limited (cf. Economy 2007). Schreurs (2005) describes how Japanese state constrained the growth of civil society by restrictive regulation on creation of non-governmental organizations (NGOs) and limiting policy information available to them, and how the Chinese state keeps a close eye on the environmental groups. According to Kim (2007) NGOs in Korea focus on domestic concerns and while some Japanese NGOs work internationally, they do so in isolation. Shin (2007: 25) comments on the lack of involvement of NGOs in international cooperation in the region as a whole: "one of the key characteristics of East Asian regional co-operation as a whole [is] a very limited role of NGOs but relatively critical role of private firms and their networks."

The case of yellow dust and desertification issue seems to be an odd fit with the above descriptions, leading as it had to a significant increase in international cooperation of NGOs. Futrell (2007: 60) gives example of a Japanese NGO called GEN working in China (Shanxi) since 1992, combining fighting desertification with sustainable development by planting apricot trees that are not only drought resistant, but also increase rural residents' income, that "raised

almost $3 million and recruited almost 2,500 Japanese volunteers to help tens of thousands of local people plant over 17 million apricot and pine trees." Efird (2007) puts the number of Japanese NGOs working on afforestation in China's Inner Mongolia province at almost one hundred, stresses the importance of the technical skills transfer that is happening, and describes the activities of OISCA International that has, apart from afforestation, "established a center for agricultural technical cooperation at Shanghai's Jiaotong University in 2002 and in 2006 opened the Alashan Desert Ecological Research and Training Center at their Inner Mongolian project" as a case in point. All in all, although the "activities of Japanese environmental organizations in China remain largely unknown to both non-Japanese NGOs and the Chinese public … a number of these NGOs have nevertheless established strong, successful relationships with Chinese counterparts and made significant contributions to Chinese social welfare and environmental protection" (ibid).

Korean civil society has also forged numerous links with counter parts in China and Mongolia. Most notable example is the Future Forest NGO that was established in 1998 by the then Korean ambassador to China Kwon Byong-hyon, after he learned that government budget for student exchanges with China that he proposed was too limited, allowing only handful to take place every year. At the beginning, therefore, Future Forest focused on organizing environmentally oriented youth exchange. In 2002, it started to send teams of Korean volunteers, called Green Corps, to plant trees in the eastern Kubuqi desert, one of the source areas of yellow dust affecting Korea. Their early successes in the area where desertification was believed to be permanent and where there were no local government initiatives to reverse it led to the initiation of the Great Green Wall project in 2006. This ambitious project is aiming at planting a tree belt 18km long and almost a kilometer wide in a four year period, with a budget of approximately US $ 7 million

and cooperation with the All China Youth Federation. The project has so far been successful and is nearing completion. In 2008, Future Forest was the first Korean NGO accredited as an observer to the UNEP. In 2009, capitalizing on its earlier accomplishments, it launched a "Billion trees in desert campaign" that is searching for resources to enlarge its successful afforestation project in China and informing domestic, regional and international policymakers of the dangers of desertification and possible mitigation opportunities.

Another Korean NGO called Northeast Asian Forest Forum (NEAFF) was also established in 1998, is based in Korea with sections in China and Mongolia, and aims to "restore degraded forest lands, to combat desertification and deforestation, and to promote environmentally sound and sustainable management of forest ecosystems in the region by strengthening networking and exchanging information among the countries concerned," and has undertaken short-term projects aimed "at combating desertification in China (on about 400 ha in inner-Mongolia and 30 ha in Shandong province) and Mongolia (on 400 ha in Selenge and 20 ha in the Gobi Desert)" by "supporting tree planting and sand fixation, exchange of personnel and information among the participating countries, and the organization of international workshops and seminars with the Secretariat of the United Nations Convention to Combat Desertification (UNCCD), FAO and other international organizations" (FAO: 2009).

Final example is the Korean environmental umbrella NGO called Korean Federation for Environmental Movement (KFEM) that has been working with the Chinese NGOs since 2003. Cooperation included organization of educational exchange programs, hosting "annual meetings in China and Korea to help NGOs network domestically and internationally on desertification" and in a notable example of innovative approach to combating desertification, "feeling that the

emphasis on trees has been misplaced, KFEM and their Chinese partners have been co-managing hybrid grass test sites with local herders and farmers in 4 locations in Jilin Province and Inner Mongolia" (Futrell 2007: 60).

