ENVIRONMENTAL ISSUES AND REGIMES IN NORTHEAST ASIA Fall 1994

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Peter Hayes and Lyuba Zarsky

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Northeast Asia is an excellent region in which to study environmental conflict and cooperation. As a "latecomer" to environmental cooperation, the states of Northeast Asia have the opportunity to learn from prior regional experience. Northeast Asia also poses many challenges to paradigms of environmental cooperation derived from other regions. As regimes are forming only now, it is possible to study them at an early stage to compare their structure, content, and driving variables with environmental regimes found in other areas such as South Asia and the Mediterranean.

In Northeast Asia, there is almost no "habit of dialogue" on which to draw for environmental cooperation, or even consensus on what constitutes the region. The "region" itself contrasts with other regions in that it contains the world's three greatest powers (the United States, China, and Russia), as well as an economic superpower (Japan), and two small powers (the two Koreas). Indeed, the states in the region that have been long standing antagonists during the colonial era, World War II, the Korean War, and the Cold War and regional hostilities continue in spite of the end of bipolar confrontation between the United States and the former Soviet Union.

In addition, there are significant environmental problems in Northeast Asia at a regional level (transboundary acid rain); environmental problems and management issues that straddle one or more borders; as well as radical differences in national institutional, economic and technological capabilities with which to respond to national and international regional imperatives. In section I, we describe these environmental problems.

In section II, we describe and analyse the emerging regimes that address this issues. These include UNEP's Northwest Pacific Action Plan or NOWPAP, the IOC WESTPAC, the ESCAP/UNDP Northeast Asian Environment Programme, and the UNDP Sub Regional Programme.

These emerging regimes are driven partly by environmental imperatives; partly by bureaucratic competition, and partly by leadership aspirations for geopolitical or geoeconomic leadership, especially by smaller states such as South Korea. There is no single regime at this time, but rather, a series of emerging, overlapping regimes with different styles and institutional implications.

In section III, we addess five critical issues which arise from consideration of these evolving environmental problems and emerging, partial regimes in Northeast Asia, namely:
capacity building; spillover effects between environmental issues (especially from climate change); monitoring and enforcement issues; financing; and, the importance of non governmental organisations and public awareness. In conclusion, we frame a set of questions for continuing research and analysis in light of what can be learned from the Northeast Asian experience.

I. ENVIRONMENTAL ISSUES IN NORTHEAST ASIA

In this section, we present brief profiles of critical environmental issues which are amenable to regional cooperation in Northeast Asia. These are:

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Transfrontier air pollution (acid rain only);
Marine pollution (radionuclides and oil only);
Migratory animals (fisheries and birds only);
Trade-environment linkages (including forestry).
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1.1 Transfrontier Air Pollution

Transfrontier air pollution at a regional level in Northeast Asia refers primarily to the "routine" atmospheric transport and deposition of particulate matter emitted mostly in the course of energy production, known as "acid rain.",

High levels of sulphur emissions from coal burning power plants and factories in China, North Korea and elsewhere in the region are the main sources of acid rain. 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 absolutely and relatively high levels of sulphur dioxide emissions when the coal is burned in inefficient plants. This acid rain may decrease biomass productivity and thereby reduce its carbon uptake, and degrade existing forests (and thereby cause the recipient country's

carbon emissions to increase).

Many scientists believe that the Korean Peninsula and Japan suffer from transfrontier acid rain originating upwind 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.

The precise 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 of acid rain 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.

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. The Asian Development Bank has mapped the likely geographical distribution of acid rain by using regional sulphur dioxide emissions and regional atmospheric circulation as proxies to suggest where acid rain may occur. Acid conditions (that is, low pH values such as 4.5) occur in Japan and southern China; elsewhere, pH values are much higher., The ADB-supported regional investigation of acid rain suggests that Northeast China, Japan and the two Koreas are relatively vulnerable to acid rain deposition, especially in winter, due to the combination of high deposition, and sensitive soils, vegetation, and materials.

Fortunately, the problem is amenable to technological controls at source, at a cost. A modern power plant with glue-gas desulphurisation equipment can remove more than 90 percent of the emissions with ease.

Also, countries in the region are moving to establish the requisite monitoring of acid rain deposition. South Korea, for example, maintains a network of 65 acid rain monitoring sites and is opening new sites on the southwest coast and on Cheju Island in the near future. The National Institute of Environmental Studies in Japan has convened a number of regional workshops on acid rain (the last one was held in January 27-29, 1993 in Tsukuba City and was to estimate an inventory of pollution and to determine regional monitoring protocols for acid rain, especially for SOx and NOx. Much remains to be done in terms of establishing common monitoring methodologies, comprehensive baseline monitoring, and ecosystem impact studies.

1.2 Marine Pollution

Marine pollution occurs in an area of overlapping and contended maritime jurisdictions, hindering and complicating joint environmental management. East Asian seas are also semi-enclosed and therefore 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. For reasons of brevity, we focus here on just one area of the region's seas, the Sea of Japan.

Undoubtedly, the most important sources of marine pollution in the Sea of Japan are:

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Coastal (urban, industrial, port and riverine) in-flows
Shipping and industrial waste dumping at sea
Radioactive waste disposal
Oil exploration and transport.
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The projected economic growth of Northeast Asia implies 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.

1.2.1 Radioactive Waste Dumping: 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's nuclear submarines lack funds and facilities to remove old fuel rods, let alone install new rods. Russia's military forces are unable to deal with the radioactive legacy of the Cold War. It is urgent to remove the nuclear reactors and fuel from decommissioned nuclear powered warships, especially submarines, for safe storage and disposal. To end Russian dumping of low- and high-level wastes at the four sites in the Seas of Japan (and Okhotsk), 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.

1.2.2 Oil Pollution: The monitoring of chemical pollution such as oil in the Sea of Japan is conducted at an existing network of stations which measure pollution three times (or more) per year. Standard techniques are used which establish the distribution of pollutants and their relationship to hydrometeorological conditions. This joint monitoring effort has been underway since 1989, and involved joint North Korean-Soviet expeditions into the Sea of Japan in 1989-90.

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 (for example, at the Russia's Golden Horn Bay). Another measure of oil pollution--the concentration of tarballs in the ocean water--ranges from 0.15-1 mg/m3. The concentration is high 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 balls drifting or cast ashore since 1975 has fallen since 1985, but increased in 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 a near doubling in the spill rate and a near tripling in the spill volume for recorded spills along its coast (see Table 1.1). Major oil spills have occurred, including the sinking of a tanker in February 1988 which damaged 2,000 hectares of marine aquaculture at Youngil Bay; and a tanker collision in July 1990 which released 1.5 million liters of bunker C oil. In August 1993, a tanker collided with another ship off Pusan and spilled 225 tonnes of bunker oil in a nine mile long slick that threatened South Korea's most popular beaches.

