Regional Cooperation and Environmental Issues in Northeast Asia

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by Peter Hayes and Lyuba Zarsky

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In this paper, we describe the rapidly emerging agenda for regional collaboration on environmental issues in Northeast Asia. In Part One, we describe briefly some of the major transfrontier or regional environmental issues in Northeast Asia that represent a menu of opportunities for cooperation (and potential conflict) between states. These issues include transfrontier air pollution (acid rain only), marine pollution (radionuclides and oil only), migratory species (fish only), and trade-environment linkages related to increasing regional economic integration.

In Part Two, we examine the emerging and somewhat overlapping regional environmental management regimes. These include UNEP's Northwest Pacific Action Plan or NOWPAP, the IOC WESTPAC, the ESCAP/UNDP Northeast Asian Environment Program, and the UNDP Subregional Technical Cooperation and Development Program.

Regional Environmental Issues

In this section, we present brief profiles of critical environmental issues that are amenable to regional cooperation. These are

- Transfrontier air pollution (acid rain only)
- Marine pollution (radionuclides and oil only)
- Migratory animals (fish only)
- Trade-environment linkages (including forestry)

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."[1]

High levels of sulfur 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 sulfur dioxide concentrations frequently exceed the state's permissible releases because the coal that is burned contains more than two percent sulfur.[2] However, even low sulfur coals can result in absolutely and relatively high levels of sulfur dioxide emissions when the coal is burned in inefficient plants. This acid rain may decrease biomass productivity and thereby reduce its carbon uptake, and it may degrade existing forests (thereby causing 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. China itself has noted the possibility that acid rain may be transmitted long distances and that it has seriously affected areas of China.[3] In Figure 1, the relative density of total annual emissions of about 16 million tonnes of sulfur dioxide emissions, by province, is shown for 1980.[4] In the area adjacent to the Yellow Sea, Chinese industry has been estimated to emit about 700,000 tonnes of sulfur dioxide per year, some of which could be transported across the Yellow Sea to Korea by the predominantly northwesterly winds.[5]

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 sulfur dioxide emissions and regional atmospheric circulation as proxies to suggest where acid rain may occur (see Figure 2). Acid conditions (that is, low pH values such as 4.5) occur in Japan and southern China; elsewhere, pH values are much higher.[6]

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[1] Transfrontier atmospheric radioactive contamination from accidents at nuclear power plants or elsewhere in the nuclear fuel cycle is the subject of global conventions established in the aftermath of the Chernobyl disaster. Some states also have bilateral nuclear reactor emergency response agreements (South Korea and Japan) or bilateral nuclear decommissioning agreements (Russia and Japan). It is known, for example, that four small Chernobyl-style reactors in the Russian Far East operate without adequate regulatory guidance. These reactors are known as GBWR-l12, Model EGD-6, and are graphite-moderated boiling water reactors used for heat and power production. Each reactor is 11 MW and uses fuel enriched to 3-3.6 percent uranium. They are located at Bilibino. The State of Alaska recently sent a delegation to Russia to investigate this situation. Many local governments are working with MINATOM to promote new nuclear reactors in the Russian Far East. We note here the atmospheric dimension of this issue, but do not expand on the possibility that a regional approach may be the appropriate way to respond to it. See Associated Press, "Gates Warns of Contamination in Former Soviet Union," *Washington Post*, 17 August 1992, A7; W. Potter, "The Future of Nuclear Power in the Russian Far East," paper presented to the Conference on U.S.-Japanese Cooperation in the Development of Siberia and the Russian Far East, Monterey, California, 22 July 1993.

[2] Fang Dong, Xu Feng-Gang, and Qui Da-Xiong, "Shentou Thermal Power Station: China," in Hills and K. V. Ramani, eds., *Energy Systems and the Environment* (Kuala Lumpur: Asia and Pacific Development Centre, 1990), 146.

[3] People's Republic of China, "National Report of the People's Republic of China on Environment and Development," report to the U.N. Conference on Environment and Development (translation), August 1991, 30.

[4] J. Sinton et al., China Energy Databook, Lawrence Berkeley Laboratory, LBL-32822. Rev. 2, UC-350, June 1993, VII-8.

[5] M. Valencia, Chen Lisheng, Chen Zhisong, "Yellow Sea Marine and Air Pollution: Status, Projections, Transnational Dimensions and Possibilities of Cooperation," mimeo, East-West Center, Honolulu, February 5, 1991, 5.

[6] Note that this map does not include the sulfur dioxide emissions of North Korea nor Russia. North Korean sulfur dioxide emissions have been estimated at about 15.6 million tonnes per year arising from the burning of about 78 million tonnes of coal per year in power plants. Environmental Resources Ltd, "Draft National Report: Democratic People's Republic of Korea," U.N. Conference on Environment and Development, September 1991, 57.

