The Domain of Environmental Cooperation in Northeast Asia

Recommended Citation

Lyuba Zarsky
CoDirector
Nautilus Institute
for Security and Sustainable Development

Prepared for the
Sixth Annual International Conference
Korea and the Future of Northeast Asia:
Conflict or Cooperation?
Portland State University
Portland, Oregon
May 4-5. 1995

I. Introduction

The environment is emerging as a "motherhood" issue in Northeast Asia. In a region imbued with hostile legacies, the environment is a relatively neutral arena for discussion. Regional discussions about environmental issues promise beneficial security spin-offs, both by promoting the "habit of dialogue," and by reducing the potential for explosive interstate environmental conflicts.

In recent years, governments have taken small, steady steps toward collective action on cross-border environmental issues. The region's environmental problems, however, are pressing and will become more so with expected high growth rates of GNP and intra- regional trade. The high costs of ecological degradation and the emerging trade- environment interface suggest that the domain of beneficial--indeed, necessary--regional cooperation is much larger than has yet been tabled.

This paper explores the domain of environmental cooperation in Northeast Asia. Part II develops an analytical framework in which the domain of regional environmental cooperation encompasses three broad categories: 1) the governance of common pool, transboundary resources and ecosystem services; 2) management of the trade-environment interface in the context of high levels of regional economic integration; and 3) building of human and technical capacities to manage within-border resources, as well as to respond to global environmental problems.

Part III examines regional environmental problems in Northeast Asia, including acid rain, marine

degradation, and habitat/biodiversity loss; and the environmental implications of projected high rates of growth and intra-regional trade, including on forest development in the Russian Far East. Part IV outlines initiatives in environmental cooperation in Northeast Asia by governments and non-governmental organizations; and offers three proposals to extend the domain of regional environmental cooperation.

II. Domain of Regional Environmental Governance

Environmental and resource management is largely the preserve of national governments. Crucial environmental issues such as the use of rivers and watersheds, emissions of industrial and household pollutants, and the management of farmlands, forests, and wetlands remain largely within the regulatory ambit of states.

On the other hand, international cooperation on environmental issues is growing rapidly. Dozens of environmental treaties were concluded in the 1970s and 1980s, encompassing issues such as the ozone layer, the prohibition of biological weapons and a ban on atmospheric nuclear testing. Two crucial global conventions, one on climate change and the other on biodiversity, were adopted at the 1992 Rio "Earth Summit." Environmental issues have also come to the forefront in multilateral economic institutions, especially the GATT and the newly- formed World Trade Organization. The increasing globalization of trade and investment suggests the intensification of market-driven pressures on governments to create common regulatory regimes in a number of dimensions, including environment policy.

A third level of environmental governance is emerging at the regional level. In part, regional environmental governance parallels the emergence of regional free trade areas and economic groupings, such as the North American Free Trade Area and the European Union. In Asia, the Association of Southeast Asian Nations (ASEAN) is discussing environment policy convergence in parallel with moves to establish an Asean Free Trade Area. In addition to the pressures of economic integration, regional environmental governance is being propelled by international environmental diplomacy. Agenda 21, a sweeping plan of action adopted by the Rio Conference, emphasized the need to build regional institutions and frameworks to promote sustainable development

In Northeast Asia, the end of the Cold War provided an opportunity for long-time antagonists to seek new arenas for dialogue and cooperation. The embrace of market- oriented reforms and trade openness also prompted interest in regional economic cooperation. Beyond its intrinsic importance, environmental cooperation is perceived to offer economic benefits in the form of technology transfer and export markets.

What is the domain of regional environmental cooperation? What can--and should-- governments accomplish through joint action at a regional level that they could not accomplish by acting unilaterally or in global concert?

In broad terms, the domain embraces three broad categories of environmental management: 1) governance of common pool, transboundary regional resources and ecosystem services; 2) management of the trade-environment interface. High levels of regional economic interdependence, especially in the context of rapid economic growth, subject within- border resources to common pool pressures through competitive markets; and 3) capacity- building, that is, joint welfare gains through cooperation in enhancing human and technological capacities to manage within-border resources and to respond to global environmental problems.

Before proceeding further, it is important to define a "region." Common pool resources do not respect political boundaries, whether of one nation singly or many nations collectively. Seen through the lens of eco-system governance, a nation is not located in one geographical "region" with a fixed number of other nations. Rather, nations (and sub-regions within them) may be simultaneously part of many regions as defined by a common sea, watershed, desert, forest, air current system, etc. The governance of each common pool resource requires the participation of those who use it. . Likewise, nations and sub-national areas are part of multiple economic regions. The United States, for example, and especially the state of California, are simultaneously part of the Asia-Pacific and North American trading areas. Depending on the analytical or political problem to be examines, the boundaries of a "region" could be drawn on functionalist and bio-physical, as well as geographical, cultural, economic and political determinants.

The focus of this paper is on "Northeast Asia" as defined by the political boundaries of six particular nation-states: China, Japan, North Korea, South Korea , the Russian Federation, and Mongolia. This designation reflects the UN propensity to draw regional boundaries in politico-geographical terms and to promote within them cooperative relations across a broad spectrum of issues. It also reflects the interests of central governments in Northeast Asia to

maintain control over foreign relations. Many environmental issues involving China and Russia concern primarily the Russian Far East and the Northeast Chinese provinces: on an ecological basis, the border of the "region" would bifurcate these two countries. Finally, the designation reflects political and security interests in excluding the United States, even though Alaska stretches well into geographical proximity. Nurtured by the UN Economic and Social Commission on Asia and the Pacific and the UN Development Program, the primary initiatives toward regional environmental cooperation have embraced these six countries.

1. Governance of Common Pool Transboundary Resources

Common pool resources are resources which are not exclusively utilized by a single agent or source. Generally, resources are considered common pool if de facto or de jure property rights to them are communal. Property rights consist of formal and informal norms, rules and institutions which specify who can utilize a resource, including who can appropriate income streams from it, as well as how they can utilize it, that is, user obligations. Examples of common pool resources include air, oceans, and atmosphere, as well as communal forests, pasturelands, fisheries, and local water management associations. In the context of international relations, common pool resources are those which extend across national boundaries; or which are not claimed exclusively by any nation.

Formal and effective forms of collective governance are required to ensure that common pool resources are utilized in ways which promote longterm sustainability. Without collective governance, common pool resources are "open access:" private welfare-maximizing decisions, especially to maximize income, will generate over-use and resource depletion. Individual users have no pecuniary or non-pecuniary incentive to limit their use and to invest in the long-term provisioning of the resource. Without use limits and investment, the resource will be undermined.

In short, without effective governance, common pool resources can generate a "prisoner's dilemma" paradox , in which "individually rational strategies lead to collectively irrational outcomes." Some researchers have concluded that any resource held in common inevitably generates a "tragedy of the commons" because of the free rider problem (i.e. those who conserve and invest in the resource cannot exclude others from enjoying the benefits of their investments). The solution, they believe, is either for the state to act as a leviathan to appropriate and control the resource; or to transform communal into private property by assigning private property rights to communal resources. In the context of state-centered international relations, this would suggest either that one state appropriate and regulate a transboundary common pool resource; or that states collectively allocate all resource rights to private citizens. Neither strategy is attractive or feasible.