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. Data is needed on estimated spill rates and number of spills per volume of oil produced or handled, and mean or median size of spills for the East Asian region and Sea of Japan to facilitate analysis of the risks of oil pollution, whether from offshore oil production, coastal refining facilities and ports, or from tankers in sea lanes. Research is also needed on 1) the physical fate of oil on surface waters, in the water column, and on bottom sediments; 2) the biological effects on fish, shellfish, seabirds, shorebirds and waterfowl; on seasonal primary, secondary and benthic productivity; and 3), on economic damage including cleanup costs.

Prevention of marine pollution is not yet a major environmental issue in the littoral states for the Sea of Japan. However, 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.

These latter problems can hinder the development of collaborative approaches to reducing marine pollution because the legal status of semi-enclosed oceans remains ambiguous under customary law and the Law of the Seas. As Mark Valencia puts it:

0. 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.

The multiple environmental problems that afflict the Sea of Japan--all of which involve multiple economic sectors and overlapping jurisdictions, and all of which are linked to marine pollution--entail a complex cooperative management scheme with very wide scope.

A first step must be to obtain scientifically valid data on pollution levels. Achieving this goal requires the use of sophisticated research equipment. As it is available in sufficient amounts and quality only in Japan and South Korea, the first step to controlling marine pollution in the Sea of Japan must be a joint effort to achieve a comprehensive and complete regional monitoring program to determine its ecological status. 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.

Russia has proposed that a regional center be established to expand the marine pollution observation system, to conduct joint research expeditions in the Japan and Yellow Seas, and to set up a data base on marine environmental quality, a proposal which the Republic of Korea has also made. The Republic of Korea has also suggested that an international agreement for prevention of marine pollution in the region should be concluded and that a regional oil spill contingency plan be established to respond to accidental releases.

Table 1.1: Marine Oil Spills Reported by Republic of Korea

Sources: UNEP, "Environmental Problems of the Marine and Coastal Area of Korea (National Report)," 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. 17; "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, Table 3; T. Grigalunas et al, "Adaptation of an Integrated, Ocean Systems/Economics Damage Assessment Model to Korea: Some Preliminary Results," in J. Marsh, Resources and Environment in Asia's Marine Sector, Taylor and Francis, London, 1992, p. 338.

1.3 Migratory Animals-Fish and Birds

In this section, we describe the basic dilemmas involved with joint management of migratory fish and bird species in East Asia. For reasons of space, we do not address the issue of trade in endangered species, nor the preservation of critical habitats (especially transborder areas) although these are all important environmental priorities for regional action.

1.3.1 Migratory Fish: In terms of tonnage produced, 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 relating to the Seas of Japan and Okhotsk that would avoid finalising 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 organisation. Although it would require some leadership--possibly by Japan or Russian fishery organisations--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.

1.3.2 Migratory Birds: The wetlands of Northeast Asia support over 150 species of waterbird., including ducks, geese, and cranes. Twenty seven of these are listed as threatened in the IUCN Red Data Book, and some are nearly extinct. Pressures on these birds include the loss of wetland habitats for nesting, feeding, and migratory stopover to urban, agricultural and coastal development, hunting, and pollution.

In Japan, for example, nearly 40 percent of its 32,170 km of coastline have been modified heavily. The total area of mudflats (beaches, estuaries, and lagoons) fell from 82,621 to 53,856 hectares between 1945 and 1989.

Migratory cranes symbolize these exterminative pressures. They migrate over a variety of routes in and across Northeast Asia. White-naped cranes, for example, have been tracked by satellite flying from Izumi in Japan, to stopover points in South Korea, on the Korean DMZ, North Korea, Russia, and China.

In both Koreas, planned reclamation of estuaries, shallow bays, and inter-tidal mudflats threaten huge areas of highly productive coastal habitat. One study for South Korea anticipates the loss of 65 percent of total coastal wetlands if development plans are implemented. Massive coastal reclamation and river modification is also underway in North Korea, with little consideration to the impact on migratory species.

Non governmental organisations and official research institutes have created a strong network of projects to band and to monitor the annual migration of birds such as the cranes.

The Wild Bird Society of Japan, for example, has worked closely with Chinese and Russian counterparts; and attended a DPRK-Japan symposium on migratory bird conservation in 1987 during which both countries agreed to participate in banding projects on Chinese Egrets. Multiple bilateral treaties between countries in Northeast Asia have been signed and implemented in the past decade. In 1994, South Korea proposed a regional, multilateral treaty to protect migratory birds and their habitats for consideration by the six states engaged in the Northeast Asia Environmental Program.

1.4 Sustainable Forest Development

Within the parameters of the Northeast Asian region lie the world's most extensive remaining forests--and some of the largest and fastest-growing appetites for timber. Extending from the Urals to the Pacific coast and from the Chinese and Mongolian borders to the Arctic, Siberia cover 1280 million hectares, which is about 30% larger than the continental United States. About half of this area is covered with forests, covering about 20% of the world's forested area and nearly 50% of the world coniferous area.

The forests of Siberia offer not only potential for human economic development; they also provide important ecological services to Russia, the Northeast Asian region and the world as a whole. These services include habitat for flora and fauna, many of which are endemic. The Far Eastern regions of Primorski and Khabarovski Krais contain a bio- diversity "hot spots" which contain a rare combination of flora and fauna species found in northern and southern regions of the earth. The Siberian tiger, for example, is the only tiger found in a northern climate. Another global service is carbon sequestration. According to one estimate, 40 billion tons of carbon are stored in Siberian forests, providing a safeguard against global warming.

The Far Eastern part of Siberia contains some of the most valuable and, until recently, least accessible and utilised of Siberia's forest resources. In 1988, the Russian Far East accounted for 65% of Soviet forest land, 66% of the nation's mature and over-mature timber, and 80% of the unstocked forest land. Until recently, however, much of the area was considered inaccessible for timber use. About 53% of Far Eastern timber was considered to be currently or potentially accessible in 1988.

With little domestic processing capability, Russia's forest exports center primarily on raw logs. The primary exports markets are in Asia, especially Japan and China and increasingly South Korea. With a large, domestic timber processing industry, Japan is the world's largest importer of raw logs. In 1989, Japan accounted for 52% of total world imports of saw and veneer logs, up from 43% in 1965. Russia's forest product exports are primarily logs and Japan is its largest market. Nearly 55% of total Soviet Union log exports were to Japan in 1988. With China accounting for another 26%, Northeast Asian countries were the destination for 81% of Soviet log exports. South Korea is also increasing its demand for Russian Far East timbers, suggesting an even greater role for regional markets.

Russian forests, including in the Far East, suffered poor management practices during the Soviet era, creating waste of forest resources. One study published in 1988 found that: ...the best stands are cut, the rest are left in a confusing array of cut and uncut stands unprofitable for further exploitation, trimmings and trunks are ignored, scrap suitable for processing is burned needlessly, and logging enterprises are prematurely shutdown. Of the 400 million cubic meters harvested

annually, 160 million cubic meters are lost in various stages of production; only 51 percent reaches the consumer and only 8 percent of the remainder (scrap) utilised anywhere.