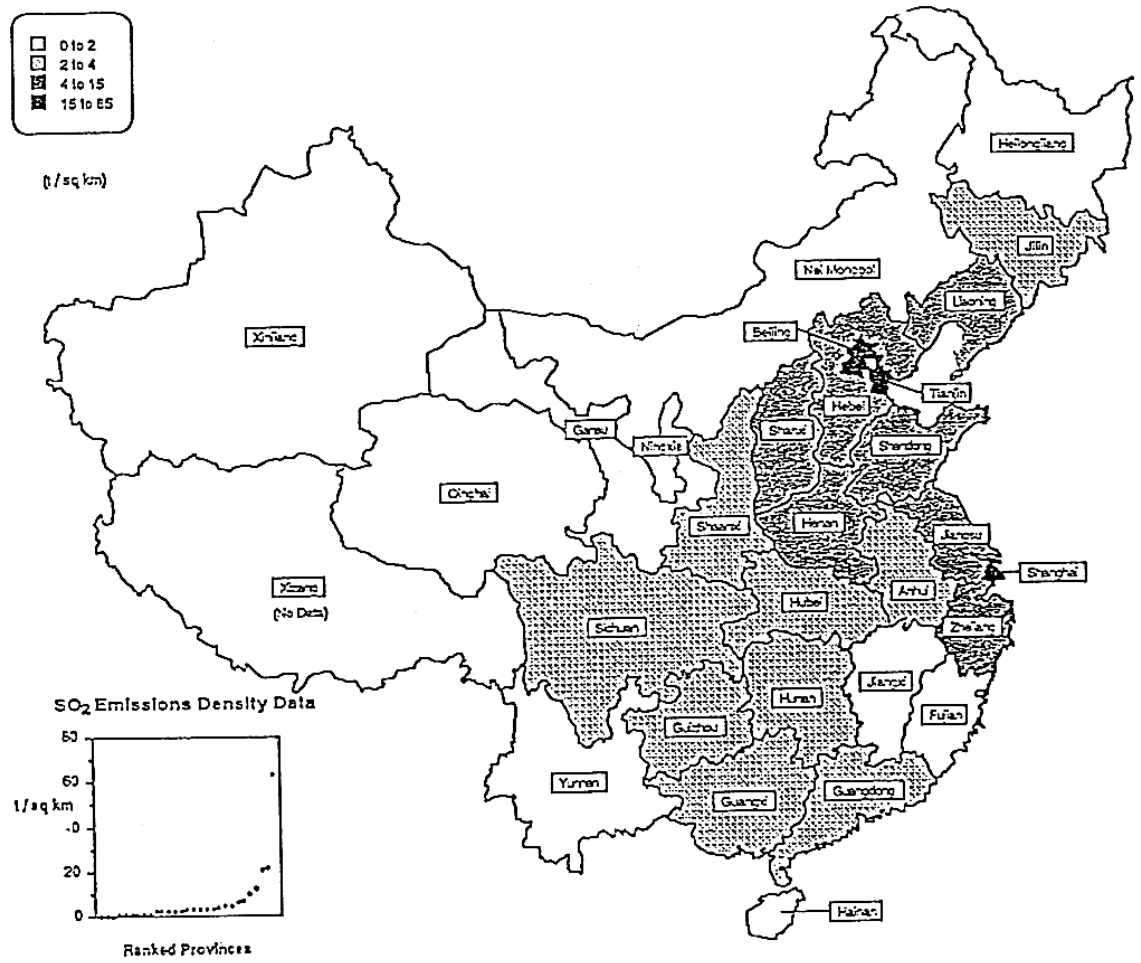

Figure 1. China's Sulfur Dioxide Emissions, 1989

Source: J. Sinton et al., *China Energy Databook*, Lawrence Berkeley Laboratory, LBL-32822. Rev. 2, UC-350, June 1993, VII-9.

Fortunately, the problem is amenable to technological controls at the source, at a cost. A modern power plant with glue-gas desulfurization 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.[7] The National Institute of Environmental Studies in Japan has convened a number of regional workshops on acid rain. (The last one was held 27–29 January 1993, in Tsukuba City to estimate an inventory of pollution and determine regional monitoring protocols for acid rain, especially for SO_x and NO_x.) Much remains to be done in terms of establishing common monitoring methodologies, comprehensive baseline monitoring, and ecosystem impact studies.

[7] The key South Korean institutions involved are the Forestry Research Institute; the National Institute of Environmental Research (NIER) of the Ministry of Environment; the Applied Meteorology Research Laboratory in the Bureau of Meteorology; and the Department of Atmospheric Physics at Yonsei University.

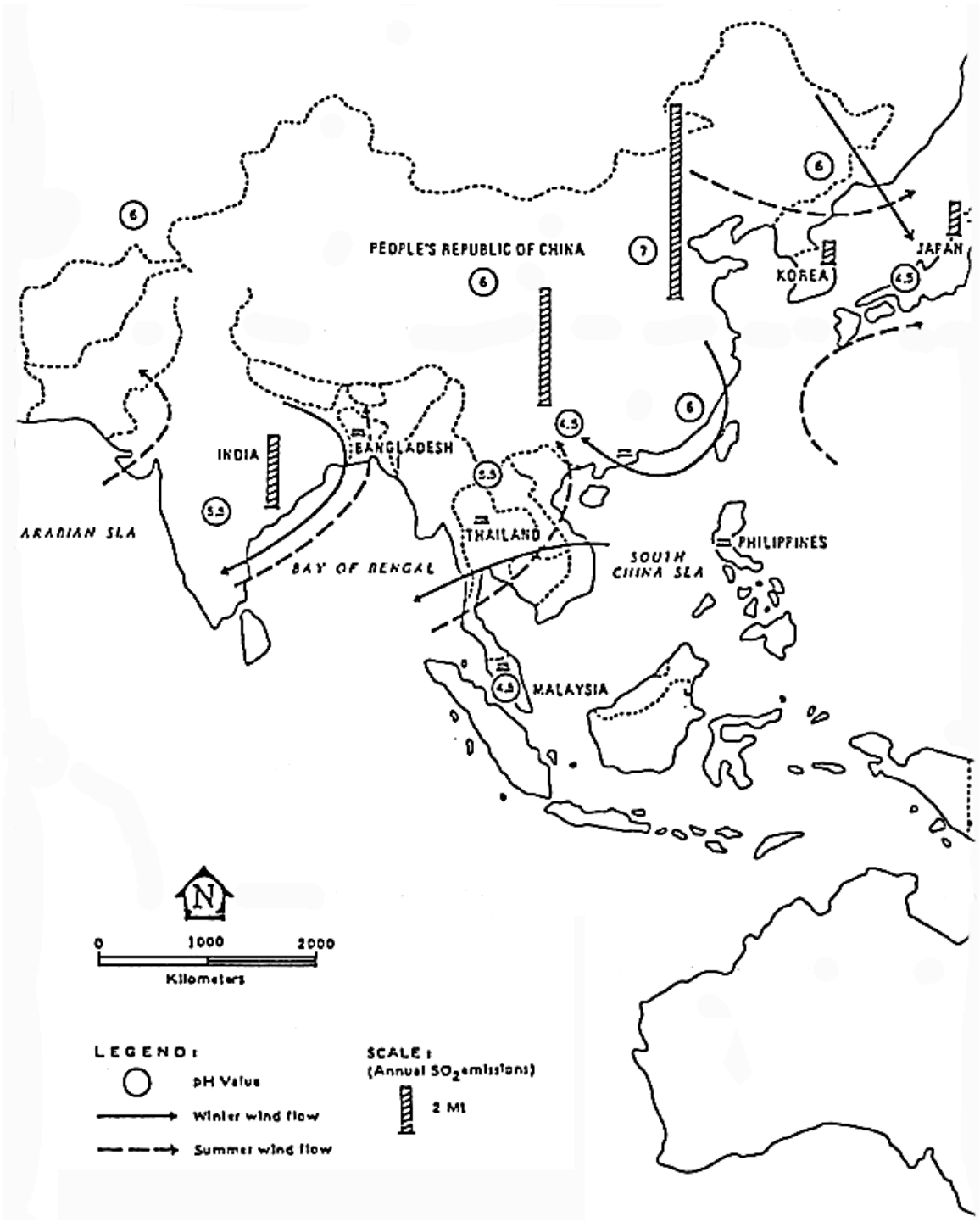

Figure 2. Acid Rain Distribution in Asia

Source: Asian Development Bank, *Environmental Considerations in Energy Development*, Manila, May 1991, 79.