Unlike prisoner's dilemma games in economic theory, however, humans can voluntarily cooperate in designing and enforcing collective governance mechanisms: incentive structures which promote the sustainability of common pool resources. Rather than carve up or appropriate common pool resources, states can cooperate in establishing Common Pool Regimes (CPRs). CPRs specify property rights and create mechanisms to enforce them. CPRs are needed whenever non-excludable, transboundary resources are subject to prisoner's dilemma- type resource degradation problems.

Some transborder common pool resources are global in nature and require international CPRs, including the atmosphere and ozone layer, the oceans, space, and biodiversity. Other resources span across a limited set of national territories, that is, a region. The domain of regional environmental cooperation encompasses the creation of CPRs for all transboundary common pool resources within the region, such as air systems, watersheds, seas, and habitats.

2. Economic Interdependence and the Trade-Environment Interface

A second category of collective action environmental problems emerges when national economies, especially resource-intensive sectors, become highly integrated in trade, investment and capital flows. Economic integration subjects states to two kind of pressures: 1) competitive market pressures which create prisoner's dilemma-type problems for local resource and ecosystem management; and 2) regulatory pressures to converge toward the environmental standards and policies of large-market countries. In the absence of collective governance, environmental standards governing trade-exposed sectors will gravitate either towards those of the most competitive producer or the largest market country.

Economic integration means that firms compete across jurisdictional boundaries. Property rights and regulatory regimes in different countries specify different rights and obligations of resource users, including firms. Regulatory regimes, in turn, affect competitiveness. Yet, firms compete in common markets. Through competitive markets, producers with the lowest private costs of production win the sale. Higher private cost producers go out of business.

Yet the difference between high and low cost producers may reflect, at least in part, differences in the property rights regimes under which they operate. Low-cost producers, for example, may create social costs including pollution, resource depletion, and irreversible ecological losses.

International market competition, in other words, is not just between firms but also between systems of rules including property rights regimes. Ceteris paribus, the rules which generate the lowest private costs will dominate. Rules systems in other countries delimit national control over resources. Through economic integration, ecological resources within national boundaries acquire common pool characteristics. Rational decisions by individual firms to maximize profits or market share can result in irrational social outcomes if longterm resource productivity is undermined. When there are net private costs to sustainable resource management, competitive, cross-border market pressures will promote resource depletion.

Two examples may illuminate the argument. The first is the rapid growth of the export- oriented shrimp industry produced by coastal aquaculture in many developing countries. Property rights to coastal resources are inadequately specified and/or enforced throughout Southeast Asia and Latin America, where the shrimp aquaculture industry has bloomed. As a result, competitive pressures have promoted highly-polluting, intensive aquaculture methods, generating widespread destruction of coastal mangroves and boom-bust industry cycles. Sustainable use requires semi-intensive and traditional harvesting methods. Companies, however, have no incentive to limit use; and a purely national regulatory structure would price national producers out of global markets. Competitive market forces, in short, mean that national coastal mangroves acquire common pool characteristics. Long-term sustainable use of national mangrove resources requires the creation of a Common Pool Regime, viz, cooperation among major producer and consumer governments to create and enforce a common property rights and regulatory framework.

Another example is the impact on agricultural sustainability of the North American Free Trade Agreement (NAFTA). NAFTA mandates the opening of Mexican agricultural markets to US-produced goods, including lower-cost American corn. But low production costs in the US are the result, in part, of the absence of agricultural policies mandating sustainable resource management. For example, corn production in the US is highly monocultural, which ecological scientists have found to be destructive of soil micro-organisms required for land productivity. In Mexico, on the other hand, the millions of peasant farmers who will be driven off the land by competitive market pressures grow a high diversity of corn and root crops. Without a regional Agriculture Agreement which specified common user rights and obligations, the rules system which will dominate will be that of the largest low-cost producer, the United States. As a result, biodiversity resources will be lost and the productivity of agricultural lands undermined.

Beyond competitive market forces, convergence in environmental standards among trade and investment partners is driven by national regulatory policies. Large market countries set product requirements for imports, including environmental, health and safety requirements. Large market countries also tend to be foreign investors. Many multinational firms find it cheaper to maintain the same production and mangement standards and practices in all international operations, standards typically generated in home countries. Import requirements and foreign investment act as transmission belts for standards set in the large market country.

Large market states have also taken initiatives to institutionalize convergence in environmental policy in the context of negotiations over trade liberalization, including in the European Union and North America. Convergence lowers transactions costs of trade which stem from a patchwork of differing national environmental requirements. It also reduces the potential that environment policies will be used as a protectionist device. As with market- driven convergence, however, policy-driven convergence may not promote sustainable resource use. Trading partners, especially at the global level, tend to be highly diverse economically, socially, politically and ecologically. Social and ecological diversity suggests that appropriate environment management policies should differ across and within nations. The issue is not so much whether standards will come "up" or "down" as what the specific local/national priorities, problems and requirements are and whether following standards developed elsewhere will address them.

There are thus two key issues in the trade-environment interface: first, the need to create and enforce common rules governing trade and investment which create incentives for sustainable resource and ecosystem management; and second, the need to design a framework of rules which allows for diversity in the context of commonality.

These are issues of governance and they can and most likely will be taken up at the global level by the World Trade Organization. The WTO has established a Committee on Trade and Environment which is considering, inter alia, the scope of national trade-impacting environment policy. However, these issues also fall within the domain of regional environmental cooperation whenever regions are highly integrated or when particular sectors are highly integrated within a region. Regional cooperation is easier and cheaper than global cooperation because there are far fewer

negotiating partners and the partners tend to have cultural, linguistic, ideological, or political affinities. Regional initiatives can thus act to lead, rather than follow, global negotiations. Nonetheless, regional and global initiatives need to move generally in similar paths.

Some analysts argue that formal governance of the trade-environment interface is unnecessary because trade openness is itself beneficial for the environment. Trade openness, they argue, promotes income growth, which is positively related to environmental quality in two ways. First, higher incomes provide resources for environmental clean-up, restoration and management. Second, higher incomes and trade openness promotes technology transfer, including cleaner and more efficient consumer and producer goods. The seminal study shows an inverted-U relationship between economic growth and some air pollutants in Mexico City, with the "turn" pegged to a per capita income of about US$5000. That is, environmental degradation increased as income rose until income hit around $5000, after which environmental quality rose with income.

The study suffers, however, from three flaws. First, it derives general conclusions about environmental quality from very narrow indicators, viz, urban air pollutants. There is little doubt that higher incomes promote consumption of better, cleaner consumer and producer goods and services. In the case of Mexico City, higher incomes propelled new car purchases, primarily North American imports. Car exhaust is a major source of air pollution in the mountain city. However, the study did not assess the relationship between ecological "capital" as a whole and economic growth. The experience of the wealthy, industrialized countries suggests that economic growth is strongly and positively related to biodiversity loss through conversion of forests, wetlands, and other habitats, as well as to increasing emissions of carbon dioxide and other greenhouse gas emissions.