Poor management practices, including insufficient reforestation, undermined the longterm ecological sustainability of the forest eco-systems and therefore, of the forest as an economic resource. In the cold and humid climate of the Russian Far East, forest stands grow and regenerate slowly and ecosystems are not highly resilient to change. Without careful and selective cutting and adequate reforestation efforts, cut forest-lands can become swamplands. In drier parts of the world, excessive or inappropriate logging can generate or exacerbate a process of desertification. In the Russian taiga, the analogous process is one of "swampification."

Clearcutting was the primary form of logging during the Soviet era. Moreover, reforestation rates were too low to support regeneration. Natural regeneration was insufficient due to "inappropriate logging methods destroying the undergrowth, inadequate assistance of natural regeneration, and inefficient forest fire protection." While some reforestation were undertaken, the overall rate of reforestation was low. According to one estimate, reforestation rates in Siberia should be 20-50 percent greater than the level of the early 1990s.

The period of the Russian Federation has not improved either logging practices or reforestation rates. Indeed, the collapse of central authority, the economic crisis in the Far East, and the new openness to foreign investment, including in the forestry sector, have worsened the prospects for sustainable forest development in the Far East. In a highly contentious and internationally known case, the South Korean company Hyundai was confronted by a coalition of environmentalists and indigenous people seeking to stop clearcutting in the Bikin River Watershed area. Despite promises to do so, Hyundai apparently undertook no reforestation efforts. It also conducted clearcutting rather than selective logging operations.

Rapid growth in China is fuelling increased demand for Siberian forest timbers. The total trade to China is not fully accounted for in national statistics, since timber is sold via South Korea traders based in the United States. Demand from Japan and South Korea is also increasing as traditional timber sources in the Northwest of the United States are reduced for conservation reasons. One detailed study of Russian timber sources both concluded and predicted that the forest industry in the Russian Far East "must in addition to domestic and other internal demand...also meet the export requirements of the Pacific Basin."

To meet the development demands of the region while maintaining the integrity of the forest eco-system, a sustainable forest management regime must be created in Northeast Asia. Regional cooperation is needed in three broad areas: i) to help build administrative and regulatory capacities in the Russian Far East; ii) to create regional Forest Codes of Conduct for foreign investors in forest operations; and iii) to manage and reduce the growth in regional timber demand. Cooperation would also help to transfer better forestry technologies and to manage forest fires, including across the China-Russia and China-Mongolia border.

3.5 Regional Economic Integration and the Environment

The countries of Northeast Asia are increasingly interested in prospects for regional economic

cooperation. Interest stems from three sources. First, the end of the Cold War has softened bilateral hostilities and nurtured bilateral commercial relations, including between China and South Korea, China and Japan, and Russia and all its Northeast Asian neighbours. Second, the collapse of the Soviet Union abruptly cut off the supply line to the Russian Far East from European Russia. Economic necessity sparked a new Russian openness to trade and investment by Chinese, Korean and Japanese firms and families. Third, the national economies of the region are characterized by differing and potentially complementary economic capabilities. Japan and South Korea have technological and financial strengths, China has a large and literate labor force, and Mongolia, the Russian Far East, and North Korea have a large base of primary resources, including forests and minerals.

Political and economic factors are generating momentum toward regional economic integration. Intra-regional trade apparently increased steadily throughout the 1980s and early 1990s. The precise extent of intra-regional trade cannot be ascertained, since data are hard to obtain and are unreliable. 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 trade between China and South Korea and China and Russia in the past three years suggest even more rapid growth. Intra-regional trade accounted for 10.8 percent of total world trade in 1989.

Although the absolute level of trade interdependence is still low, it is growing. Most important, it is growing despite the lack of government agreements or policies of the sort that promoted European economic integration. In this, it resembles the rest of Asia-Pacific, where economic integration has been driven by markets, national policies, and bilateral agreements, rather than regional policies.

Intra-regional trade figures mask the importance of several bilateral trade relationships in the region, especially between Japan-South Korea and Japan-China. Exports to Japan, for example, accounted for 14.5% of all Chinese exports in 1992, while imports from Japan comprised 17.9% of total imports. South Korea is likewise heavily integrated with Japan: imports accounted for 23.8% of total South Korean imports in 1992, while exports to Japan comprised 15.1% of total exports. Indeed, Japan is by far the most important trading power in the region, with its trade with South Korea and China accounting for almost 70% of the total trade in Northeast Asia. Trade between China and South Korea is also significant and growing, although it remains unofficial and thus unaccounted for.

Intra-regional trade figures are typically derived from national trade statistics. A more meaningful gauge of regional economic integration would be obtained by data disaggregated at the provincial level. According to one Chinese study, the Northeast provinces of China including Heilongiang, Jilin, Liaoning and Tianjin export 44% of their total exports to other countries in Northeast Asia. In the Russian Far East, Chinese imports of textiles have surged since borders were relaxed in the early 1990s. According to a leading Russian economist, living standards Russia's Khabarovskii Krai would drop by 30% if imports were cut off.

Economic integration suggests that there are benefits in regional cooperation in managing links between trade and environmental policy and more broadly between economic and environmental policy. It also suggests that there are both environmental and economic costs in not doing so. The costs stem from two directions. On the economic side, a patchwork of national environmental policies increases the transactions costs of trade. Exporters, importers and investors must spend

time and money first gaining information about second conforming to different national regulations. Costs of enforcement are also likely to be higher with a variety of national regulatory frameworks, especially if there are fundamental differences of philosophy and social objectives.

On the environmental side, regional trade integration accelerates economic growth, increasing demands for resource inputs and ecological services. China's GNP, for example, is growing at the rate of around 12% per year. Unless accelerated growth occurs within resource management policies which internalize environmental costs and stay within absolute ecological limits, it will accelerate environmental degradation and resource depletion.

Except for transboundary open-access resources, such policies could be left to national governments alone. If all nations undertook sound national environmental management, there would be no problems of resource-depleting growth or the cross-border issues, such as air pollution, which flow from it.

Economic integration, however, both reflects and intensifies pressures to be competitive in regional markets. Intense competition for export markets, resources and foreign investment can lower or retard the raising of environmental standards. In Northeast Asia, a "pollution haven" or "resource extraction haven" strategy may be especially attractive to nations seeking to woo Japanese companies facing increasingly stringent domestic environmental regulations (as well as rising labor costs); or seeking foreign investment in the exploitation of forest, mineral and ocean resources. Common regimes also enhance the strength of monitoring and enforcement of environmental regulations.

The need to promote environmentally sound regional trade patterns does not necessarily suggest the retardation of processes of trade liberalization and regional integration. Trade openness itself can help to improve environmental management, in part because trade and foreign investment act as a transmission belt for regulatory standards, as well as technology transfer. Countries with the largest markets, most advanced technologies, and foreign investment funds (and foreign aid) tend to be the pace-setters for the regionally integrated countries. If product standards are low in the large-market country, they will pull regional standards down. On the other hand, if environmental standards in the region's largest markets are high, trade will pull national standards up.