Marine Pollution

Marine pollution occurs in an area of overlapping and contended maritime jurisdictions, hindering and complicating joint environmental management.[8] East Asian seas are also semienclosed 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 for fisheries and aquaculture, destruction of flora and fauna, red tides, decline in tourism, and so on. For reasons of brevity, we focus here on just one of the region's seas, the Sea of Japan, known as the Eastern Sea in Korea.

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

- coastal (urban, industrial, port and riverine) inflows
- shipping and industrial waste dumping at sea
- radioactive waste disposal
- oil exploration and transport

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.

Radioactive Waste Dumping. In early 1993, Russia admitted that for decades the former Soviet Union had dumped civilian and military radioactive wastes 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 from reactors operating in the Far East.[9]

Russia's military forces cannot deal with the radioactive legacy of the Cold War. There is an urgent need to remove the nuclear reactors and fuel from decommissioned nuclear-powered warships, especially submarines, for safe storage and disposal, but Russia lacks funds and facilities to remove the old fuel rods from its nuclear submarines, let alone install new ones.[10] To end Russian dumping of low- and high-level wastes at the four sites in the Seas of Japan and Okhotsk, interim storage facilities must be located and constructed on Russian territory. Other states in the region have complementary capabilities. Japan, for example, has significant experience in decommissioning its former nuclear-powered ships.

Oil Pollution. The monitoring of chemical pollution such as oil in the Sea of Japan is conducted at an existing network of stations that measure pollution three times (or more) a year, using standard techniques to 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 the surface waters of the northwestern Pacific Ocean. In coastal regions of the Sea of Japan, the level of pollution is much higher, often 2.5 times the level of unpolluted ocean waters, and even exceeding maximum permissible concentrations on a permanent basis (for example, at Russia's Golden Horn Bay).[11]

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[8] On the jurisdictional disputes, see J. Prescott, "Mar itime Jurisdiction in East Asian Seas," Occasional Paper 4, Environment and Policy Institute, East-West Center, Honolulu, 1987.

[9] 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.

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

[11] "National Report from Russia Proposing UNEP Action Plan on the Natural Resources and Environment Management in the Northwest Pacific," Second Meeting of Experts and National Focal Points on the Development of the Northwest Pacific Action Plan,

Another measure of oil pollution, the concentration of tar balls in the ocean water, ranges from 0.15-1 mg/m^3. The concentration is high along sea-lanes, especially south of Honshu. The prevailing winds concentrate the tar balls in different parts of the Sea of Japan, depending on the season. Japan reports that overall, the number of tar balls drifting or cast ashore since 1975 has fallen since 1985, but increased in 1990 in areas of southern Honshu, the Sea of Japan, and western Kyushu.[12]

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). 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 that released 1.5 million liters of bunker C oil.[13] 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.[14]

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 are needed on estimated spill rates and number of spills per volume of oil produced or handled, and on the 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 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, and on seasonal primary, secondary, and benthic productivity; and (3) on economic damage, including cleanup costs.[15]

Preventing marine pollution is not yet a major environmental issue in the states bordering 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 that disagree on territorial boundaries and that are divided over the best way to manage fisheries' stocks on a sustainable basis. Such problems can hinder the development of collaborative approaches to reducing marine pollution because the legal status of semienclosed oceans remains ambiguous under customary law and the Law of the Seas. 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.[16]

The scope and complexity of achieving cooperative management of 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-are shown in Figure 3.

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

United Nations Environment Programme, Beijing, 26–30 October 1992, 4.

[12] "National Report (Japan)," Second Meeting of Experts and National Focal Points on the Development of the Northwest Pacific Action Plan, United Nations Environment Programme, Beijing, 26–30 October 1992, 3.

[13] "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 Northwest Pacific Action Plan, United Nations Environment Programme, Beijing, 26–30 October 1992, 17.

[14] "Oil Spill Threatens South Korean Beaches," *San Francisco Chronicle*, 3 August 1993, A14.

[15] D. S. Lee and M. J. Valencia, "Pollution," in J. R. Morgan and M. J. Valencia, eds., *Atlas for Marine Policy in East Asia* (Berkeley: University of California Press, 1992).

[16] M. J. 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, 169.

Table 1. Marine Oil Spills Reported by the Republic Of Korea (ROK)

	Number of accidents	Quantity of oil (megaliters) spilled
1987	152	0.5
1988	158	1.1
1989	200	0.4
1990	248	2.4
1991	240	1.3

Note: These data are for all of the ROK's coastline, not just the Sea of Japan. The fraction of spills on the east versus the south and Yellow Sea coastlines is about 20 percent in any given year in the 1980s. In comparison, Japan reported a total of 583 marine oil spills in all coastal areas in 1990 (compared with 248 in the ROK).
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 Northwest Pacific Action Plan, United Nations Environment Programme, Beijing, 26–30 October 1992, 17; "National Report (Japan)," Second Meeting of Experts and National Focal Points on the Development of the Northwest Pacific Action Plan, United Nations Environment Programme, Beijing, 26–30 October 1992, Table 3; T. A. 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* (London: Taylor and Francis, 1992), 338.