Secondly, the study suffers from a logical flaw. Even if the hypothesized U-curve relationship is correct, an evaluation of the net welfare result will depend on what is irreversibly lost during the rapid growth process. The conclusion is reminiscent of the logical conundrum popularized during the Vietnam War: "we had to destroy the village in order to save it."

Thirdly, experience and empirical data increasingly show that the costs of environment- blind economic growth are likely to be higher than development paths which build in environmental protection. The experience of the Philippines and South Korea, for example, shows that "grow now, pay later" imposes high financial, social and ecological costs. Development strategies which promote income growth while preventing or minimizing pollution and ecosystem degradation could generate an entirely different relationship between economic growth and environmental quality. It could be less negative or even positive if strong environment protection policies promote product and process innovation and enhance investment in environmental infrastructure.

The point is not that trade openness is itself necessarily "good" or "bad" for the environment. Rather, it is that economic interdependence generates pressures which make within-border resources take on common pool characteristics. Sustainable management of the trade-environment interface requires collective governance, including at the regional level.

3. Building Capacities for National and Global Environment Management

The domain of regional environmental cooperation extends beyond managing common pool resources to the capture of joint welfare benefits in building domestic environment management capacities. The costs of capacity-building can be reduced through regional cooperation in three ways: 1) pooling of resources, including knowledge, information, and technology; 2) economies of scale and agglomeration in investment in environmental infrastructure; and 3) knowledge spillovers and accelerated learning curves. Increased domestic management capacities enhance capacities to respond to global environmental problems.

Environmental management is extremely information-intensive and knowledge- intensive. Few countries in the world have yet created a baseline ecosystem information base at a national level: biodiversity resources have not yet been mapped, pollution monitoring stations are not yet in place, etc. Pooling of resources can reduce the cost of creating an information management system, as well as collecting, storing, updating and disseminating information. Moreover, cooperation to standardize and intercalibrate information would increase the net benefits of information systems.

In some cases, there may be scale and/or agglomeration economies in creating joint management capacities across regional boundaries. For example, the costs of training environmental professionals may be reduced by creating a regional environment management training center or programs rather than many national centers. Regional cooperation can also accelerate learning by providing opportunities for people to communicate. Exchanges among

scientists, businesspeople, environment organizations, educators, and policymakers could be especially fruitful.

III. Environmental Issues in Northeast Asia

A. Degradation of Common Pool Resources

Common pool resources require collective action in establishing governance mechanisms for sustainable utilization. In Northeast Asia, the primary common pool resources are the region's seas, air systems, and habitats which support biodiversity, especially for migratory birds and fish.

Transborder Air Pollution: Acid Rain

The primary problem of transborder air pollution in Northeast Asia is the "routine" atmospheric transport and deposition of particulate matter emitted mostly in the course of energy production, known as "acid rain."

The main sources of acid rain are high levels of sulphur emissions from coal-burning power plants and factories in China, North Korea and elsewhere in the region. The north and south eastern regions of China have especially high levels of sulphur dioxide emissions (Figure 1). One study of China's largest coal-fired power plant showed that sulphur dioxide concentrations frequently exceed the State's permissible releases because the coal that is burned contains more than two percent sulphur. However, even low sulphur coals can result in high levels of sulphur dioxide emissions when the coal is burned in inefficient plants. Acid rain may decrease biomass productivity and thereby reduce its carbon uptake, degrading existing forests and causing the recipient country's carbon emissions to increase.

Many scientists believe that the Korean Peninsula and Japan suffer from transfrontier acid rain originating from Manchurian China. Some have also noted that Mongolia may receive acid rain originating over its northwestern border with Russia. Depending on the time of year, some countries may be originators and recipients of acid rain, especially North Korea. In winter (January), the air flows are generally from the Asian land mass to the ocean, while in summer (July), the opposite is the case (Figure 2). According to a study by the Asian Development Bank, Northeast China, Japan and the two Koreas are relatively vulnerable to acid rain degradation due to the combination of high deposition and sensitive soils, vegetation, and materials.

The scale and impact of transfrontier acid rain deposition remains unclear, in part due to the lack of monitoring stations and ecological studies. Initial studies indicate, however, that the levels may be on a par with Europe. China itself has noted the possibility that acid rain may be transmitted long distances and has seriously affected areas of China. In the area adjacent to the Yellow Sea, Chinese industry has been estimated to emit about 700,000 tonnes of sulphur dioxide per year, some of which could be transported across the Yellow Sea to Korea by the predominantly northwesterly winds. Fortunately, the problem is amenable to technological controls at source: a modern power plant with glue-gas desulphurization equipment can remove more than 90 percent of the emissions. Countries in the region are also establishing facilities to monitor acid rain deposition. Much remains to be done, however, in terms of establishing common monitoring methodologies, comprehensive baseline monitoring, and ecosystem impact studies.

Marine Degradation

Marine degradation encompasses two broad issues in Northeast Asia: the pollution of common seas, notably the Yellow Sea and the Sea of Japan; and the sustainable harvesting of fisheries in the north Pacific, including the Sea of Japan, the Sea of Okhotsk, and adjacent coastal areas.

Joint management of regional seas is hindered by regional jurisdictional disputes East Asian seas are also semi-enclosed and thus particularly subject to the effects of chemical pollutants including hydrocarbons, heavy metals, industrial and agricultural chemicals, radionuclides, sewage, heat wastes, and many other materials. The resultant ecological and economic damage includes commercial losses from fisheries and aquaculture, destruction of flora and fauna, tourism, red tides, etc.

Five of the six states in the region have coastlines along the Sea of Japan (only Mongolia does not). The most important sources of marine pollution are:

Coastal (urban, industrial, port and riverine) in-flows
Shipping and industrial waste dumping at sea
Radioactive waste disposal

Oil exploration and transport.

Projected high rates of regional economic growth imply that all of these sources could grow exponentially, while the assimilative capacity of the ocean may be stretched to its limit--or beyond. In the future, exploitation of seabed minerals may increase the stress on marine environments. In this section, we will address only two dimensions of chemical pollution, namely, the radioactive and oil-related pollution issues in the Sea of Japan.

In early 1993, Russia admitted that the former Soviet Union had dumped civilian and military radioactive wastes for decades in the Sea of Japan, in contravention of domestic and international laws. The total quantity of radioactive materials involved in this activity was relatively small compared with other radioactive pollution in the same period. However, the Russian activity was significant because it related to legal precedent and the integrity of the London Dumping Convention which precludes signatories from engaging in such wanton dumping. It also highlighted the possibility of additional uncontrolled radioactive pollution of the Sea of Japan arising from Russia's military and reactors operating in the Far East.