Japan is by far the largest market and source of foreign investment in Northeast Asia. South Korea and Taiwan are also important investors and traders. All three countries tend to s high sanitary and health product standards for imports. However, the region's most important regional environmental problems stem not from the use of products from the processes of their production or harvesting. Countries do not regulate foreign production processes of imported products. Indeed, they are barred by GATT from doing so.

Establishing common environmental process and product standards would reduce the transactions cost of trade and set a common floor for environmental management. However, the countries of the region differ greatly in terms of types and demands on ecosystems, levels of economic development, political systems, and (potentially) social preferences. Ecological diversity suggests that appropriate standards be set at the ecosystem level, rather than regional, national or even provincial.

The primary challenge facing Northeast Asia, or any other region undergoing a process of economic integration, is two-fold: first, how to develop a common regional framework for environmental management in the face of ecological and social diversity at national and sub-national levels; second, how to manage specific issues arising from trade- environment links in the context of broad regional trade-environment agreements.

Three innovative approaches to regional trade-environment cooperation could help to meet the challenge: i) harmonizing standard-setting methodologies; ii) enacting Environmental Sectoral Agreements; and iii) developing common Environmental Guidelines for Development Planning. Standard-Setting Methodologies: The need for diversity-within-commonality might be approached by seeking to harmonize not environmental standards per se but the methodologies by which standards are set. Examples are Environment Impact Assessment systems and Health and Environmental Risk Assessment and Ordering Methodologies. Environmental Resource Agreements: The need to manage specific trade-environment issues could be addressed by developing Sectoral Environmental Agreements, especially for primary resource-intensive sectors such as agriculture, tourism and forest products. Such Agreements would aim not to manipulate prices but to establish common policy frameworks. In agriculture, for example, common policies could be developed to govern the use of input subsidies, zoning regulations, reporting and labelling requirements, including for pesticides, crop rotation requirements, etc. Another innovation might be a Farm Licensing System: farmers would need to show that they had a Sustainable Management Plan as a condition for obtaining a license to farm. Such a system would allow for diversity not just between nations but between individual farms. While broad guidelines and principles would be specified, farmers would be able to implement them according to the particular conditions of their own farm/locale.

Environmental Guidelines for Development Planning: Environmental guidelines for development planning aim to provide a framework in which to manage economic growth. Guidelines could encompass issues such as integrated land use planning; infrastructure requirements for projected growth in local industries and population, including energy, water and sewage; and integrated industry mix/eco-system planning.

Regional cooperation in establishing such Environmental Guidelines would promote learning and build management capacities among member countries. Setting the Guidelines in common would help to reduce cross-border pollution and act to provide a higher common floor for environmental management in the region.

Plans for joint development of the Tumen River area may offer a pilot project for developing regional Environmental Guidelines. The UNDP-sponsored Tumen River Area Development Project calls for infrastructure and industry development along the Tumen River delta area extending from Chongjin, North Korea to Vladivostok, Russia and inland to Yanji, China (see Map 3.1). The Project has five members: China, the Russian Federation, Mongolia, South Korea, and North Korea. Still in a formative stage, the vision for the Project is reflected in a recent "master plan" report to the UNDP:

0. 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 [Tumen River Economic Development Area] into a major international shipping, trading and

manufacturing zone with a favourable investment climate. Such a climate will attract potential foreign investors and accelerate economic growth and prosperity.

Member countries have agreed to a set of Environmental Principles as guideposts for the design of the Tumen River project. In October 1992, a preliminary environmental assessment was presented to the Programme Management Committee's second meeting. The report stated that the hinterland, deltaic and adjacent coastal areas were ecologically fragile, and noted the paucity of environmental and resource data for the area.

In May 1993, the third meeting of the Programme Management Committee reviewed a draft set of "Environmental Principles" with the following objectives:

0. A project goal will be to achieve "environmentally sound and sustainable development" in accordance with UNCED, international environmental law and agreements, and multilateral donor requirements;

0. Participating governments will cooperate and coordinate with each other on environmental concerns and will be responsible for preparing impact assessments of projects on national territory, but coordination of environmental protection of projects developed within the zone by the Tumen River Development Corporation will be the responsibility of institutions developed to implement the scheme.

0. Member states will provide for non-governmental organisations to participate in environmental assessment procedures.

However, very little ecosystem study or environmental assessment has been undertaken, especially of the vast and ecologically fragile wetland areas of the Tumen River delta. Without baseline ecological data, it is not possible to design 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 to pollution. While 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."

Most significantly, 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

II. ENVIRONMENTAL REGIMES IN NORTHEAST ASIA

In this essay, we describe four emerging regional environmental management regimes in Northeast Asia. These include UNEP's Northwest Pacific Action Plan or NOWPAP, the IOC WESTPAC, the ESCAP/UNDP Northeast Asian Environment Programme, and the UNDP Sub Regional Programme.

2.1 Northwest Pacific Action Plan (NOWPAP)

The UNEP Regional Seas Programme was initiated in 1974 as a global program implemented through regional components. At present, it comprises of ten regions; three more regional programs (including NOWPAP) are under development. Over one hundred and forty coastal states and territories participate in the program. The divisions of the Cold War combined with the non-membership of United Nations of the two Koreas blocked UNEP from implementing a regional program in the Northwest Pacific.

In May 1980, at the initiative of states bordering the semi-enclosed seas of the Northwest Pacific, the UN Environment Programme (UNEP) Governing Council decided to prepare new action plans for seas not yet covered by UNEP's Regional Seas Programme. In response, the littoral states promptly nominated National Focal Points to develop the NOWPAP. Officials from the six concerned states met informally in Nairobi in May 1991 at which time they reaffirmed their governments' willingness to initiate the NOWPAP. Due to the wide range of early suggestions as the content of the Action Plan, UNEP convened an early formal consultative meeting in Vladivostok in October 1991 in conjunction with the Center for International Projects and Pacific Oceanological Institute. Experts from five national delegations (North Korea did not attend) reported on aspects of the marine environment. The Japanese report addressed marine pollution monitoring in adjacent seas of Japan and water quality management; the former Soviet, Chinese, and South Korean reports dealt with fundamental and applied marine pollution studies, pollution-related marine ecological problems, and regional maritime pollution monitoring.

The participants agreed that National Focal Points henceforth would prepare national reports for future meetings. These reports are to cover the status of the marine environment and coastal areas; national policies and measures to deal with marine pollution; and proposals for steps to be taken in a Regional Action Plan. They noted that regional cooperation in response to a pollution emergency would be appropriate for joint activities in the future.