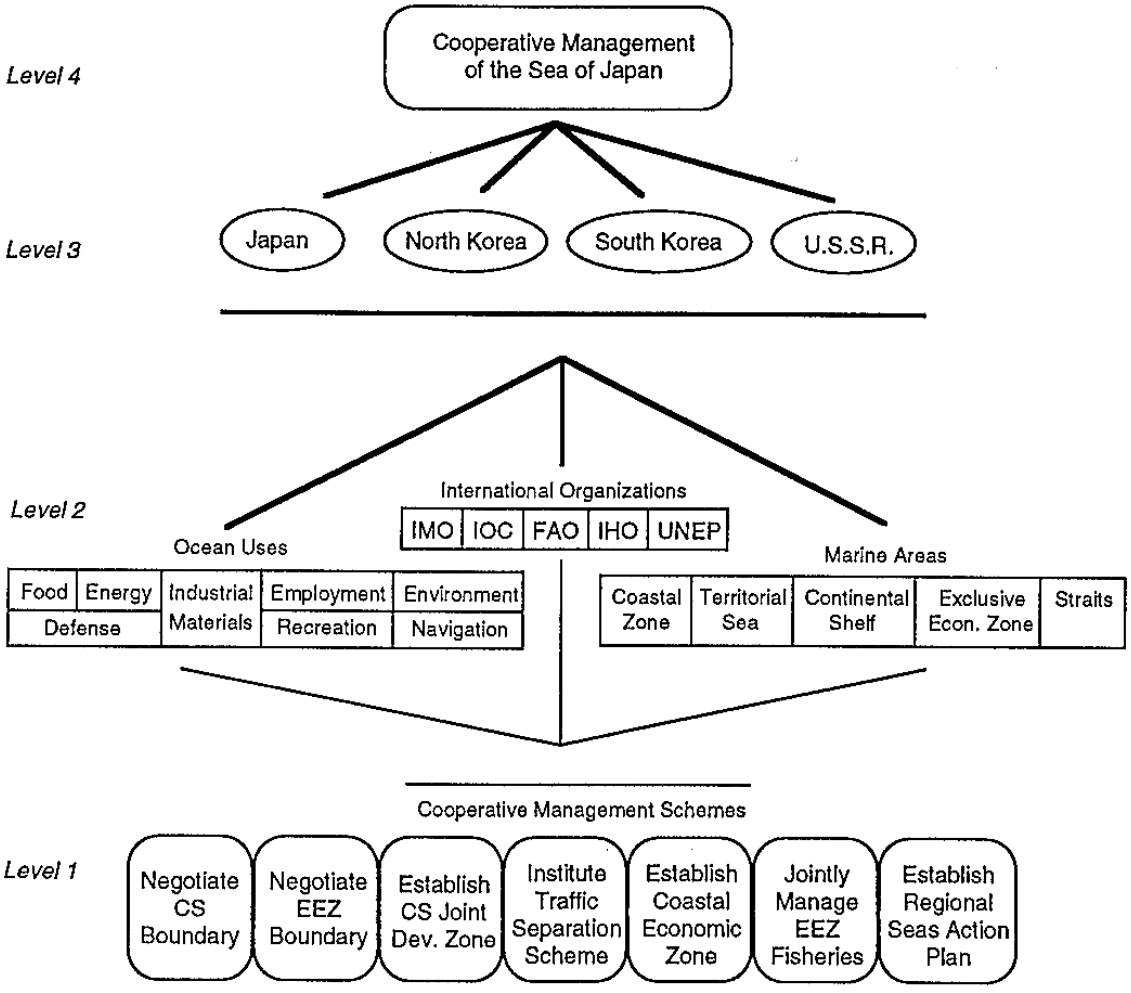

Figure 3: Cooperative Management Hierarchy for the Sea of Japan
Source: D. Dzurek, An Analytical Modle for Managing the Sea of Japan, Environment and Policy Institute, Honolulu, working paper 31, January 1992, 13.

materials, and to automate the collection and analysis of data.[17]

Russia has proposed that a regional center be established to expand the marine pollution observation system, to conduct joint research expeditions in the Yellow Sea and Sea of Japan, and to set up a database on marine environmental quality—a proposal that the Republic of Korea has also made.[18] The Republic of Korea has also suggested that an international agreement to prevent marine pollution in the region should be concluded and that a regional oil spill contingency plan should be established to respond to accidental releases.[19]

Migratory Animals—Fish[20]

In terms of tonnage produced, the North Pacific is the most important fishing region in the world. In 1984, for example, 32 percent 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 that migrate between the high seas and Exclusive Economic Zones (EEZs) of states, and between EEZs.[21] Indeed, the majority of the fish now exploited by countries adjacent to the East Asian seas are shared stocks.[22]

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 nongovernmental.) 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.[23]

In this section, we describe the basic dilemmas involved with joint management of migratory fish species in East Asian oceans. For reasons of space, we do not address the issue of trade in endangered species, preservation of critical habitats (especially transborder areas), or migratory bird species, although these are all important environmental priorities for regional action.

None of these agreements are regionwide 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 manage the fishery stocks have even increased tensions between states-as occurred most recently be-

[17] M. Valencia, ed., "International Conference on the Seas of Japan and Okhotsk, Nakhodka, U.S.S.R., September 1989: Transnational Resource Management Issues and Possible Cooperative Responses; Summary of Soviet Papers," mimeo, East-West Center, Honolulu, April 1991, 27–28.

[18] "National Report from Russia Proposing UNEP Action Plan on the Natural Resources and Environment[al] Management in the Northwest Pacific," Second Meeting of Experts and National Focal Points on the Development of the Northwest Pacific Action Plan, United Nations Environment Programme, Beijing, 26–30 October 1992, 14.

[19] "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 Northwest Pacific Action Plan, United Nations Environment Programme, Beijing, 26–30 October 1992, 31–32.

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[21] A. Szekely and Barbara Kwiatkowska, "Marine Living Resources," in Sand, *The Effectiveness of International Environmental Agreements: A Survey of Existing Legal Agreements* (Cambridge: Grotius, 1992), 270.

[22] Tadashi Yamamoto and Hajime Imanishi, "Use of Shared Stocks in the Northwest Pacific Ocean with Particular Reference to Japan and the U.S.S.R.," in J. Marsh, *Resources and Environment in Asia's Marine Sector* (London: Taylor and Francis, 1992), 39.