In Korean case, the involvement did not remain limited to NGOs only. Korean corporations investing in China started to address the desertification / DSS issue as a part of their corporate social responsibility programs. For example Hyundai Motor's afforestation project intends to restore a 50 square km of grassland in the Kunshantag desert in Inner Mongolia. It will be implemented by Korean Federation for Environmental Movement with the participation of Chinese central government, Inner Mongolia's regional government and local NGOs and should be completed by 2012. Other Korean corporations that have supported tree planting programs in China include Korean Air and SK. Moreover, environmental cooperation on the local government level is also appearing. Korean regional government in Gyeonggi-do plans "to create a 'Gyeonggi Green Eco-park' in concert with the All China Youth Federation," and the administration pledged a total of US $ 645,000 for the effort (Joongang Ilbo, 2009). Like Hyundai, it will work through an NGO, in this case Future Forest, to implement the plan.

As the above documents, there are very encouraging signs showing that the second, trans-societal mechanism of increasing peaceful links between non-state actors is taking shape. Individual activists, NGOs, private corporations and even regional governments are reaching out, creating networks that allow transferring technical skills, improving efficiency of existing and future projects, and sometimes introducing innovative methods of combating desertification. It also shows that the activity of civil society that was stimulated by the yellow dust / desertification issue is changing the limited role it traditionally played in regional cooperation

and environmental policy in the region. On the other hand, the impact of all these activities on changing or transforming the national security state is as of yet limited, but could increase if high-profile lobbying activities stressing the graveness of situation and promoting more international cooperation on the issue, like the ones undertaken in last two decades by Kwon Byong-hyon of Future Forest, continue.

Final section will consider public policy implications of the yellow dust case study. As the tempo and scope of regional cooperation was judged as unsatisfactory, it will employ insights from game theoretical modeling of international environmental agreements to outline a realistic policy aimed at ensuring future Chinese cooperation on the DSS monitoring and address the cause - desertification - at the same time. Inducing China to participate more enthusiastically would further increase the virtuous effects of environmental peacemaking in region in the form of more trust, transparency and lower barriers to cooperation on other issues in the future.

VII. HOW TO FOSTER INTER-GOVERNMENTAL COOPERATION

As was described in the previous parts of this paper, yellow dust is a serious regional problem with substantial health and economic impacts. It has spawned a host of bilateral and multilateral initiatives, with many joint statements about need for cooperation issued but few tangible outcomes reached, mainly due to reluctance of China to share its yellow dust data and allow research into the causes of the phenomenon. Guo et al. (2005: 12) note the paucity of data even in China itself, where “despite of the significant monetary or physical losses to a regional

economy, [yellow dust] is not listed as a disaster by Chinese government, thus no data have been included in major data sources such as official reports, database, government documents, yearbooks etc." With the severity of dust storms and damage they cause drastically increasing in recent years, this level of inter-governmental cooperation cannot be judged as satisfactory. The question is then how to induce China to cooperate more readily, and be more flexible on issues such as data sharing and research into sources, causes and movements of DSS that could significantly improve forecasting and reduce transboundary damages in the near future.

As state sovereignty prevents enforcement of international agreements, international environmental agreements (IEA) have to be designed in a self-enforcing way. Wagner (2001) describes some insights from game theory on design of IEAs. Limiting strategic interaction to single environmental choice variable, such as sharing data in our case, is too weak to enforce full cooperation. Stabilizing instruments to reduce defection from IEAs include transfer payments and linkage (eg. concessions in other domains of international or domestic politics). Transfers can be in cash or kind, and regular payments are preferred to single payments schemes as this turns the game into a reiterated one where donor and recipient interact repeatedly and strategies of reciprocity are capable of sustaining favorable equilibrium. One disadvantage of transfers is that they affect donor's reputation in future negotiations. Strategic linkage, on the other hand, is not associated with bad reputation of being a weak negotiator and therefore it is often preferred to transfer payments. Research and development (R&D) cooperation or trade concessions can be suitable issues for stabilizing IEAs. Finally, more subtle linkage concerns country's reputation, where failure to cooperate in a given issue reduces country's credibility in other negotiations.

These insights are the base of the following proposal for future cooperation. Stabilizing the data sharing agreements with transfers in form of ODA for improved monitoring and early warning systems have proved as inadequate to prevent Chinese defection. Therefore, more substantial transfers, in form of ODA designated for afforestation[13] are required. The advantage of this kind of transfer is that it will have a form of regular payments over long period of time, as afforestation is by definition a long term project with duration in years or even decades. Cooperative outcome is therefore more probable. Strategic linkage in form of R&D cooperation in desertification prevention should be offered as well, as both South Korea and Japan have extensive afforestation experience, and this should increase effectiveness of Chinese efforts to combat desertification.