Russia lacks the funds and facilities required to deal with the radioactive legacy of the Cold War. Among the urgent tasks are is the removal of nuclear reactors and fuel from decommissioned nuclear-powered warships, especially submarines, for safe storage and disposal. To end Russia rad-waste dumping at sea, interim storage facilities on Russian territory must be located and constructed. Other states in the region have complementary capabilities. Japan, for example, has significant experience in decommissioning its former nuclear powered ships.

Chemical pollutants, such as oil, in the Sea of Japan is a serious and growing regional environmental problem. On the basis of one measure of oil pollution--average levels of dissolved hydrocarbons--the open areas of the Sea of Japan contain about 1.5-1.8 more oil than that of the surface waters of the northwestern Pacific ocean. In coastal regions of the Sea of Japan, the level of pollution is much higher, often at 2.5 times the level of unpolluted ocean waters, and even exceeding maximum permissible concentrations on a permanent basis.Another measure of oil pollution--the concentration of tarballs in the ocean water--shows a high concentration along sealanes, especially south of Honshu. The prevailing winds concentrate the tarballs in different parts of the Sea of Japan, depending on the season. Japan reports that overall, tar ball concentration has dropped since 1985 but increased (since 1990) in areas of southern Honshu, Sea of Japan, and western Kyushu.

The rate of marine oil spills appears to be increasing. South Korea, for example, reports that the volume of oil spilled along its coastline nearly tripled between 1987 and 1991 (Table 1).

Models of oil pollution dispersal show that oil slicks in the Sea of Japan could move onto adjacent coastal regions or move out into the open seas, depending on tides and winds. Cooperation to reduce and control marine pollution could foster a dialogue on the overarching issue of managing holistically an oceanic ecosystem between parties who disagree on territorial boundaries and who are divided over the best way to manage fisheries stocks on a sustainable basis.

Territorial and management disputes hinder collaboration on reducing marine pollution, however, because the legal status of semi-enclosed oceans remains ambiguous under customary law and the Law of the Sea. As Mark Valencia puts it:

The most successful efforts to deal with marine environmental problems are carefully nurtured with simultaneous institution-building, scientific, and treaty-drafting activities at the regional level, but this can come about only with strong and sustained littoral state support.

A first step would be to obtain scientifically valid data on pollution levels, requiring a joint effort to develop a comprehensive regional monitoring program to determine the ecological status of the Sea of Japan. Valencia has argued that regional cooperation would be useful to intercalibrate measuring methods; to determine indicator species; to study the biogeochemical flows of pollutants at the river/ocean, water/sediment, and air/water interfaces; to monitor dump sites for dredged materials; and to automate the collection and analysis of data.

In terms of tonnage harvested, the north Pacific is the most important fishing region in the world. In 1984, for example, 32 per cent of the world catch came from the north Pacific, of which almost 90 percent was caught in the northwest Pacific. Regional states are highly dependent on this produce. Japan and the two Koreas derive about 90 percent of their respective catches from the region, and Russia and China about 30 and 10 percent respectively. An acute problem associated with high seas fisheries in the northwest Pacific and East Asian seas is that of straddling and highly migratory stocks, that is, species such as tuna and many kinds of groundfish and pelagic fish which migrate between the high seas and Exclusive Economic Zones (EEZs) of states, and between EEZs. Indeed, the majority of the fish now exploited by countries adjacent to the East Asian Seas are shared stocks.

A regional approach may be appropriate for jointly managing the fisheries of the enclosed seas of Japan and Okhotsk and adjacent coastal areas. Fishery agreements are bilateral and exist between Russia and Japan, and Russia and North Korea on the one hand; and between Japan and South Korea, and Japan and North Korea on the other. (A number of these agreements are non governmental). The agreements establish a delicately balanced set of reciprocal fishing rights with catch quotas, and specify that scientific and technical consultations should be held. In some cases, joint regulatory zones are prescribed as to number and size of trawlers, types of gear, dates of operation, and catch.

None of these agreements is region-wide and no regional fora exist in which to discuss allocation of catch. Thus, the management regime does not correspond to the inherently widely distributed and mobile fisheries resource. Consequently, a number of stocks are severely depleted. Unilateral actions to exploit or to manage the fishery stocks have even increased tensions between states--as occurred most recently between Russia, Japan, Poland and South Korea over the pollock stocks in the Sea of Okhotsk. Nor have larger regional or global agreements proven adequate to the task, as membership of the International North Pacific Fisheries Commission is limited to Japan, Canada and the United States.

Some experts have proposed a Northwest Pacific approach to the Seas of Japan and Okhotsk that would avoid finalizing the jurisdictional issues raised by the Law of the Seas and other territorial disputes, but would incrementally modify existing arrangements; create regional non governmental arrangements; and establish a regional scientific organization. Although it would require leadership--possibly by Japan or Russian fishery organizations--such an approach would build on existing bilateral agreements to secure information on coastal fisheries, especially in relation to collection of statistics, scientific research, depicting shared stocks, and identifying overfishing. An informal, consultative regional forum on fisheries issues along with related fields of maritime ecology, pollution, law, and security may also be productive.

Biodiversity

Endowed with areas of high species biodiversity, the Northeast Asian region suffers from high levels of biodiversity loss. In Japan, over 700 plants are classified as threatened. Over 80 birds are classified as threatened in China and nearly 80 birds in South Korea. The main threats are the introduction of exotic species that out-compete endemic species; habitat destruction; hunting; overharvesting; and sometimes, deliberate extermination. Habitat destruction is particularly

significant, arising from conversion to other uses, removal of vegetation or erosion, and/or fragmentation, wherein habitat is carved into areas too small to support endemic species. In addition, future changes in global climate may further stress regional habitats.

Northeast Asian countries have adopted two approaches to conserving and restoring biodiversity. First, they have attempted to protect so-called flagship threatened species such as the East Asian tiger, the Panda bear, and the Crane. Second, they have created networks of protected areas to maintain habitat. The region has an extensive network of nature reserves of many different types and status, including biosphere reserves, world heritage sites, national parks, prefectural parks, forest reserves and watershed reserves. The total protected area varies greatly between countries. Japan has the largest share of protected land, about 12 per cent of its total land area. North Korea is on the low end with 0.5 per cent.

Despite current efforts, many critical habitats for endangered plants and animals remain unprotected; and in some cases, protected areas are inadequate. Moreover, some critical habitats cross national boundaries, yet protected areas either stop at the border or are managed differently by bordering countries. The habitat of the Siberian Tiger, for example, extends across the borders of the Russian Far East, China and North Korea. Yet there is no crossborder management capacity, not even for the exchange of information.

One of the most significant transboundary biodiversity issues is the threat to migratory species, especially birds. Birds migrate over a variety of routes in and across Northeast Asia, respecting no national or political boundaries, not even the tense DMZ between North and South Korea. White-naped cranes, for example, have been tracked by satellite flying from Izumi in Japan, to stopover points in South Korea, the DMZ, and North Korea, before flying on to Russia and China.