At the second meeting of experts and National Focal Points, held again in Beijing in October 1992, all six countries were represented. At this meeting, a consultant presented a draft Regional Action Plan which was reviewed, and in some important respects, modified (at the insistence of Japan, for example, that the section on Biodiversity and Ecological Resources be deleted, which was agreed except for the section on wetland reserves and genetic resources).

The geographical area to be covered by the Action Plan is not entirely clear. At the first meeting, the majority view was that it would cover initially the marine environment and coastal areas of the Japan and Yellow Seas, without prejudice to its possible future extension to cover additional marine environment and coastal areas of participating states. The delegates have also reserved their right to call the Sea of Japan by different names. The 1993 meeting formally endorsed the following definition of scope:

0. [M]arine environment and the coastal areas of the Sea of Japan and the Yellow Sea, which are generally considered as the area north of the line between the mouth of the Changjiang River and Cheju-do Island, without prejudice to its possible future extension to cover additional marine environment and coastal areas of the participating countries as may be determined at a later stage.

The fulcrum of regional programs is the Action Plan. The draft Action Plan discussed at the November 1993 NOWPAP meeting in Bangkok. Most fundamentally, the NOWPAP states committed themselves to:

0. [W]ork towards the development of a regional convention for protection and management of the coastal and marine environment and the resources of the North- West Pacific region, and will explore the formulation of appropriate protocols that could be adopted to formalize the commitment to mutual cooperation, assistance and collaboration especially in the case of emergencies (and the prevention of disposal of radioactive waste at sea.)

The strategy for regional coastal and marine environmental management accepted in Bangkok has five elements: the monitoring and assessment of environmental conditions; creation of an efficient and effective information base; integrated coastal area planning; integrated coastal area management; and establishment of a collaborative and cooperative legal framework.

The draft NOWPAP Action Plan therefore concentrates on the short and medium-term assembling the basic information needed for regional management of coastal and marine resources. To that end, five objectives were adopted for implementation upon finalisation of the Action Plan:

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     (i)  To assess regional marine environmental conditions by coordinating
and
     integrating monitoring and data gathering systems on a regional basis,
making the best
     use of the expertise and facilities available within the region on a
consistent and
     collective basis;
     (ii) To collate and record environmental data and information to form a
     comprehensive database and information management system which will
serve as a
     repository of all relevant, available data, act as the sound basis for
decision-making,
     and serve as a source of information and education for specialists,
administrators, and
     others;
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(iii) To develop and adopt a harmonious approach towards coastal and marine environmental planning on an integrated basis, and in a pre-emptive, predictive and precautionary manner;

(iv) To develop and adopt a harmonious approach towards the integrated management of the coastal and marine environment and its resources, in a manner which combines protection, restoration, conservation and sustainable use;

(v) To develop and adopt a regional framework of legislative and other agreements for mutual support in emergencies, collaboration in the management of contiguous bodies of water, and cooperation in the protection of common resources as well as in the prevention of coastal and marine pollution.

The activities and tasks contained in the Action Plan reflect these objectives and focus on information gathering, resources and environmental quality surveys, collation and exchange of information, and collaborative research.

Given the pre-existing hostilities in Northeast Asia, the adoption and full realisation of these objectives would be an extraordinary achievement. As an interim step, participating states agreed that UNEP would coordinate implementation of the final Action Plan until a regional coordinating secretariat is established within the region. Meanwhile, national capabilities running in parallel are the institutional foundation of the Plan.

A related regional project overlaps with the short-term objectives of the NOWPAP. The project, titled Prevention and Management of Marine Pollution in East Asia Seas, is a proposed $8 million activity over five years funded by the Global Environment Facility and implemented by the UN Development Program. The scope is broader than that of NOWPAP as the GEF project includes ASEAN states (Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, Thailand), Cambodia, China, North Korea, and Vietnam.

The project was formulated in two expert missions that travelled to the region in December 1992 and February/March 1993. The general approach focuses on developing national institutional and legal capacities for integrated coastal zone management and control of marine pollution arising from international conventions, primarily by provision of technical assistance, developing regional collaboration via a network of collaborating institutions, conducting environmental monitoring and evaluation, and increasing public awareness. The project will use national demonstration projects to exemplify methodologies used in relation to each of these components. In the area of integrated coastal zone management, for example, comprehensive planning and management will be undertaken in the harbor and surrounding area at Xiamen in China, and in the Batangas Bay in the Philippines. Thus, the GEF project is intended to move beyond mere monitoring of and reactive response to the problems of marine pollution to innovative, proactive, and practical management measures commensurate with the rapidly growing problem.

2.2 Intergovernmental Oceanographic Commission (IOC/WESTPAC)

The IOC was established in 1960 as a functionally autonomous body within UNESCO and is charged with basic oceanographic research. Under the IOC's rubric, a Cooperative Study of Kuroshio and Adjacent Regions had been conducted between 1965-77. In this case, the study area was the Kuroshio current which spans the East China Sea, the Southern Sea of Japan, the Eastern Philippines Sea, and (later) the South China Sea.

The IOC's Sub Commission for Western Pacific (WESTPAC) was established in 1989. Given that the earlier effort on the Kuroshio had relied on the scientific efforts and contributions of only a few countries (and that Southeast Asian developing countries had minimal participation due to lack of scientific and technical resources), the WESTPAC program was designed from the outset to increase local human and technical capabilities in the course of fundamental research into ocean climatic and food resources variability, and improved understanding of geological processes which affect the economies of the western Pacific states.

The Secretariat is to be established in Bangkok which hosted the second session of the Commission in January 1993 (the next session is planned for 1996 and will likely take place in Tokyo). Due to the vast WESTPAC area (which encompasses the Pacific west of a line following the Emperor Trench from Kamchatka Peninsula, to Wake Island, along the Tuamotu Archipelago, and back to Antarctica south of New Zealand), WESTPAC adopted a sub-regional approach to implementing its research program (see Table 2.1 for membership). IOC itself notes that the current program involves much greater cooperation among states of the Northeast Asian region.

Table 2.1: Member States of WESTPAC by Sub-Region

South Pacific sub region: Australia, Fiji, France, New Zealand, Western Samoa, Solomon Islands, Tonga, USA

Central and East Asian sub region: Australia, China, Indonesia, Malaysia, Singapore, Thailand, UK (Hong Kong), Vietnam

North-western Pacific sub region: China, Democratic People's Republic of Korea, Japan, Republic of Korea, USSR/Russia

International Oceanographic Commission, A Review of IOC Activities in the Western Pacific Since the Establishment of WESTPAC, IOC/INF-733, Paris, May 31, 1989, p. 29.

The goals of an IOC regional sub commission are to:

0. define regional problems and develop marine scientific research programs implement IOC global marine scientific research programs at a regional level facilitate the regional exchange of scientific data, especially to developing countries identify training, education and mutual assistance needs.