Of course, as we have seen in the case study, afforestation ODA from Korea and Japan has been already given to China since the 1990s. But there was no linkage between the two issues, meaning that the negotiations on DSS monitoring and desertification were separate issues. The trick here is to offer substantial more afforestation ODA as a quid-pro-quo for Chinese data sharing. This would represent a true "win-win" outcome for all countries involved. South Korea and Japan are trying to get access to Chinese yellow dust data for almost a decade, and as the storms are getting worse they are willing to pay increasingly higher price for this access. Therefore, they should be willing to make a transfer to China in the form of substantial afforestation ODA to ensure cooperation. This kind of ODA to China is, moreover, in their best long term interest as well. Even if the regional monitoring system is established, without reversing the trend of rapid desertification in China the storms and the damage inflicted will probably keep increasing, lowering and possibly even cancelling out the damage reducing impact

[13] The term afforestation as used in this part is not limited to planting trees only, but includes grassland revegetation and other appropriate techniques preventing and reversing desertification.

of better forecasting. Afforestation ODA addresses the cause of the DSS problem in the long run, while allowing mitigation of impacts in the short term. As for the political costs of offering substantial ODA during the current economic crisis, public concern about yellow dust is high enough in both countries to warrant support for such aid, or ODA could be redirected from other projects.

Apart from afforestation, other areas that can be fruitfully targeted by the offered ODA package are the causes of looming water crisis in Northern China. As was mentioned above, many afforestation methods require irrigation, and the dropping ground water table in Northern China is thus a bad omen for the sustainability of any efforts to stem desertification in the future. A plan to address water shortage should, as Pomerantz (2009) suggests, focus on the improving efficiency of water use in rural agriculture with "low-tech solutions [such as] re-lining and/or covering irrigation ditches, fixing leaky pipes … [that] many farmers, or even whole rural communities, are unlikely to invest in them without subsidies and/or greater incentives."

For China, the reason for why such a transfer would make cooperation more attractive is that its desertification problem is one of truly massive proportions, and it cannot handle it on its own. Desertification affects almost 28 percent of the total land territory of China, and adversely affects 400 million people. In 2008, Chinese State Council Development Research Center estimated that the direct economic loss from desertification reached 54 billion Yuan ($ 7.9bn) annually. Guo et al. (2005: 3) describe the huge resources China is dedicating towards the issue at the moment: "total investment related to [yellow dust] for the next ten years in China alone is estimated to be about $ 35 billion … most investment will go to reforestation, grassland regulation, tillage management, water conservation, and soil preservation." The problem here is that dedicating a

lot of financial resources alone is not sufficient. As the analysis by Yin et al. (2005) suggests, there are major issues in how the ambitious goals of the central government are locally implemented. Errors in planning, execution or follow up measures can lead to inefficient expenditure of resources. China simply seems to lack both the resources and institutional capacity needed for stopping the worsening desertification trend, not to mention to turning it around. Chinese authorities and scholars are aware of this fact.[14]

Substantial afforestation ODA from Korea and Japan, coupled with R&D support and capacity building efforts, could make a real difference in preventing further desertification. Moreover, its socioeconomic impacts would be another incentive for China to accept it. China suffers from high rates of rural unemployment which are getting higher due to the current economic crisis as migrant workers are laid off and head back to the countryside. Major afforestation ODA would translate into many long term labor intensive projects, creating employment opportunities in the rural areas and thus helping Chinese leadership improve the situation in the countryside both from economic and environmental point of view.[15] This is particularly true as one of the most effective methods of restoring grasslands in Inner Mongolia seems to be the grazing ban, which is unsustainable in the long term "unless livestock farmers are supported in generating a stable income" (Kuchelmeister and Meyer 2007: 18).

[14] The National Capacity Needs Self-assessment for Global Environmental Management submitted in 2005 by China to UN Convention to combat desertification identifies *a shortage of international projects designed to combat desertification* as a problem and calls for more international support. Yin et al. (2005) argue that "the international community needs to be more actively involved in assisting and facilitating the execution of these programs [to] bolster contacts between governmental and nongovernmental organizations (NGOs) on the numerous environmental issues, encourage the exchange of the involved professionals, provide training and expertise on market-based solutions to relevant environmental problems, and support the engagement of domestic environmental NGOs and other institutions in these programs."

[15] Guo et al. (2005: 19 - 23) present a case study of the biggest DSS mitigation project in China, showing that it delivered "tremendous environmental and social benefit in the past four years," and that addressing DSS through the right policies is actually cost effective as well.

The suggested policy, in the form of afforestation ODA linked to Chinese cooperation on sharing yellow dust data, would have beneficial impacts on trans-national linkages in the region as well. The already considerable involvement of NGOs from Korea and Japan in China could be increased even more if part of the ODA would be in the form of a fund dedicated specifically to funding cross-border NGO activities, networking and cooperation. Something along these lines has already taken place when the so-called "Obuchi Fund" was established after the visit of Japanese prime minister Obuchi Keizo to China in 1999 with 10 billion yen (roughly 100 million US $) to assist the Japanese NGO activities for afforestation in China.