Northeast Asian wetlands support over 150 species of waterbird, including ducks, geese, and cranes. Twenty seven are listed as threatened in the IUCN Red Data Book; some are nearly extinct. Pressures include the loss of wetland habit to urban, agricultural and coastal development. Nearly 40 percent of Japan's thirty-two thousand km of coastline have been modified heavily. The total area of mudflats (beaches, estuaries, and lagoons) fell from about 82 to 53 thousand km between 1945 and 1989. In Korea, planned reclamation of estuaries, shallow bays, and inter-tidal mudflats threaten huge areas of highly productive coastal habitat. One study of South Korea anticipates the loss of 65 percent of total coastal wetlands if development plans are implemented. Massive coastal reclamation and river modification are also underway in North Korea, with little consideration for the impact on migratory species.

Preserving migratory birds requires governments to coordinate national policies which govern coastal and inland wetlands, as well as to create cross-border management regimes. The freshwater Khanka Lake, for example, which spans the China-Russia border about 220 kilometers north of Vladivostok is one of Northeast Asia's most important stopping points for migratory birds. The Lake is threatened by draining and conversion to agriculture, especially rice, pesticide pollution, overgrazing, fishing, and recreational abuse. Governments have taken some action to protect migratory birds, including bilateral treaties. South Korea has proposed to supplement bilateral relationships with a regional, multilateral treaty. An important issue for a regional convention would be how to incorporate bilateral agreements between the states within the region; and how to design protocols for signature by extra-regional states. Moreover, the relationship would need to be determined between the a regional treaty and the proposed East Asian flyway under the Berne Convention. The biggest stumbling blocks, however, are likely to be regional disputes over island territories.

B. Regional Economic Integration and the Environment

Political and economic factors are generating momentum toward regional economic integration in Northeast Asia. Intra-regional trade apparently increased steadily throughout the 1980s and early 1990s, although data constraints inhibit precise estimates. According to one estimate, the (money) value of intra-regional trade among five Northeast Asian nations increased by 225 percent between 1981 and 1989, while the volume of world trade increased by only 160 percent. Increasing, but not documented, trade between China and South Korea and China and Russia in the past three years suggest even more rapid growth.

Rent by ideological and military divides for fifty years, Northeast Asian trade has been skewed away from the high level of integration which has emerged in other parts of the world where borders are friendly. The Russian Far East, for example, relied on western Soviet republics for the vast bulk of its import needs until the collapse of the Soviet Union. Japan and South Korea developed trade primarily with the United States, while North Korea relied on China and Russia. In Western Europe and North America, by contrast, the strongest trade relationships are with geographical neighbors.

With the end of the Cold War and increasing economic openness, trade and investment flows within the region are predicted to boom. The growth will be driven largely by markets, that is, by lower transport costs and the ease of contact afforded by proximity, in the context of rapid economic growth.There are also factor complementarities, , including low labor costs in China, primary resources in the Russian Far East, and high-technology capacities in Japan. Gravity and international norm models of international trade patterns predict phenomenal growth in intra-regional trade over the next fifteen years. According to one estimate, the value of trade flows within the Northeast Asian region will more than double by 2000 and triple by 2010 (Table 2).

Trade-Environment Interface

The relationship between rapid growth, rising intra-regional trade, and the environment in Northeast Asia has not yet been charted. Studies elsewhere suggest that economic integration tends to pull environmental standards toward the large-market country. In Europe, where the large market country is Germany, policy convergence has tended to raise environmental standards. Market-driven processes, however, have been greatly conditioned and augmented by the array of institutions created by the EC and EU. The Maastricht Treaty, for example, raised the profile of environmental issues and expanded the realm of environmental cooperation.

Japan is by far the most important market and source of foreign investment in Northeast Asia. Japan's trade with South Korea and China accounts for almost 70 percent of total intra- regional trade. The share of Japan's exports going to Northeast Asia is predicted to increase from 9.2 per cent in 1990 to 12 per cent in 2000, while the import share will increase from 10.8 per cent to 13.0 per cent. Trade between China and South Korea is also significant and growing. By 2000, Chinese exports to South Korea are predicted to be nearly 5 per cent of its total exports, while China will take nearly 8 per cent of South Korea's total exports.

Besides Japan, South Korea, Hong Kong and Taiwan are also important investors and traders in Northeast Asia. These countries tend to have high domestic sanitary and health product standards for imports. However, the region's most important regional environmental problems stem not from the use of products but from the processes of their production or harvesting. Countries do not unilaterally regulate foreign production processes of imported products. Indeed, they are barred by GATT from doing so.

Moreover, the center of economic gravity in Northeast Asia is increasingly China. Already the largest economy in the region, China is growing at the rate of about 12 per cent per year. Under both high and low growth scenarios, China's GNP is expected to triple that of second-place Japan by

2010. As a large-market country, increasing integration with China would likely pull environment standards down (or inhibit their rising) rather than up.

Environmentally unconstrained trade expansion in the region would bring both environmental benefits and costs. Under any scenario, trade openness in North Korea, for example, would likely improve energy efficiency and reduce pollution from what appear to be the world's dirtiest and oldest coal-fired plants. North Korea's juche policy has inhibited the transfer of more modern, cleaner and more efficient technology for nearly fifty years.

On the other hand, there is no regional investment code which would necessarily promote environmentally beneficial technology transfer through foreign direct investment. Anecdotal evidence from China suggests that, to reduce costs, local partners or purchasers ask foreign investors and exporters to strip away safety and environment protection components of their investments. In the Russian Far East, enforcement of environmental regulations is nearly non-existent, either for domestic or foreign investors. Moreover, without common frameworks to govern the sustainable use of the resources and ecosystem services within national boundaries, competitive market forces are likely to accelerate ecological degradation through increased intra- regional demand. Wetlands, coastlines, agricultural lands, and forests are prime candidates for trade-driven degradation.

Common frameworks would ensure a common floor for environmental management. The floor would be in place for the expansion of trade and investment not only within but outside the region. The key question is how to establish a common floor given that Northeast Asian countries differ greatly in terms of types and demands on ecosystems, levels of economic development, and political systems. The problematique, in short, is how to allow for diversity within commonality. Three approaches might be fruitful.

First, rather than adopt uniform standards, Northeast Asian nations could adopt common methodologies and decision rules for setting environment standards through instruments such as impact and risk assessment and Environmental Guidelines for Development Planning. Second, they could develop regional Environment Management Agreements at a sectoral level, especially for heavily-traded primary products. By conditioning trade on sound environmental management, such agreements would utilize trade openness as a mechanism to promote rising environmental commitments. Third, nations could establish common Environmental Guidelines for Development Planning. Such Guidelines could be developed in the course of common development projects, such as the Tumen River Economic Development Area (see below).

Sustainable Forest Development in the Russian Far East

Located primarily in the Russian Far East, the forests of Northeast Asia are an important ecological and economic resource for the region (and indeed, the world). Through increasing regional economic integration, Russian forests are likely to supply an every larger portion of a rapidly rising intra-regional demand for wood.