WESTPAC identified nine projects to achieve these general objectives at its first meeting in Hangzhou, China, in February 1990, and adopted a Medium Term Plan (1991-1995). These nine projects are:

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      Ocean Science in Relation to Living Resources:
          Toxic and anoxic phenomena associated with algal blooms (red tides)
          Recruitment of Penaeid Prawns in Indo-Western Pacific
      Marine Pollution Research and Monitoring:
          Monitoring heavy metals and organochlorine pesticides using
Musselwatch
          Assessment of river inputs to seas in WESTPAC Region
      Ocean Dynamics and Climate
          Banding of porite corals as component of ocean climate studies
          Ocean dynamics in the northwest Pacific
          Continental shelf circulation in the western Pacific
      Ocean science in relation to non-living resources
          WESTPAC palaeogeographic map
          Margins of active plates.
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Obviously, there may be some overlap in activities envisaged to occur under the rubrics of WESTPAC and NOWPAP. Moreover, many of the WESTPAC activities are conducted in the South Pacific and in East and Southeast Asian oceans (thus overlapping UNEP's East Asian and Southwest Pacific Regional Action Plans rather than NOWPAP). The IOC Secretariat believe, however, that WESTPAC will have to draw on the stronger national marine scientific and technological capabilities in Northeast Asian states if it is to succeed.

Moreover, WESTPAC's SEAWATCH program may be helpful in the implementation of NOWPAP. Also, work by Northeast Asian members of WESTPAC (which includes all six states that participate in NOWPAP) on continental shelf circulation, ocean dynamics, paleogeographic mapping, tectonics and coastal zones, and on musselwatch and harmful algal blooms, are all either more active in Northeast Asia than in East or Southeast Asia, or are implemented on a western Pacific-wide basis without sub regional focus. The IOC Secretariat suggest that a mechanism may need to be set up to coordinate with NOWPAP, as has occurred already via the Coordinating Body on the Seas of East Asia (COBSEA) farther south. WESTPAC anticipates, for example, conducting training in the field of modelling of coastal circulation in order to predict and control accidental oil spills. It is also developing a WESTPAC Action Plan as follow-up to UNCED, both of which appear to be similar to concerns raised at NOWPAP.

2.3 Northeast Asian Environment Programme (ESCAP/UNDP)

The Northeast Asian Environment Programme initiative arose out of a symposium held in Seoul in September 1992 which had supported the development of an informal environmental network; and preceded by an earlier joint memorandum of understanding between Russia and South Korea calling for the creation of a regional environmental forum.

The first Northeast Asian Conference on Environment was held in Niigata, Japan the following October, and was organised jointly by the Japanese Environment Agency and Ministry of Foreign

Affairs. Delegations from China, Russia, and South Korea attended (not North Korea due to sensitivities on the part of Japanese foreign affairs officials although participants suggested that it should be invited to the next meeting which was held in Seoul in mid-September, 1993).

The first Conference sought to promote a frank policy dialogue on environmental problems "of common concern to the region as a whole." To this end, the participants agreed to convene the Conference regularly (in principle, annually), to be hosted by different countries of the region. In addition to emphasising the role of local government in regional cooperation, the participants suggested the following possible priority areas for regional cooperation

- Information sharing and exchange network
- Joint surveys and monitoring on acid rain, marine pollution, biodiversity
- Collaborative research and training
- Case studies of economic instruments for environmental management.

This mandate led to the convening of the Meeting of Senior Officials on Environment Cooperation in Northeast Asia, organised by the regional UN commission ESCAP in cooperation with UNEP and UNDP. The meeting took place in Seoul in February 1993 and was attended by the same five states (not North Korea). The participants considered a consultant's report which gave an indicative list of possible areas of collaboration, and emphasized energy-related air pollution, and capacity building as important cross sectoral themes. They also suggested that only one or two substantive issues be concentrated upon at the outset in order to demonstrate the utility of cooperation, and that these activities be expanded incrementally. Although they cautioned against an overly ambitious program, they also recognised that identifying priority areas also necessitated the adoption of an overall strategy for regional environmental cooperation and a support arrangement.

The following areas for regional cooperation were canvassed:

- Technology for sustainable development and UNEP's Regional Centre on Technology Transfer at Osaka and Shiga (Japan)
- Energy issues, especially clean coal combustion (China, Mongolia, South Korea)
- Monitoring and surveying of air pollution, especially acid rain (Japan, Russia, South Korea, Mongolia)
- Forest decline (South Korea)
- Capacity building (South Korea)
- Information exchange and network (South Korea)

The following priority areas within which specific projects for regional cooperation could be developed were adopted:

- Energy and air pollution
- Capacity building
- Ecosystem management, in particular deforestation and desertification.
- Intercalibration of pollution measurement equipment.

The meeting concluded that coastal and marine pollution issues should be addressed within the UNEP NOWPAP framework.

In mid-September 1993, the Ministry of Environment in South Korea convened the Second Northeast Asian Conference on Environmental Cooperation at the ministerial and/or deputy ministerial level accompanied by high level technical experts to discuss common problems, experiences with various economic instruments, harmonising monitoring of pollution, etc. The major topics considered at the Seoul meeting were:

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       Exploration of methods to enhance environmental cooperation in
Northeast Asia
       including harmonisation of the on-going environmental meetings
       Market-based policy measures for environmental management
       Pollution measuring methods, including criteria, units and
intercalibration
       Exploration of joint research topics
       Classification of hazardous wastes
       Experiences and roles of local government in Northeast Asian
environmental
       cooperation.
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The follow-up meeting to the February 1993 Meeting of Senior Officials is to be held in Beijing in early 1994. As chair of the Meetings and the lead UN agency for the ongoing program, ESCAP lends a more representative flavor to the deliberations which suits foreign affairs ministries, and is less apt to take a proactive role to defining a technical basis for political consultations than would be UNEP or UNDP and some national environmental agencies. A consultant is to prepare a review of candidate proposals for joint projects under the priority areas listed above for presentation to the next intergovernmental meeting in Beijing.

2.4 Sub-Regional Technical Cooperation and Development Programme (UNDP)

In addition to UNEP and UNESCO, the United Nations agency for technical cooperation, the UN Development Programme, has mediated and facilitated cooperation at a regional level. UNDP is instrumental in the Tumen River Area Development Programme which has a joint environmental component. It has also obtained agreement on two regional projects under the Global Environment Facility with developing countries of the region-- one on greenhouse gases, and a second on marine pollution. In addition, UNDP has developed a sub-regional programme of cooperation between six regional states on themes pertaining to sustainable development, albeit at a relatively low level of activity. These include:

0. Thermal combustion and pollution reduction programme. This programme recommended cross-border and inter-country modelling of air pollution, provision of clean coal technology, cogeneration, emission control technologies, etc.

0. Expansion of Temperate Zone Food Crops.

0. Renewable Energy Applications for Rural Energy Supply. Country exchanges have occurred, for example, between China and North Korea.