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

tween Russia, Japan, Poland, and South Korea over the pollock stocks in the Sea of Okhotsk.[24] Nor have larger regional or global agreements proved 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 finalizing the jurisdictional issues raised by the Law of the Seas and other territorial disputes, but would incrementally modify existing arrangements, create regional nongovernmental arrangements, and establish a regional scientific organization. Although it would require some leadership—possibly by Japanese 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.[25]

Regional Economic Integration, Trade, and the Environment

In the past, environmental quality has been treated typically as an amenity to be balanced and traded off against economic growth. A new paradigm suggests instead that environment and development goals should be integrated and synergies sought whenever possible. Known as ecologically sound and sustainable development, this concept underlies the new international consensus expressed at the 1992 Earth Summit, especially in the Agenda 21 and Rio Declarations:

> Humanity stands at a defining moment in history. We are confronted with a perpetuation of disparities between and within nations, a worsening of poverty, hunger, ill health and illiteracy, and the continuing deterioration of the ecosystems on which we depend for our well-being. However, integration of environment and develop-ment concerns and greater attention to them will lead to the fulfill-ment of basic needs, improved living standards for all, better protected and managed ecosystems and a safer, more prosperous future.[26]

In this section, we consider some of the leading regional dimensions of "unsustainable" development strategies and outline potential areas of cooperation in the pursuit of sustainable development. Regional dimensions stem from the burgeoning economic integration of the region, especially increasing intraregional trade, as well as the increasing outward orientation of Northeast Asian economies. In the spirit of integration, we consider cooperation that is likely to be sound and desirable on both economic and environmental grounds.

Beyond managing common environmental resources, such as air, water, coastline, and habitat, regional cooperation in environmental management should be pursued when it offers net economic benefits relative to national management alone. Net benefits may spring from one or more of the following sources:

- Economies of scale in management, including costs of information collection, storage, and dissemination; scientific and administrative training; and establishing and operating monitoring and enforcement mechanisms;
- Economies of agglomeration (the creation of one or more centers or fora for regional environmental management) including knowledge spillovers, reduced transport costs, and cheaper inputs;
- Reduced transactions costs of trade stemming from a common environmental regulatory framework;
- Economies of scale in capacity building, including technological, managerial, social, and physical infrastructure;
- Resource pooling, which allows projects in environmental management or sustainable development to be undertaken which would otherwise not occur;
- Elimination of the "free rider" problem, including the political, environmental, and economic costs of political conflicts arising from inadequate incentive and enforcement structures;

[24] D. Pitt, "Fishing Countries Split on Harvests, Di f-ferences Over the Pollock Catch in Russian Waters Flare at U.N. Parley," *New York Times*, 3 August 1993.

[25] Johnston and Valencia, "The Russian Far East," op cit., 29, 42.

[26] United Nations Conference on Environment and Development, "Agenda 21," chapter 1, preamble, paragraph l; June 14, 1992; emphasis added.

- Elimination of standards-lowering competition;
- Enhanced bargaining power in international environment, development and trade fora, including donor agencies.

Many of these benefits obtain under conditions of medium to high levels of regional economic integration and cooperation. Trends toward economic cooperation in Northeast Asia are accelerating, pushed from three directions. First, political hostilities are softening, turning former enemies into trade and development partners. In turn, economic cooperation itself is likely to promote better regional security relations. Second, the world economy is undergoing an intensified process of economic integration. Successful development strategies in the 1990s require competitive export sectors, which can be enhanced through regional cooperation. Third, nearly all the countries in the region are undergoing a process of structural adjustment toward more market-oriented economies.[27]

Intraregional trade apparently increased steadily throughout the 1980s and early 1990s. The precise extent of intraregional trade cannot be ascertained, since data are hard to obtain and are unreliable. According to one estimate, the (money) value of intraregional trade among five Northeast Asian nations increased 225 percent between 1981 and 1989,[28] while the volume of world trade increased only 160 percent. Increasing trade between China and South Korea and China and Russia in the past three years suggests even more rapid growth. Intraregional trade accounted for 10.8 percent of total world trade in 1989.[29]

Links Between Regional Trade and the Environment. Economic integration, especially increasing intraregional trade, presents new issues for regional environ-mental regulation. On the one hand, integration tends to accelerate economic growth-itself a goal of sustainable development. Without environmental controls, however, faster economic growth speeds the rate of resource depletion and generates high levels of industrial pollution.[30] Ecological degradation results both from the increased pace of growth and changes in the industry mix toward more toxic and polluting industries.[31] Besides social and environmental costs, the "grow now, pay later" strategy of unsustainable development is likely to generate large environmental financing needs in the future.[32] In a feedback effect, these costs could undermine economic future growth.

On the other hand, even if nations individually raise environmental standards, trade affecting local/national environmental controls will be vulnerable to standards-lowering trade competition. Rising standards are likely to increase production or resource extraction costs, at least in the short term, undermining international competitiveness. In a highly competitive regional and global context, national governments are subject to economic and political pressures that push standards down. Governments may even try to gain competitive advantage by seeking foreign investment through low or lax environmental

[27] M. J. Valencia, "Economic Cooperation in Nort h-east Asia: The Proposed Tumen River Scheme," *Pacific Review* 4, 3 (1991), 263–271; Kim Sung-hoon, "Prospects for Regional Economic Cooperation in Northeast Asia: Republic of Korea's Perspectives," paper presented to the conference on Korean Options in a Changing International Order, Fifth Conference on North Korea, Institute of East Asian Studies, UC Berkeley, 11 December 1991.

[28] Kim Sung- hoon, "Prospects for Regional Economic Cooperation in Northeast Asia: Republic of Korea's Perspectives," paper presented to the conference on Korean Options in a Changing International Order, Fifth Conference on North Korea, Institute of East Asian Studies, UC Berkeley, 11 December 1991, Table 2. The five countries were China, Japan, Russia, North Korea, and South Korea. Data for Mongolia were not available.

[29] Kim Sung- hoon, "Prospects for Regional," op. cit., Table 1.

[30] Studies of rapid growth without environmental co n-trols include T. Panayotou and C. Sussangkarn, "The Debt Crisis. Structural Adjustment and the Environment: The Case of Thailand" (Bangkok: Thailand Development Research Institute, October 1991); and W. Bello and S. Rosenfeld, *Dragons in Distress: Asia's Miracle Economies in Crisis* (San Francisco: Food First, 1990), chapters 5, 6, 11, and 12. See also Ministry of Environment, "National Report of the Republic of Korea to UNCED, 1992," Republic of Korea, December 1992. For a general equilibrium model of the relationship between resource depletion and increases in demand, see W. Cruz, and R. Repetto, "The Environmental Effects of Stabilization and Structural Adjustment Programs: The Philippines Case" (Washington, D.C.: World Resources Institute, September 1992).