Demand for wood products is positively related to increases in income. Demand for wood and wood products has grown rapidly with high rates of GNP growth in the region and is projected to increase substantially in this decade. Between 1991 and 2000, total wood demand is expected to increase to about 217 million m3 (roundwood equivalent), an increase of nearly 20 percent. Increasing consumption of industrial wood in China alone accounts for more than two thirds of the projected growth in regional wood demand.

The challenge is to meet increasing wood demand in ways that are both ecologically and

economically sound. There are three broad ways to meet the increased demand: 1) expanding domestic production; 2) expanding intra-regional trade; 3) increasing imports from outside the region. The primary source of extra-regional wood imports has been the West Coast of North America. Environmental concerns, however, are likely to restrict supplies from North America in the future, suggesting that other supply sources, including domestic and intra-regional, will become more important.

The Russian Federation is the only net exporter of roundwood and wood products in the region. About 80 percent of wood exports from the Russian Far East go to East Asia. The forests of the Russian Far East cover about 70 million hectares. With an estimated growing stock of nearly 9 billion m3, they are an immense potential wood resource. Much of the forest is old growth boreal or temperate, single species conifers. The forests provide important ecological services, including habitat for a wide range of endemic and migratory species, watershed protection, and a global store of organic carbon. Much of the forest area is wild and inaccessible, offering a vast potential for tourism, as well as support for indigenous cultures.

Russian and international environmental groups have raised concerns that the Far Eastern forests are under threat from foreign logging companies. Although concessions specify selective felling methods and require reforestation, scientists and environmental groups have documented clearcutting operations which destroyed extensive tracts of forsts and entire watersheds. In one internationally-known case, pressure from Territory governments and environmental groups suspended logging operations of the Hyundai Corporation near the Bikin River Watershed.

Is logging compatible with wildlife conservation and environmental protection? If so, on what scale and under what management regime? The estimated annual growth in the entire region is about 180 million m3 of wood, while the logging rate is only one million m3 per year. However, in many old growth forests, there is zero net annual growth, because annual increment is equal to mortality. Climatic and soil conditions in the Russian Far East make forests especially vulnerable to degradation. Cold temperatures and low levels of sunlight make tree growth rates very low. High levels of humidity prevent degraded forests from turning into deserts but can turn them into swamplands. The combination of forest fires and clearcut logging techniques dramatically decrease turnover of organic material on the forest floor.

There is potential to cut far more wood than is being removed today without squandering the forest resource -- provided that forests are under sustainable, multiple-use management plans. Russian national and local governments have primary responsibility to develop and enforce such plans. However, concerted trade and investment policies of regional trading partners could play an important role in fostering environmentally sustainable and economically optimal forest management. Such policies could be crystallized in a Sustainable Forest Management Agreement.

A recent report to the International Tropical Timber Organization (ITTO) stressed the importance of trade-related incentives for sustainable forest management. Although focussed on tropical timbers, recommendations pertain equally to temperate and boreal forest products. The report found that negative incentives, that is, trade restrictions, do not improve and even undermine sustainable forest management. Positive incentives, on the other hand, can complement and reinforce sound domestic management. The report recommended: a country certification scheme, which would certify that producer countries were implementing specified policies, regulations and management plans;

better market access for timber exports from producer countries which meet the requirements of the certification scheme;

additional financial assistance required for implementing national sustainable management plans

and policies;

species protection for specific tree species in danger of over-exploitation through offtake export quotas.

Such recommendations are feasible in the context of the producer-consumer country framework of the ITTO. No such global framework exists for temperate or boreal forest products and there is no regional forest framework in Northeast Asia. Nonetheless, they provide a useful starting point for further research and regional discussion. Rather than countries, for example, a Northeast Asian scheme might certify individual producers/companies. Rather than providing better access for timber products, a regional approach might develop a broader strategy of Environment Trade Preferences which reward progress toward sustainable forest management with better market access for manufactured or other goods. Countries could also develop guidelines for their own companies undertaking logging operations in the Russian Far East.

Tumen River Area Development Plan

The primary arena for environmental cooperation in the context of economic development in Northeast Asia is the Tumen River Economic Development Area (TREDA). The lower reaches of the Tumen River have been designated as the site of a possible major development plan encompassing China, the DPRK, the Russian Federation, Mongolia and the ROK. As currently envisioned, TREDA consists of that terrain located within conceptual boundary lines drawn from Chongjin in the Democratic People's Republic of Korea, through Yanji in the People's Republic of China, to Nakhodka in the Russian Federation. Still in a formative stage, the vision for the Project is reflected in a recent "master plan" report to the UNDP:

```
     A convenient, reliable, safe and cost-effective road, rail, air and
seaport
     transportation infrastructure along with water, waste treatment and
electrical
     energy will act as catalysts to facilitate trade and spur population
growth and
     industrial development. Providing adequate utilities and improving
     transportation infrastructure for all modes to provide convenient
freight
     distribution and travel links worldwide is a precondition to help
transform the
     TREDA into a major international shipping, trading and manufacturing
zone
     with a favorable investment climate. Such a climate will attract
potential
     foreign investors and accelerate economic growth and prosperity.
```

The five participating countries are currently negotiating a Memorandum of Understanding on Environmental Principles (MOU). If signed, the MOU would represent the first regional environmental agreement in Northeast Asia.. To date, Mongolia, Russia and North Korea have signed. The MOU commits the project to the goals of "environmentally sound and sustainable development." Reports suggest, however, that hinterland, deltaic and adjacent coastal areas are ecologically fragile, and note the paucity of environmental and resource data for the area. Baseline ecological data is crucial to an environmentally sustainable development plan.

A draft Preliminary Environmental Study completed in May, 1994 constitutes the first stage of

environmental assessment. The UNDP-commissioned study concludes that the TREDA spans a region of "globally significant biodiversity values" and "includes a wide range of ecosystems, many of which are themselves regionally or globally significant." It also suggests that the wetlands and marine environment of Posiet Bay in the center of the coastal area of the zone are highly vulnerable to pollution. Although existing levels of population and industry are apparently not degrading this ecosystem, their expansion, the report concludes, "may not be compatible with maintenance of the ecological, tourism and mariculture values."

The draft Environmental Study concludes that an environmental assessment of the Tumen River Project is not "possible or appropriate at this stage in the project because of the nature of the project, the preliminary level of project definition and the lack of coherent and reliable background information" (our emphasis). The Study makes two recommendations. First, that regional strategic environmental planning be undertaken "to identify appropriate and inappropriate activities in specific environments." Second, that institutional and human resource capacities be strengthened to "meet the challenges that will be generated by TRADP." These include environmental quality control, enhancement of environmental assessment capabilities and procedures, and ecosystem and species management.

A Northeast Asian Consultative Commission for the Development of the Tumen River

Economic Development Area has been proposed. The Commission would aim to promote cooperative projects in environmental management, as well as trade, infrastructure and other areas. Adequate management of the Tumen River, however, requires management of the entire watershed which reaches into Mongolia. Moreover, the Tumen is already highly polluted, suggesting that restoration will be a crucial preliminary to development.