To sum up, Korea and Japan need both access to Chinese DSS data, and the success of the Chinese efforts in combating desertification if they are to prevent the already considerable socioeconomic damage caused by DSS from increasing in the future. The policy outlined above is aimed at delivering both, plus would result in boosting the dynamics of environmental peacemaking that is already taking place in the region.

VIII. CONCLUSION

This thesis has used the recent international relations literature arguing that environmental cooperation can make further inter-state cooperation easier through spillover effects to suggest an environmental peacemaking policy for the Northeast Asia. Empirical evidence shows that environmental cooperation can have spillover effects such as increased trust, institutionalizing habits of cooperation and greater civil society involvement even in cases of extreme distrust or

outright hostility between the states. However, it has to be emphasized once again that (as of yet), the benefits of increased trust rarely materialized outside the environmental cooperation area.

Northeast Asia remains seriously under-institutionalized, hampered by distrust between the states, and is perceived as a region where inter-state conflict may occur in the future. It faces severe environmental problems that could worsen this situation and further increase tensions between the states. The transboundary environmental issues in the region are of course not limited to dust storms only, they include among others acid rain, climate change, declining fish stocks, nuclear and toxic waste dumping and water scarcity. Any of them is hard to deal with due to the lack of institutions and trust, and because of links between these environmental issues and concerns about energy security and economic development.

As Conca and Dabelko (2002: 8) correctly point out, trying to tackle these new environmental security concerns through traditional approaches is futile:

"A narrow security-state frame of reference ignores several inconvenient facts: the poor fit between military tools and the environmental 'threats' they are meant to counter; the enormous ecological toll of war, war preparation and national-security institutions; and the obstacles to effective environmental cooperation created by the zero-sum logic of the national security state."

In this context, the current Northeast Asian arms build up is making even less sense then when perceived through the usual lens of security dilemma. Not only are Korea, China and Japan failing to increase their security, or improve the security situation in the region as a whole, but they also channel their resources away from addressing the environmental issues that are causing damage to their societies and national interests in continued economic development right now, and are casting doubt whether it is sustainable in the future.

In contrast, using the concept of environmental peacemaking allows policymakers to approach the regional environmental challenges as opportunities that allow improving the strategic climate in the region, rather then threats that can further aggravate the enduring tensions and generate yet more distrust. Even if the benefits of environmental peacemaking would remain limited to furthering cooperation on other regional and global environmental issues only, it would definitely a course of action worth undertaking. Cooperation in form of building monitoring and early warning network for yellow dust, combined with extensive aid to reduce desertification and promote sustainable development in rural China and Mongolia is a prime candidate for a regional environmental offensive. Here, barriers to cooperation are lower as the issue is not directly connected with either energy security or economic development in the advanced coastal regions, reaching a "win-win" situation for all sides is possible, and the issue commands public attention in all countries in the region and has already sparked an unusual level of trans-societal cooperative activities.

As a final point, the specific situation of South Korea should make its policymakers to pay attention to the possibilities of environmental peacemaking more then anybody else. Their geopolitical position puts them right in the middle of Sino – Japanese rivalry. Korea cannot avoid being a middle power surrounded by big powers, but it can improve its situation by using imaginative and farsighted policies. Korea's domestic afforestation efforts are widely recognized as one of the most successful ever carried out, and it has world class experience and technology in this area. The obvious thing for Korea to do would be to take advantage of this by using it as a basis for increasing its regional and global profile. Instead of huge outlays on military modernization (that are nevertheless insufficient to keep pace with arms build up of Japan and China), Korea should cut its military spending and devote its attention and resources to pursue

the environmental peacemaking strategy in the region, starting with comprehensively addressing the yellow dust issue, and then use the increased trust and "habit of cooperation" to turn to more contentious, but no less pressing regional environmental issues.

There are some indications that Korean policymakers see these possibilities. Consider the recent quote by Minister of the Korea Forest Service Ha Young-je: "Korea has played a major role in rebuilding damaged forests in Asia …[and] plans to utilize its network and skills by building an international organization, tentatively titled AFoCO, or Asia Forestry Cooperation Organization … the Foreign Ministry and the Blue House are actively supporting the plan" (Korea Magazine 2009: 9). Hopefully, this paper has clearly shown the reasons why this is an excellent plan, that if carried out can potentially transform Northeast Asia into a region with more trust, more understanding, more regional institutions as well as more cooperation on common concerns between the states, and in the end more, and moreover lasting, peace.

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