[31] H. Hettige, R. Lucas, and D. Wheeler, "The Toxic Intensity of Industrial Production: Global Patterns, Trends and Trade Policy," *American Economic Review* 82, 2 (May 1992): 478–81.

[32] L. Zarsky, "Lessons of Liberalization in Asia: From Structural Adjustment to Sustainable Development," paper presented to the Regional Experts Meeting on Regional Environmental Financing, ESCAP and ADB, Bangkok, 15–17 June 1993.

regulations, creating so-called pollution or resource extraction havens. In Northeast Asia, such a strategy may be especially attractive to nations seeking to woo Japanese companies facing increasingly stringent domestic environmental regulations (as well as rising labor costs),[33] or to those seeking foreign investment in the exploitation of forest, mineral, and ocean resources.

Pollution and "Resource Extraction Havens." The "pollution/resource extraction haven" strategy in Northeast Asia is risky on three counts. First, if pursued by all the developing countries of Northeast Asia, a vicious circle of standards-lowering competition could result in an onslaught of environmental degradation. Beyond high long-term social and health costs, rapid resource depletion and ecological decline are likely to carry high opportunity costs. The income and employment stream generated by rapid and unregulated exploitation of Siberian timber resources, for example, may be less-perhaps far less-than the development of the Russian Far East as an international tourism asset.[34]

Second, companies and industries attracted by "pollution havens" are likely to be low-growth "sunset" industries that face a limited future.[35] A development strategy based on non-dynamic companies is unlikely to bring technology transfer and knowledge spillovers, which are crucial to sustainable, self-generating economic growth.

Third, products manufactured or extracted from "pollution/resource extraction havens" may face import barriers in the increasingly environment- and health-conscious markets of the OECD. Northeast Asian timber resources may be especially vulnerable: global campaigns by environmentalist groups such as Greenpeace have already targeted unsustainable logging practices by South Korean, North Korean, and other foreign companies in the Siberian forests.[36]

Initiatives both by governments and by voluntary national and international market-based eco-label programs seek to discriminate among timbers on the basis of harvesting methods. Independent certifiers bestow an identifying mark on suppliers or operations that harvest forest products according to sustainable management techniques. The global Forest Stewardship Council is seeking to go one step further and provide accreditation for local certifiers of sustainable forest products. Companies such as the consumer products giant Home Depot have announced that they will buy only from forest products suppliers who can credibly ascertain that the timber was sustainably harvested. In the expectation that forest campaigns will intensify in the coming decade, Home Depot is engaging in strategic behavior and positioning itself for a market shakeout.[37]

The nations of the region could individually eschew the "pollution haven" strategy by imposing local/national environmental controls. However, in addition to the problem of standards-lowering competition, a patchwork of differing national regulations may impede regional trade by increasing the transactions costs of trade. Exporting companies must undertake outlays to obtain information and adjust production specifications.

Finally, regional economic cooperation may itself create new or additional transboundary environmental externalities. Unless regulated, joint infrastructure projects such as the proposed Tumen River Development Project may increase the level of transboundary air and water pollu-

[33] Byung-Doo Choi, "Political Economy and Environmental Problems in Northeast Asia," paper presented to the International Geopolitical Union conference, U.N. University, Tokyo, 3 September 1993. Choi argues that the process of migration of Japan's "dirty" industries is due in part to processes of capitalist development in which nations move from labor-intensive to natural resource-based processing industries and then to capital-intensive and technology intensive industries. Resource and capital-intensive industries are both energy-intensive and polluting.

[34] Besides low quality and low value species, the exploitation of forest resources such as timber in the Russian Far East is hampered by a harsh climate, resulting in slow regrowth and high operating cost. See C. A. Backman and T. R. Waggener, "Soviet Timber Resources and Utilization: An Interpretation of the 1988 National Inventory," Center for International Trade in Forest Products, Working Paper 35, University of Washington, Seattle, October 1991.

[35] J. Leonard, *Pollution and the Struggle for World Product* (Cambridge: Cambridge University Press, 1988).

[36] A. Rosencranz and A. Scott, "Siberia's Threatened Forests," *Nature*, 23 January 1992.

[37] J. Ervin, Forest Stewardship Council, author interview, 10 June 1993; S. Rhodes, Executive Director, Scientific Certification Systems, author interview, 7 May 1993. See also "Fact Sheet," Forest Stewardship Council, Richmond, Vermont, 1993.

tion, as well as degrade crossborder habitat required to maintain the region's biodiversity.[38]

Global Trends in Trade and Environment. Pressures for regional cooperation to manage links between trade and the environment arise at the global as well as regional level. At the GATT, a Working Group on Environmental Measures and Trade was established in October 1991. Depending on the fate of the Uruguay Round, the group may receive an expanded mandate to consider an agenda for a GATT "Green Round." Environmental groups are pushing either for greater national scope in the environmental regulation of imports or for mandatory minimum global environmental standards as a condition for access to the global trade regime. In North America, the setting and enforcement of environmental regulations were crucial to the negotiation of the North American Free Trade Agreement.

The International Standards Organization (ISO) is working to develop global standards for environmental management. Although it is a voluntary organization, the ISO tends to provide both the framework and the technical specifications for many governments in setting mandatory standards. Whether through voluntary organizations or through politically pressured government regulations, the issue of environmental conditionality on traded goods and services will be of increasing importance in the 1990s.

Regional Cooperation in Trade and Sustainable Development. There are three arenas in which regional and global trends point toward benefits in regional cooperation in managing links between trade and the environment.

First, Northeast Asian nations could cooperate in setting and enforcing a common environmental regulatory framework for products, production processes, and resource extraction methodologies. The central aims of such a framework would be to develop common approaches to the internalization of environmental costs into output prices and to ensure that the scale of economic activity remains within ecosystem thresholds.

Environmental standards could be developed for a range of trade and investment affecting environmental standards: environmental impact assessments, air and water quality, waste management, energy use, conservation of biodiversity, and so forth. The draft environmental principles articulated by the Third Program Management Committee of the Tumen River Development Project could serve as the foundation for a common approach to national environmental management of production. The draft principles, however, covered only the design and not the environmental management aspects of the proposed Tumen River project.[39] The ben efits of regional standards include economies of scale in information, management, and enforcement. They also eliminate "free rider" problems associated with national standards alone. It would be crucial, however, to build in mechanisms by which standards could change as new information became available or as citizen and consumer preferences changed.

