REGIONAL ENVIRONMENTAL COOPERATION IN NORTHEAST ASIA Aug. 1994

Recommended Citation

REGIONAL ENVIRONMENTAL COOPERATION IN NORTHEAST ASIA

Report to
Regional Bureau For Asia and the Pacific
United Nations Development Programme

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August 1994

Acknowledgments

Lyuba Zarsky acted as Team Leader and took lead responsibility for Sections One, Two and Four and for integrating the report as a whole. Keith Openshaw took lead responsibility for Section Five. Peter Hayes took lead responsibility for Section Three and provided input into Section Four. Philip Tortell provided important information concerning the DPRK which is attached to this report. Rachel Sommerville of Nautilus Institute provided editorial support. We would like to thank all the officials at UN offices and governments in the region who assisted the authors in the research undertaken to produce this report.

EXECUTIVE SUMMARY

Environmental issues offer new imperatives--and opportunities-- for regional cooperation in Northeast Asia. Agenda 21 calls for regional environmental cooperation to complement national and global initiatives. In Northeast Asia, growing interest in regional cooperation has been promoted by changes in political- security relations, greater regional economic integration, and increasing environmental stress.

A Meeting of Senior Officials on Environmental Cooperation in North-East Asia was held in Seoul February 8-11, 1993 and agreed to concentrate regional cooperation in three priority areas: 1) energy and air pollution; 2) ecosystem management, especially deforestation and desertification; and 3) capacity-building.

This report outlines twelve projects for regional environmental cooperation in two priority areas: eco-system management and capacity-building. The recommended projects reflect official proposals, as well as research gathered in the course of field missions. Capacity-building has been divided into sub- categories: national and local environmental management capacities;and regional (that is, cross-boundary) environmental governance capacities.

To aid in selecting projects, the Report canvasses key regional environmental issues including: forest and grassland degradation, sustainable development of Russian Far East forests, biodiversity loss, watershed degradation, and issues arising from increasing economic integration. It also develops a conceptional framework to analyze the domain of regional environmental cooperation; and presents guidelines for project selection, including: 1) environmental impact; 2) contribution to sustainable economic development; 3) efficiency; 4) feasibility; 5) inclusiveness and mutual benefit; 6) decentralization; 7) incrementalism; and 8) fundability.

The recommended projects are:

Capacity-Building: National and Local Northeast Asia Environment Management Training Program Hazardous Waste Management Training Program Network of Environmental Researchers and Scholars Local Environmental Governance Network

Capacity-Building: Regional Data Intercalibration and Measurement Standardization Regional Biodiversity Management Program Northeast Asian Convention for the Protection of Migratory Birds Watershed Management: GIS/Remote Sensing Pilot Project

Ecosystem Management: Deforestation and Desertification Regional Seed Research and Distribution Program Regional Forest and Grassland Information Base Regionalization of China's Trees for Life: Grow a Tree Project Sustainable Forestry and Agro-Forestry Network

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REGIONAL ENVIRONMENTAL COOPERATION IN NORTHEAST ASIA

1. BACKGROUND

Environmental issues offer new imperatives--and opportunities--for regional cooperation in Northeast Asia. Agenda 21 calls for regional environmental cooperation to complement national and global initiatives. In Northeast Asia, growing interest in regional cooperation has been prompted by changes in political-security relations, greater regional economic integration, and increasing environmental stress.

A Meeting of Senior Officials on Environmental Cooperation in North-East Asia was held in Seoul February 8-11, 1993. The meeting agreed to concentrate activities of regional cooperation in three priority areas:

1. Energy and Air Pollution;
2. Ecosystem Management, especially Deforestation and Desertification; Capacity-building.
3. The Meeting also agreed that consultants be asked to develop specific project proposals in each of the three priority areas for consideration at a Second Meeting to be held in Beijing scheduled for early November, 1994.

This report outlines and recommends twelve potential projects for regional environmental cooperation in two priority areas: eco-system management and capacity-building. The recommended projects reflect official proposals, as well as research gathered in the course of field missions to Northeast Asia. To better define the crucial and large area of capacity- building, we have generated two sub-categories: 1) improving national and local environmental management capacities; 2) building regional (that is, cross-boundary) environmental management capacities.

In this report, Northeast Asia encompasses the following six countries (and sub-regions within countries):

China (Northeast Region: Inner Mongolian Autonomous Region, Heilongjiang, Jiling and Liaoning provinces);

Democratic People's Republic of Korea;

Japan;

Mongolia;

Republic of Korea;

Russian Federation (Far East region: territories of Primorsk, Khabarovsk, Sakhalin, Amur, and Magadan).

The report is composed of five sections. Section Two provides a conceptual framework to analyze the net benefits of regional environmental cooperation, and operational guidelines for project selection. Sections Three-Five describe key issues and present project proposals for capacity-building for national environmental management (Section Three); capacity-building for regional environmental governance (Section Four) and for eco- system management (Section Five). A summary of proposed projects is presented in Appendix One.