IV. Environmental Cooperation in Northeast Asia

The longterm objective of regional cooperation is to develop coherent, coordinated, regional frameworks to govern management of transboundary common pool resources and the trade-environment interface, as well as to capture joint welfare benefits in capacity- building. Frameworks encompass agreed-upon rules and penalties for breaking the rules, as well as economic incentives, voluntary guidelines, standard operating procedures, and even custom. This ensemble of formal and informal constraints and incentives may be called an environmental management regime.

Several environmental management regimes are emerging in Northeast Asia. All six Northeast Asian countries are participating in the Northwest Pacific Action Plan (NOWPAP) which currently targets the Sea of Japan/East Sea of Korea, and the Yellow Sea. Developed under the auspices of UNEP's Regional Seas Programme, NOWPAP states have committed themselves to develop a regional convention to protect and manage the coastal and marine environment and resources of the Northwest Pacific region.

Northeast Asian countries are also participating in the Intergovernmental Oceanographic Commission's Sub-Commission for the West Pacific (WESTPAC). Established in 1989, the program is designed to increase local managerial and technical capacities for research into ocean climate, food resources variability, and geological processes. Since the geographical scope of WESTPAC is vast (stretching from Kamchatka to Wake Island, along the Tuamotu Archipelago and back to Antarctica south of New Zealand), a sub-regional approach was adopted. All the Northeast Asia states except Mongolia are members of a Northwestern sub-region of WESTPAC.

In addition to regional initiatives, Northeast Asian states have concluded a host of bilateral treaties and agreements to promote environmental cooperation, including between Japan and the Russian Federation, China and the Russian Federation, China and the ROK, and the ROK and Japan. There are also regional NGO initiatives to promote environmental cooperation, most notably the Northeast Asia and Pacific Environmental Forum.

One of the most effective ways to promote regional environmental management in Northeast Asia would be to establish an institutional vehicle to spearhead and/or coordinate regional environmental initiatives. The Northeast Asia Environment Programme, which brings together high-level officials primarily for foreign ministries, is an incipient regional institutional vehicle. Under the auspices of ESCAP and supported by the UNDP, the Programme has operated

to date as a series of meetings of Senior Officials. Another emerging institutional vehicle is the Northeast Asian Conference on Environmental Cooperation. This Conference has brought together environment ministry officials, as well as academics and environmental NGOs, in a series of regional meetings.

To be robust, an institutional framework should develop from two directions: from the "bottom up" by undertaking cooperative activities incrementally in a range of areas; and from the "top down" by creating a regional coordination structure to select priorities, provide vision and act as a catalyst for project implementation. A coordination structure could consist of an ongoing Steering Committee composed of senior Foreign and Environment Ministry officials. The Steering Committee would oversee and coordinate ongoing projects and propose new projects. Rather than a centralized institutional structure, the functions of a secretariat would be undertaken at national or local levels by participating countries. A barometer of success would be the density of cooperative activity, both by government and non-government actors.

Three Proposals

Regional efforts at environmental cooperation have been most successful when taken in an incremental, step-by-step approach. In the same spirit, we offer three proposals: 1) Regional Environment and Development Bank; 2) Regional Energy Network; and 3) Northeast Asian Trade and Environment Policy Task Force.

A Regional Bank would aim to mobilize both private and donor sources in providing loans and grants for investment in environmental infrastructure and environmentally- sound development projects. The Bank could offer loans at market rates of interest, as well as on concessional terms. Clients could include private firms, provincial and other local authorities, national governments, and regional groupings such as the TREDA. Private firms, for example, could borrow monies to upgrade or add technology or equipment which enhanced environmental management. The fundamental principle of the Bank would be to integrate environmental principles into development projects.

A Regional Energy Network would provide opportunities for researchers and activists to explore ways in which regional cooperation would enhance the efficiency of energy use and provide for cleaner sources of increased energy supply. The Network would function both to generate and disseminate original research, as well as to create opportunities for information exchange. Participants in the Network could interact electronically as well as hold workshops and seminars.

A Northeast Asian Trade and Environment Policy Task Force would begin to explore the emerging and potential environmental issue involved in the region's increasing economic integration. Composed of researchers in universities and thintanks, the Task Force would consider ways in which increased economic cooperation could yield environmental benefits and the policy frameworks required.

Notes

1. A. La Vina,, M. Leonen and J. Santiago, "Free Trade in the ASEAN and Its Implications on the Environment: A Comparative Critique of Environmental Impact Assessment Systems," Manila: Institute of International Legal Studies, 1994.

2. UNCED, Agenda 21, Paragraph 38:29, June 14, 1992

3. T. Teitenberg, Environmental and Natural Resource Economics, New York: Harper Collins, 1992, p. 54.

4. E. Ostrom, Governing the Commons, The Evolution of Institutions for Collective Action, Cambridge: Cambridge University Press, 1990, p. 5.

5. Ostrom, op cit

6. See L. Zarsky and J. Drake-Brockman, "Trade, Environment and APEC: Imperatives and Opportunities for Regional Cooperation," Center for Asian Pacific Affairs, Asia Foundation, San Francisco, December, 1994; and L. Zarsky, Trade-Environment Linkages and Sustainable Development, Report to Department of Environment, Government of Australia, Nautilus Institute, October, 1991

7 J.H. Primavera, "Shrimp Farming in the Asia-Pacific Region: Environment and Trade Issues and Regional Cooperation," and Mangrove Action Project, "The Environmental and Social Costs of Developing Coastal Shrimp

Aquaculture in Asia," papers to Workshop on Trade and Environment in Asia-Pacific: Prospects for Regional Cooperation, Nautilus Institute, September, 1994.

8 .J. Boyce, "Wiping Out 7000 Years of Biodiversity," Nautilus Bulletin, December, 1993, p. 8.

9. G.M. Grossman and A.B. Krueger, "Environmental Impacts of a North American Free Trade Agreement," Discussion Paper #158, Woodrow Wilson School of Public and International Affairs, Princton University, 1991.

10. See L. Zarsky, "Lessons of Liberalization in Asia: From Structural Adjustment to Sustainable Development," in Regional Financing for the Environment, Manila: Asian Development Bank, 1995.

11. See Associated Press, "Gates Warns of Contamination in Former Soviet Union, Washington Post, August 17, 1992, p. A7; W. Potter, "The Future of Nuclear Power in the Russian Far East," paper to the Conference on U.S.-Japanese Cooperation in the Development of Siberia and the Russian Far East, Monterey, California, July 22, 1993.

12. D. Fang, F-G. Xu , and D-X. Qui, "Shentou Thermal Power Station: China," in P. Hills and K.V. Ramani, eds, Energy Systems and the Environment, Asia and Pacific Development Centre, Kuala Lumpur, 1990, p. 146.