The Tumen River Development Programme is the most advanced of these sub-regional activities. It is envisaged to be a multi-billion dollar project involving six regional states in which North Korea, Russia and China will jointly develop a free economic zone. The states have created a Joint Management Committee to oversee planning activities. The Joint Management Committee will supervise subcommissions on trade and logistics; telecommunications, banking, and industry and infrastructure investment strategy.

As we noted earlier, the Tumen River Area Development Project may establish important legal and political precedents that will bear on other regional environmental agreements. To the extent that the Commission established to run the project keeps open the possibility that it will enhance economic cooperation in Northeast Asia as a whole--and keeps open the possibility of admitting non-riparian states such as Japan to membership--the Tumen River project may become the nucleus for Northeast Asia's first economic and environmental institution

III. CRITICAL ISSUES

In conclusion, we point to five critical issues that arise from the preceding discussion. These are: 1) capacity building; 2) spillover effects between environmental issues (especially from climate change); 3) monitoring and enforcement issues; 4) financing; and 5), the importance of non governmental organisations and public awareness. We conclude with a series of questions for further research and analysis.

3.1 Capacity Building: The initial emphasis in the various regional initiatives that are underway is to build on capacity at a national level. Given the uneven, and in some cases, undeveloped technical and organisational capabilities found in the region, this emphasis is entirely appropriate.

Capacity building, however, is not simply training at the national level and the creation of an environmental oversight capability. It also refers to the ability to bring together the different stakeholders (non governmental, official, business, and academics) in a policy dialogue; to inform all relevant actors; to make effective use of that information; to introduce and use economic and regulatory instruments for environmental management; and to have the institutional capacity to coordinate the many components and activities at all different levels and across all sectors of the society and economy. In short, capacity building is a corollary of a broad based program of social and institutional development, especially in economies-in-transition or in developing countries.

In addition to these challenges at the national level which are prerequisites of effective national participation in a regional programme, regional programs for environmental cooperation also entail developing regional capacities in the medium and long-term.

3.2 Regional Dimensions of Global Issues: Many global concerns such as ozone and climate change

may be dealt with best in global fora. Some global issues, however, may interrelate with regional issues in ways that cannot be ignored. Climate change, for example, may redistribute regional atmospheric circulation and precipitation patterns and thereby affect concerns such as transfrontier pollution, ecosystem management, and desertification, at a regional level.

In particular, the impact of climate change may be a productive area for regional collaboration. This issue is also one that concerns all states in the region, yet (in contrast to acid rain) does not arise from or within any specific state or group of states within the region.

At this time, global circulation models offer poor resolution for the northeast region, let alone for a nation. Participants in the study therefore can only pose qualitative scenarios of climate change at this stage, with consequent uncertainty with regard to the range of possible costs and benefits of climate change.

A regional scientific approach to developing a regional climate model is therefore an urgent priority. Such a project should draw on existing Global Circulation Models (GCMs) and attempts to nest a regional model within the global models, rather than attempting the extremely costly exercise of building a GCM for use within the region or starting a regional exercise from scratch. The choice of regional climate modelling parameters, the data requirements to validate the model, the interpretation of the model's results etc are all items that require a regional rather than a national approach.,

The proposed Global Change Regional Research Network for Temperate East Asia under the START program and known as TEACOM will address this imperative. This project proposes to:

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      Define regional research priorities and identify regional questions
with global
     significance
      Support education and training activities
      Establish a regional data management and information system
      Distribute research results to scientists within the region and
communicate results to
          decision makers of the region to serve as the scientific basis for
developing
     strategies for mitigating and adapting to global environmental changes.
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Although the Regional Research Network will address global change issues, it will also include the regional response to global climate change, land use patterns, and land- ocean interactions in the coastal zone.

In addition to scientists from the standard six countries of Northeast Asia, the program proposal suggests that the academy based in Taipei (China) might also be invited to participate. It might be, therefore, a suitable scientific rubric under which to house a regional effort to define climate change impacts and regional responses to these impacts.

3.3 Monitoring, Verification, and Non-Coercive Enforcement: All institutions based on international

cooperation face free riding by signatories who obtain the benefits of an international agreement while avoiding the costs by non-compliance. The likelihood that signatories to regional environmental agreements might try to avoid meeting their commitments poses the question of monitoring, verification and enforcement of compliance.

Fortunately, there are important precedents for monitoring and verifying international atmospheric agreements, at the regional level in Europe, and globally in ozone depletion convention. This experience provides some signposts for how binding regional environmental agreements in Northeast Asia might be monitored, verified, and enforced.

Verification is the international control of compliance with agreed measures and behaviour by means of tools and procedures agreed upon in an instrument of international law--for example, a protocol on compliance to a long range air pollution control convention. Verification can be defined as having different densities depending upon the level of distrust between parties to the agreement and the technical difficulty of obtaining information with an adequate level of confidence on the other.

A regional verification procedure would be multilateral rather than bilateral in implementation (although it may rely heavily on national/unilateral monitoring and verification capabilities such as satellite systems). Assuming that all parties will be accorded equal treatment in the protocol, it is reasonable to suppose that all parties also will be subject to monitoring and verification by an implementing organisation established under regional conventions.

Anthropogenic sources of many pollutants vary greatly with respect to characteristics that affect greatly their suitability for monitoring and verification. Some are stationary, emit copiously and continuously, and are suitable for direct, quantified monitoring. Power stations and large factories exemplify this type of emitter. Other sources are stationary and numerous but only emit intermittently very small quantities of gas. There are also very many mobile point sources that are sporadic emitters such as vehicles and livestock. Finally, there are very diffuse sources such as farmers whose fertiliser may end up in rivers that pollute semi-enclosed oceans. Thus, the monitoring problem is complex.

As only the first "large" category is suitable to direct monitoring and verification, most verification will be done indirectly by using national and UN statistics for many production and consumption balances for items that would be of concern in regional environmental conventions. Parties to a regional Convention must agree on the types of data, required disaggregation and detail, and common reporting rules for national reports. This data can be analysed and verified by the implementing organisation which is thereby relieved of the onerous task of collecting information from scratch.

The history of the verification of international agreements offers some important lessons for environmental verification systems. First, environmental costs and benefits may not accrue as fast as in the areas of arms control and the stakes are not perceived as central to the immediate security of the state nor (usually) to regime survival in that state.

States may therefore be less demanding of a verification system for environmental agreements than in other domains. Moreover, when states coordinate because of self interest, there is little reason to

defect or cheat and little or no verification or enforcement is needed. If the costs of many environmental measures are low, then verification measures are needed mostly to build confidence in the regime rather than to raise the question of non compliance and enforcement.

Second, it is inevitable and proper that enforcement responsibility will be lodged primarily at the same level as implementation responsibility, that is, within nation states. The bulk of the monitoring and verification for regional environmental agreements should be conducted at this level, rather than at the regional level. Environmental agreements should strive also for maximal transparency and openness, including a strong role for non- governmental organisations in monitoring compliance.