2. WHY COOPERATE?
CONCEPTUAL FRAMEWORK AND PROJECT GUIDELINES

2.1 Domain of Regional Environmental Cooperation

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

On the other hand, international environmental cooperation is growing rapidly. Dozens of environmental treaties were concluded in the 1970s and 1980s, encompassing issues such as protection of the ozone layer, the prohibition of biological weapons and the banning of atmospheric nuclear testing. These treaties were conducted within the broad institutional framework of multilateralism. Environmental issues have also come to the forefront in multilateral economic institutions, especially the GATT and the newly-formed World Trade Organization.

A third level of environmental governance is emerging at a regional level. Regional governance, defined as cooperation among a geographically-circumscribed set of states, aims to complement and reinforce national and global environmental management. What is the legitimate purview of regional environmental cooperation? What can it fruitfully accomplish?

Like global and national environmental governance, the overarching aim of regional cooperation should be to promote ecologically sound and sustainable social and economic development. Meeting this objective entails both restoration of degraded eco-systems and conservation and maintenance of existing eco-systems. At a policy level, it entails the integration of economic and environmental objectives at every level of planning.

All the governments in the region have made commitments to national sustainable development planning in the context of rapid economic growth. They have all also expressed interest in promoting a process of regional environmental cooperation. Regional coordination and collaboration on environmental management could offer new opportunities to link economic and environmental objectives.

There are three levels of environmental governance in which regional cooperation can be fruitful: 1) national; 2) regional; and 3) global (see Figure 2.1). In broad terms, these three levels correspond to eco-system (and/or economic) boundaries. In Figure 2.1, the shaded area represents the potential domain of regional environmental cooperation.

Global: Global eco-systems such as oceans, climate and the ozone layer require a global level of governance. However, regional cooperation on global issues can be effective in one of two ways. First, where a global agreement exists, regional cooperation can be the institutional vehicle for implementation. Second, where a global agreement does not exist, regional cooperation can achieve a greater positive global environmental impact than unilateral action alone.

Cooperation in the environmentally sound production and use of energy, for example, could help to reduce greenhouse gas emissions beyond what a nation could achieve on its own. If regional countries are large emitters, such reductions could have a significant global--as well as regional--environmental impact. Moreover, regional initiatives can build momentum for a global agreement and help to generate a coherent regional perspective on what such an agreement should contain. In the area of generating rules to govern trade-environment linkages, for example, the decade-long experience and decisions of the European Community will greatly influence the direction of the World Trade Organization.

Regional: Geographically bounded regions often contain whole or the large part of eco-systems such as watersheds, oceans and coastlines, and habitats of migratory birds, fish and mammals etc. Moreover, many kinds of cross-border air, water and land pollution, including acid rain and agro-chemical run-offs are experienced by geographic neighbors. National environmental governance alone cannot effectively manage such resources. Regional institutional frameworks are required.

Figure 2.1

DOMAIN OF REGIONAL ENVIRONMENTAL COOPERATION

Geographic proximity also often (although not always) promotes economic integration, suggesting that national environmental regulations will affect trade and investment flows and vice versa. A patchwork of environmental regulations adds to the transactions costs of trade and investment. On the other hand, if environmental regulations are seen simply as barriers to trade and investment, nations could be pressured by competition to reduce environmental standards. Regional cooperation can help to promote ecologically sustainable economic development by generating common regulatory frameworks which include positive trade-related incentives for environmentally sound management.

National: Many eco-system boundaries are local and require national or sub-national management. However, nations within a geographic region often confront many of the same or similar environmental problems and issues. They also may share common historical, linguistic or cultural identities. Regional cooperation can accelerate learning, helping national governments, business firms, and communities to more rapidly acquire environment management skills. Policymakers can also save the costs of reinventing the wheel by sharing data and research, as well as adopting neighboring standards or methodologies for setting standards. Convergence in approaches to environment, as well as trade and development policies more generally, facilitates regional economic integration.

In some--perhaps most--cases, eco-system boundaries do not neatly conform to governance boundaries, no matter how large the nation or geographic region. Some environmental problems may span only one or two borders, requiring bilateral or trilateral rather than regional cooperation. On the other hand, some ecological issues may be simultaneously regional and global, or regional and national, or even all three. Moreover, there are positive spillovers between the different governance levels. Initiatives which improve regional management of global resources such as an ocean or habitat generate knowledge and skill which improve national or regional environmental management.

Nonetheless, it is useful to conceptualize the different domains of cooperation, especially in defining the objectives of potential cooperative projects. This report focuses primarily on regional cooperation on national and regional, rather than global, environmental issues and objectives. However, some proposed projects, such as the Regional Convention for the Protection of Migratory Birds, will improve management of global resources by conserving bio-diversity, even though they aim primarily to improve regional eco-system management.