Capacities for monitoring and enforcement of (regional) environmental standards could be enhanced by regional cooperation. Economies of scale could be gained in the regional creation of inspection and certification systems. A regional organizational infrastructure, such as a Northeast Asian Commission on Trade and Environment, may be needed to use scientific and citizen input both in the setting and the monitoring of environmental standards.

Second, Northeast Asian nations could cooperate in promoting environmentally-friendly "green" industries, including export-oriented industries. Trade-environment linkages, in other words, offer not only new constraints but also new opportunities for industry growth.[40] Env ironmental "sunrise" industries might include environmentally sensitive tourism, sustainably harvested forest products and fishing industries, and environmentally sound value-added industries. Industries could be targeted with research and development support, donor support, and/or domestic credit or other subsidies. A regional eco-label could also be developed to target "green consumers" in Japan and other OECD countries. Regional cooperation could also help to promote an international eco-labeling frame-

[38] A. Rosencranz and D. Gordon, " Tumen River Needs Tighter Reins, " *Christian Science Monitor*, 19 April 1993, 18.

[39] See UNDP, Memorandum of Understanding on Environmental Principles Governing the Tumen River Economic Development Area, Annex B, Environmental Principles, May 1993.

[40] K. Anderson, "Economic Growth, Environmental Issues and Trade, " in C. F. Bergsten and M. Nolands, eds., *Pacific Dynamism and the International Economic System* (Washington, D.C.: Institute for International Economics, 1993).

work more conducive to promoting developing country exports.[41]

Targeted industries should be dynamic, high-growth, and efficient. The additional environmental externalities justify additional support. Further research is needed to identify regional industry development projects with high technological, social, economic, and environmental spinoffs.

Third, there is likely benefit in regional cooperation in developing common negotiation postures and positions on environmental regulation within other trade organizations, including GATT, the Asia-Pacific Economic Cooperation group (APEC), and the ISO. Common positions are likely to enhance the bargaining power of Northeast Asian countries in shaping the environmental parameters of trade in the coming decade.

Regional Environmental Management Regimes

In this section, we describe briefly the 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 Program, and the UNDP Subregional Program.

Northwest Pacific Action Plan (NOWPAP)

On the initiative of states bordering the semienclosed seas of the Northwest Pacific, the United Nations Environment Programme (UNEP) Governing Council decided in May 1989 to prepare new action plans for seas not yet covered by UNEP's Regional Seas Program. In response, the littoral states promptly nominated National Focal Points to develop the NOWPA Officials from the six concerned states[42] met informally in Nairobi in May 1991, at which time they reaffirmed their governments' willingness to initiate the NOWPA Due to the wide range of early suggestions on the content of the Action Plan, UNDP convened an early formal consultative meeting in Vladivostok in October 1991. Experts from five national delegations (North Korea did not attend) reported on the following:

- Marine pollution monitoring and water-quality management in the seas adjacent to Japan (Japan);
- Fundamental and applied marine pollution studies, pollution-related marine ecological problems, and regional maritime pollution monitoring (former Soviet Union, China, Republic of Korea).

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.[43]

At the second meeting of experts and National Focal Points, held in Beijing in October 1992, all six countries were represented. At this meeting, a consultant presented a draft Regional Action Plan that was reviewed, and in some important respects, modified. (Japan insisted, 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.)[44]43

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 Sea of Japan and Yellow Sea, without prejudice to its possible future extension to cover additional marine environments and coastal areas of participating states. The delegates have also reserved their right to call the Sea of Japan by different names.

[41] L. Zarsky, "Eco-Labels and 'Green Trade': Towards an International Eco-Labelling Framework," paper for the Informal Experts Workshop on Life-Cycle Management and Trade, OECD Environment Directorate, 20–21 July 1993.

[42] That is, China, North and South Korea, the former Soviet Union, Japan, and Mongolia.

[43] "Report of the First Consultative Meeting of Experts and National Focal Points on the Development of NOWPAP," First Consultative Meeting of Experts and National Focal Points on the Development of the Northwest Pacific Action Plan (NOWPAP), Vladivostok, 28–31 October 1991, 1–5.

[44] Report of the Second Meeting of Experts and N a-tional Focal Points on the Development of the Northwest Pacific Action Plan, Beijing, 26–30 October 1992.

Intergovernmental Oceanographic Commission (IOC/WESTPAC)

The IOC was established in 1960 as an autonomous body within UNESCO and is charged with basic oceanographic research. The IOC's Subcommission for Western Pacific (WESTPAC) was established in 1989. The secretariat will 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.)

The goals of an IOC regional subcommission are to

- 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 as follows:

- Ocean science in relation to living resources:
  1. Toxic and anoxic phenomena associated with algal blooms (red tides)
  2. Recruitment of Penaeid Prawns in Indo-Western Pacific
- Marine pollution research and monitoring:
  3. Monitoring heavy metals and organochlorine pesticides using Musselwatch
  4. Assessment of river inputs to seas in WESTPAC region
- Ocean dynamics and climate:
  5. Banding of porite corals as a component of ocean climate studies
  6. Ocean dynamics in the northwest Pacific
  7. Continental shelf circulation in the western Pacific
- Ocean science in relation to nonliving resources:
  8. WESTPAC paleogeographic map
  9. Margins of active plates.[45]

Obviously, there may be some overlap in activities expected to occur under the rubrics of WESTPAC and NOWPA 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 Regional Action Plan rather than NOWPAP). The IOC secretariat believes, 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 NOWPA Also, work by Northeast Asian members of WESTPAC (which includes all six states that participate in NOWPAP) on conti-nental 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 subregional focus. The IOC secretariat suggests that a mechanism may need to be set up to coordinate with NOWPAP, as has occurred farther south already through the Coordinating Body on the Seas of East Asia (COBSEA).[46] WESTPAC anticipates, for example, conducting training in the field of modeling of coastal circulation to predict and control accidental oil spills. It is also developing a WESTPAC Action Plan as a follow-up to UNCED, both of which appear to be similar to concerns raised at NOWPA.[47]

Northeast Asian Environment Program (ESCAP/UNDP)

The Northeast Asian Environment Program initiative arose out of a symposium held in Seoul in September 1992 that supported the development of an informal environmental network and an earlier joint memorandum of under-standing between Russia and South Korea calling for the

[45] "IOC Subcommission for the Western Pacific: Se c-ond Session," Intergovern-mental Oceanographic Commission Reports of Governing and Major Subsidiary Bodies, UNESCO, Bangkok, 25–29 January 1993; "Overview on IOC/WESTPAC Activities," IOC note for NOWPAP consultation, Vladivostok, 25 October 1991; "WESTPAC Information," no. 1, November 1992.