In addition to the standard repertoire of political pressure, sanctions etc. against non- complying states, alternatives to coercive enforcement have emerged. In some instances, states have recognised each other's licensing rather than ceding licensing powers to an international authority. Such reciprocal recognition schemes operate in many areas including phytosanitary certificates for exports, shipping oil pollution prevention certificates, marine waste disposal permits, hazardous materials trade, and trade in endangered species. States also harmonise standards and standard setting laws and procedures, often by adopting models from overseas. (For example, the environmental impact assessment, green labelling and pollution taxes).

Many states have also committed themselves outside of treaties to providing early warning and notification, for example, with respect to banned chemicals exchange of standards, or adjustments to trade-controlled items (such as endangered species). Regimes also create transnational networks of lower level "operational" national officials who short circuit hierarchical communications across boundaries, or who communicate directly with international organisations that may then reintroduce environmental information at much higher political levels in the same nation state. Such structures can defuse and even prevent disputes arising in the first place.

Non adversarial techniques have also developed to resolve international disputes from escalating to interstate conflicts. Local legal challenges have been mounted across borders thereby achieving settlement without involving the states themselves. (In Europe and North America, this technique requires that legal systems grant status to foreign parties in local judicial or administrative procedures). The filing of complaints and the launching of infringement hearings are two other techniques that have been used (in the former, in the Montreal Protocol; in the latter, in the European Economic Community).

Reporting requirements are also an important means of imposing national "discipline" on treaty parties, especially when combined with international expert auditing and public debate in committees or annual conferences. Such procedures are already well developed in the occupational health and safety agreements administered by the International Labour Organisation. Similar procedures are used by the International Monetary Fund and multilateral funding agencies also conduct national and sectoral audits as preconditions for or requirements of development loan agreements. Environmental auditing, however, has a weak tradition although the Montreal Protocol requires substantial reporting to permit monitoring of compliance and administration of various aspects of the agreement.

3.4 Financing: The issue of who will pay for the costs of regional environmental cooperation is

central. Donor states must recognise that obtaining the benefits of cooperation require to achieve regional sustainable development, including the environmental benefits, necessitates investment in creating a regional institutional framework. The donor community has a critical role to play in providing additional resources, especially in capacity building for regional environmental management. In the long term, national and regional institutions should become self financing.

Donors, especially the Asian Development Bank, should ensure that environmental conditionalities are an integral part of project and structural adjustment lending for all recipient countries in the region. In short, both bilateral and multilateral financing should be restructured to directly address the environmental dimensions of sustainable development.

Third, donor agencies should be reformulating their own programs to develop a research and analytical capacity to identify regional as well as national benefits of sustainable development and to incorporate these in lending activities. In particular, they should invest resources in identifying complementarities and synergies of environmental and economic measures in Northeast Asia.

3.5 Non Governmental Organisations and Public Awareness: In conclusion, we stress that without active participation by civil society, many environmental policies are doomed to failure. Regional efforts are no less subject to this imperative than local, national or global activities.

Non governmental organisations have already played an important role in paving the way to regional environmental cooperation. The various meetings convened by scholars at the East West Center on regional oceans management, the PECC Fisheries Taskforce, or the regional Northeast Asia/Northwest Pacific environmental fora convened by the Asia Foundation in 1992 and 1993, and the East Asian Parliamentarians for Environment are leading examples. In addition to providing a backchannel for the exchange of ideas and proposals for regional management of environmental problems, non governmental organisations can mobilise popular support for these initiatives at a grass roots level. As Agenda 21 states:

> One of the major challenges facing the world community as it seeks to replace unsustainable development patterns with environmentally sound and sustainable development is the need to activate a sense of common purpose on behalf of all sectors of society. The chances of forging such a sense of purpose will depend on the willingness of all sectors to participate in genuine social partnership and dialogue, while recognising the independent roles, responsibilities and special capacities of each.

It is crucial, therefore, to involve non governmental organisations in regional deliberations and activities in Northeast Asia at the outset rather than as an afterthought.

3.6 Further Research and Analysis: A variety of theoretical frameworks can be applied to the processes of integration, and to categorise different types of regional activities. These theoretical approaches encompass very different modalities of interstate behaviour and structural circumstances. Two two basic models exist for regional cooperation on environmental issues, namely, collaboration whereby a common resource is managed by two or more states, versus cooperation between states over a range of environmental issues. In this essay, we discovered that states in Northeast Asia are engaged in extensive albeit incipient environmental cooperation in spite of the existence of enormous asymmetries of military and economic power within the region; and that such cooperation is found with respect to a common resource (marine issues), a shared environmental threat (transboundary air pollution) and a range of bilaterally contentious environmental issues (such as the role of environmental concerns in regional trade and investment flows). States in Northeast Asia seem to have little concern about theoretical consistency or institutional neatness in approaching environmental issues, but have been driven to adopt pragmatic approaches consistent with overarching political and security constraints.

Given this evidence, the following questions arise for further comparative research on regional environmental cooperation: Are regional environmental problems and demands on nation-states a new form of functional imperative leading in turn to new regional institutions and political communities?

Do regional environmental institutions provide the political "space" for new types of political mobilisation with implications for personal and group identities that transcend national loyalties?

Do states cooperate with each other at a regional level primarily on environmental issues of local rather than national or global nature? Or are they driven to cooperate more by transboundary pollution, crossborder environmental issues, or regional demands posed by global environmental deterioration?

Is the sequence of adoption by which local-national versus regional and transboundary issues an important determinant of the success of a regime?

How do environmental issues interrelate with political-military and economic integration at a regional level?

Is environmental cooperation driven in part by geopolitical and geoeconomic objectives of nation states in search of political or economic advantage?

And do environmental issues motivate closer military or economic ties between states facing "environmental aggression" or "environmental discrimination" by external adversaries or competitors?

To what extent are successful regional environmental regimes grounded in the search for economies of scale and learning opportunities for building national environmental management capacities, versus ameliorating or avoiding environmental insults which cross borders?

Does the existence of a regional "giant" or dominant state facilitate regional environmental regimes? Or do overly-symmetrical power relations within a region block such regimes?

Do differing political cultures which prevail in different regions affect the pace, scope, and content of regional environmental regimes? In particular, do sub-regional cooperation programs in Asia follow an "Asian" set of diplomatic and operational codes that contrast with Ango-European approaches to conflict avoidance and resolution?

Do regional environmental regimes follow "functional form?" Or is the scope and organisation of the regime unrelated to the eco-geographical "shape" of the environmental problem?

Is the performance of environmental regimes best measured by political and institutional indices?

Or do objective ecological criteria exist against which to test the success of regimes, especially on a comparative basis?

Are international organisations integral to the successful initiation and implementation of regional environmental regimes?

Or have bureaucratic interplays between such agencies hindered more than helped states develop regional regimes?

What is the relationship between sub-regional environmental regimes of the type considered in this essay with "macro-regional" environmental cooperation such as is found under the North American Free Trade Agreement, or the Asia-Pacific Economic Cooperation consultative process?