13. N. Bhatti and D. Street, "Acid Rain in Asia," Enivronmental Management, 16, 4, 1992. For a description of this study, see J. Cofala, "Modeling Acid Rain in Southeast Asia," Options, Winter 1993, pp. 10-11; the actual scope of this study is the whole of Asia, including Northeast Asia, not just what is commonly known as Southeast Asia.

14. N. Bhatti, D. Streets, op cit, pp. 541-562; H. Akimoto, H. Narita, "Distribution of SO2, NOx and CO2 Emissions from Fuel Combustion and Industrial Activities in Asia with a 1o x 1o Resolution," Atmospheric Environment, 28, 2, 1992, pp. 213-225; and R.T. Crow, "Air Pollution and Capacity Building in Northeast Asia: Suggestions for Cooperative Action," discussion document for the North East Asia Regional Environmental Program, February 25, 1994

15. People's Republic of China, National Report of the People's Republic of China on Environment and Development, report to the UN Conference on Environment and Development, (translation) August 1991, p. 30; see also Z. Feng and N. Ogura, eds, Proceedings of China-Japan Joint Symposium on the Impacts and Control Strategies of Acid Deposition on Terrestrial Ecosystems, Research Center for Eco-Environmental Sciences, Chinese Academy of Sciences; and Ministry of Education, Science and Culture of Japan; Beijing, November, 1994.

16. M. Valencia, L.Chen, Z.Chen, "Yellow Sea Marine and Air Pollution: Status, Projections, Transnational Dimensions and Possibilities of Cooperation," (mimeo), East West Center, Honolulu, February 5, 1991, p. 5

17. On the jurisdictional disputes, see J. Prescott, Maritime Jurisdiction in East Asian Seas, Occasional Paper 4, Environment and Policy Institute, East West Center, Honolulu, 1987

18. See Administration of the President of the Russian Federation, Facts and Problems Related to the Dumping of Radioactive Waste in the Seas Surrounding the Territory of the Russian Federation, October 24, 1992; translated by Greenpeace Russia, April 22, 1993.

19. See W. Broad, "Disasters with Nuclear Subs In Moscow's Fleet Reported," New York Times, February 26, 1993; J. Handler, "Russian Navy Nuclear Submarine Safety, Construction, Defense Conversion, Decommissioning, and Nuclear Waste Disposal Problems," Greenpeace Nuclear Free Seas report, Washington DC, February 15, 1993.

20. "National Report from Russia Proposing UNEP Action Plan on the Natural Resources and Environment Management in the North-West Pacific," Second Meeting of Experts and National Focal Points on the development of the North-West Pacific Action Plan, United Nations Environment Programme, Beijing, October 26-30, 1992, p. 4.

21. "National Report (Japan)," Second Meeting of Experts and National Focal Points on the Development of the North-West Pacific Action Plan, United Nations Environment Programme, Beijing, October 26-30, 1992, p. 3.

22. M. Valencia (Editor/Author), "International Conference on the Sea of Japan," Occasional Papers of the East-West Environment and Policy Institute, Paper No. 10, East- West Center, Honolulu, 1989, p. 169.

23. M. Valencia, ed. "International Conference on the Seas of Japan and Okhotsk, Nahodka, USSR, September 1989: Transnational Resource Management Issues and Possible Cooperative Responses; Summary of Soviet Papers,"

(mimeo), East West Center, April 1991, pp. 27-28.

24. A. Szekely and B. Kwiatkowska, "Marine Living Resources," in P. Sand, The Effectiveness of International Environmental Agreements: A Survey of Existing Legal Agreements, Grotius Publications, Ltd., Cambridge, United Kingdom, 1992, p. 270.

25. T.Yamamoto and H. Imanishi, "Use of Shared Stocks in the Northwest Pacific Ocean with Particular Reference to Japan and the USSR," in J. Marsh, Resources and Environment in Asia's Marine Sector, Taylor and Francis, London, 1992, p. 39.

26. D. Johnston and M. Valencia, "The Russian Far East and the North Pacific Region, Prospects for Cooperation in Fisheries," paper for Workshop on Russian Far in the North Pacific Region: Opportunities for and Obstacles to Multilateral Cooperation, East West Center, Honolulu, August 19, 1993, pp. 3-5.

27. D. Pitt, "Fishing Countries Split on Harvests, Differences Over the Pollock Catch in Russian Waters Flare at U.N. Parley," New York Times, August 3, 1993.

28. P.Johnston and M.Valencia, op cit, pp. 29, 42.

29 L. Zarsky, P. Hayes, and K. Openshaw, Regional Environmental Cooperation in Northeast Asia, Report to Regional Bureau for Asia and the Pacific, UN Development Program, New York, August, 1994, Table 4.1.

30. L. Zarsky, P. Hayes, and K. Openshaw, Regional Environmental Cooperation in Northeast Asia, Report to Regional Bureau for Asia and the Pacific, UN Development Program, New York, August, 1994, Table 4.1.

31. Unauthored, "Principles of Biological Diversity of the Khanka Lake Basin Ecosystem," (mimeo) Vlaidvostok, Pacific Institute of Geography, Russian Academy of Sciences, undated.

32. T. Akaha, "International Cooperation for the Sustainable Resource Development of the Russian Far East," paper to the Workshop on Trade and Environment in Asia-Pacific: Prospects for Regional Cooperation, Nautilus Institute, September, 1994.

33. K-Y. Jeong, S. Kurbayashi, and H. Takahasi, "International Trade in NEA: Past, Present and Future," Working Paper Number 1, Project on Economic Cooperation in Northeast Asia, Sasakawa Peace Foundation, February, 1995.

34. D. Vogel, The Greening of Trade Policy:National Regulation in a Global Economy, Cambridge: Harvard University Press, 1995.

35. B. Verhoeve, G. Bennett, D. Wilkinson, Maastricht and the Environment, Arnhem, Netherlands: Instittue for European Environmental Policy, 1992.

36. Derived from K-Y. Jeong, op cit, Table 2, p. 32.

37. K-Y. Jeong, op cit, Table 1, p. 31.

38. L.Zarsky, P. Hayes, and K. Openshaw, op cit, Table 5.2.

39. V. Krever, E. Dinerstein, D. Olson, and L. Williams,eds, Conserving Russia's Biological Diversity, An Analytical Framework and Initial Investment Portfolio, Washington: World Wildlife Fund, January, 1994, p. 120.

40. London Environmental Economics Centre, The Economic Linkages Between the International Trade in Tropical Timber and the Sustainable Management of Tropical Forests, Main Report to the International Tropical Timber Organization, March 19, 1993.

41. Stewart, J.B. and B.H. Sewell, "Background Paper on Regional Environmental Cooperation," Prepared for Second Meeting of Senior Officials on Environmental Cooperation in Northeast Asia, Beijing, September 23-25, 1994.

View this online at: https://nautilus.org/eassnet/the-domain-of-environmental-cooperation-in-northeast-asia/

Nautilus Institute
608 San Miguel Ave., Berkeley, CA 94707-1535 | Phone: (510) 423-0372 | Email: nautilus@nautilus.org