[46] IOC secretariat, communication, 17 September 1993.

[47] "IOC Subcommission for the Western Pacific: Se c-ond Session," Intergovern-mental Oceanographic Commission Reports of Governing and Major Subsidiary Bodies, UNESCO, Bangkok, 25–29 January 1993, 8, 15.

creation of a regional environmental forum.[48]47 The first Northeast Asian Conference on Environment was held in Niigata, Japan, the following October, and was organized jointly by the Japanese Environment Agency and Ministry of Foreign Affairs. Delegations from China, Russia, and South Korea attended. (North Korea did not attend owing to sensitivities on the part of Japanese foreign affairs officials, although participants suggested that it should be invited to the next meeting, which will be held in Seoul.)

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 regularly (in principle, annually) and be hosted by different countries in the region. In addition to emphasizing 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.[49]

This mandate led to the Meeting of Senior Officials on Environmental Cooperation in Northeast Asia, organized by the regional U.N. commission ESCAP in cooperation with UNEP and UND 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 that gave an indicative list of possible areas of collaboration and emphasized energy-related air pollution and capacity building as important cross-sectoral themes. They suggested concentrating on only one or two substantive issues at the outset to demonstrate the utility of cooperation, and then expanding on these activities incrementally. Although they cautioned against an overly ambitious program, they also recognized that identifying priority areas also necessitated adopting an overall strategy for regional environmental cooperation and a support arrangement.[50]

The following areas for regional cooperation were canvassed:

- Technology for sustainable development and UNEP's Regional Center 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, harmonizing monitoring of pollution, and so forth. The major topics considered at the Seoul meeting were

- Exploration of methods to enhance environmental cooperation in Northeast Asia, including harmonization of the ongoing environmental meetings;
- Market-based policy measures for environmental management;
- Pollution measuring methods, including criteria, units, and intercalibration;

[48] F. Pinto, "UNDP Environment-related Activities and Experiences in Relation to Northeast Asian Regional Environmental Cooperation," paper presented to the Northeast Asian Conference on Environmental Cooperation, Niigata, Japan, 13 October 1992, 1.

[49] "Chairman's Summary: Northeast Asian Confe r-ence on Environmental Cooperation," Niigata, Japan, 15 October 1992.

[50] "Report of the Meeting of Senior Officials on Env i-ronmental Cooperation in Northeast Asia," Economic and Social Commission for Asia and the Pacific, Seoul, 8–11 February 1993, 4–5.

- Exploration of joint research topics;
- Classification of hazardous wastes;
- Experiences and roles of local government in Northeast Asian environmental cooperation.

The follow-up to the February 1993 Meeting of Senior Officials will be held in Beijing in mid-December 1993. 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 it is less apt to take a proactive role in defining a technical basis for political consultations than UNEP or UNDP and some national environmental agencies. A consultant will prepare a review of candidate proposals for joint projects under the priority areas listed above and present it at the December meeting.

Subregional Technical Cooperation and Development Program (UNDP)

In addition to UNEP and UNESCO, the United Nations agency for technical cooperation, the United Nations Development Programme (UNDP), has mediated and facilitated cooperation at a regional level. UNDP is instrumental in the Tumen River Development Project, 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, the other on marine pollution. In addition, UNDP has developed a subregional program of cooperation between six regional states on themes pertaining to sustainable development, albeit at a relatively low level of activity. These include the following:

- Thermal combustion and pollution reduction program. This program recommended crossborder and intercountry modeling of air pollution, provision of clean coal technology, cogeneration, emission control technologies, etc.[51]
- Expansion of Temperate Zone Food Crops.[52]
- Renewable Energy Applications for Rural Energy Supply.[53] Country exchanges have occurred, for example, between China and North Korea.[54]

The Tumen River Development Project is the most advanced of these subregional activities. It is expected to be a multibillion dollar project involving six regional states in which North Korea, Russia, and China will jointly develop a free economic zone.[55] The states have created a Program Management Committee to oversee planning activities. The committee will supervise subcommissions on trade and logistics, telecommunications, banking, and industry and infrastructure investment strategy.[56]

In October 1992, a preliminary environmental assessment was presented to the 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.[57]

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

- 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;
- Participating governments will cooperate and coordinate 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

[51] G. Redding, "Reduction of Atmospheric Pollution from the Burning of Coal: Proposed Program Strategy 1992–1996 for Northeast Asia Subregional Program," report to UNDP, June 1991.

[52] N. Carter, "Northeast Asian Subregional Program: Expansion of Temperate Zone Food Crops," mission report to UNDP, June 1991.

[53] G. Redding, "Development of Renewable Energy Applications: Proposed Program Strategy 1992–1996 for Northeast Asia Subregional Program," report to UNDP, June 1991.

[54] "Consultation Mission to Mongolia and DPR Korea: Modified Mission Report," Regional Energy Development Program Subprogram on New and Renewable Sources of Energy, RAD/86/136, August 1990.

[55] L. Kaye, "Hinterland of Hope: Regional Powers Have Ambitious Plans for Tumen Delta," *Far Eastern Economic Review*, 16 January 1992, 16–17.

[56] M. Miller, A. Holm, T. Kelleher, " Tumen River Area Development," report on consultations with governments, UNDP, 16 October 1991, 2–6.

[57] Program Management Committee, "Preliminary Assessment of Natural Framework and Environment," in Infrastructure, Industry, Telecommunication and Environment, second meeting, Beijing, October 1992.

be the responsibility of institutions developed to implement the scheme.

- Member states will provide for nongovernmental organizations to participate in environmental assessment procedures.[58]

The Tumen River Development Project may establish important legal and political precedents that will bear on other regional environmental agreements.

[58] "Memorandum of Understanding of Environmental Principles Governing Tumen River Economic Development Area," draft, September 1993.