2.2 Benefits of Regional Environmental Cooperation

The primary benefit of regional environmental cooperation is improved environmental quality. By setting common regulatory frameworks and sharing information and expertise, countries eliminate the "free rider" problem and create shared values of increasing environmental commitments. There are also significant diplomatic, security and economic benefits.

Diplomatic benefits stem from creating the opportunity to articulate and negotiate common regional interests in global or broader regional environment fora. A common stand will increase the bargaining power of regional states. Examples include the Asia Pacific Economic Cooperation group (APEC), which is developing an agenda on environmental issues; the World Trade Organization's new Trade and Environment Committee; and various arenas in which international environment treaties are being developed.

Security benefits stem from improving the overall climate for regional understanding. In this sense, regional environmental initiatives could act as confidence-building measures which promote the "habit of dialogue." On the other hand, if ignored, cross-border pollution and resource degradation could be the source of increased regional hostility.

The negotiation of many environmental initiatives, both global and regional, tends to focus on

assessing and allocating additional costs of environmental controls. There is little attempt, however, to gauge economic benefits resulting from better environmental management. A growing body of evidence suggests that prevention is cheaper than restoration. Moreover, the depletion of resources such as forests, coastlines, fisheries, and agricultural lands precludes economic development options and displaces costs to the future.

In short, economic benefits of regional cooperation stem from better management of common environmental assets. In addition, regional cooperation to improve national environmental management may be more efficient than national management alone. Net economic benefits may spring from one or more of the following sources:

Knowledge spillovers and accelerated learning curves;

Economies of scale in data collection and information management, including storage and dissemination;

Economies of scale in scientific, managerial and administrative training;

Better and cheaper enforcement mechanisms arising from the creation of positive, trade-related incentives;

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 and investment stemming from a common environmental regulatory framework;

Resource pooling;

Elimination of regional standards-lowering competition.

Some of these benefits, such as reduced transactions costs of trade, are positively correlated with regional economic integration. Beyond the static effects of improved efficiency, regional cooperation has positive dynamic economic impacts. Accelerated learning curves may increase the general rate of industrial product and management innovation, increasing economic growth. The growth of knowledge in environmental management may generate improved capacities for research and development more generally.

2.3 Key Environmental Issues in Northeast Asia

Existing regional environmental regimes are generally of two types. One is targeted around a particular common resource, such as the Mediterranean Action Plan or the Gulf of Aqaba. The second type is a broad institutional framework encompassing a variety of regional environmental governance and national capacity-building objectives.

Both types of regimes are found in the Asia and Pacific region. Broad regional frameworks for environmental cooperation exist in South Asia (South Asia Cooperative Environment Programme), Southeast Asia (ASEAN) and the South Pacific (South Pacific Regional Environment Programme). There are also a host of resource-specific regimes, such as the Action Plan for Protection and Development of the Marine and Coastal Areas of the East Asian Region (under the auspices of UNEP).

The most crucial regional environmental issues facing Northeast Asia as a region are: 1) marine pollution, 2) air pollution, 3) loss of biodiversity, 4) forest management, including deforestation/desertification and the sustainable development of the large forest resources of the Russian Far East, and 5) increasing amounts of hazardous waste.

The most important common regional resources are the Yellow Sea and the Sea of Japan (also called the East Sea of Korea). Surrounded by China and the Korean Peninsula, the Yellow Sea is semi-closed, shallow and relatively stagnant. While its pollution-tolerance is relatively low, it receives large amounts of suspended solids and other pollutants from coastal cities, the Yellow and Yanagtze Rivers, oil spills and other sources. Planned large-scale reclamation and industrial projects will remove mudflats, reducing the Sea's pollution-absorption capacities while increasing pollution loading.

Five Northeast Asian countries have coastlines on the Sea of Japan/East Sea of Korea. The Sea suffers a high rate of marine pollution: oil levels are much higher than the open ocean and are even higher in coastal areas and shipping lanes. There are also concerns about radioactive waste dumping and depletion of fisheries.

A cooperative process to establish a regional governance structure for both Seas has been initiated under the auspices of UNEP's Regional Seas Programme: the Northwest Pacific Action Plan (NOWPAP). Focussed initially on marine pollution, NOWPAP may eventually embrace many facets, including fisheries, tourism and coastal management. There are also proposals for an integrated economic-ecological development plan encompassing all the littoral states, cities, and villages.

Cross-border air pollution, especially high levels of dust and "acid rain," is a pressing regional environmental issue. Due to the lack of monitoring stations and ecological studies, the precise sources, scale and impacts of cross-border acid rain are yet to be determined. Much remains to be done in terms of establishing common monitoring methodologies, comprehensive baseline monitoring, and eco-system impact studies.

A third key issue requiring regional environmental governance is the loss of biodiversity, stemming

in large part from habitat destruction, as well as introduction of exotic species, overharvesting, and hunting (see Section Four). Protection of migratory animals, especially birds and fish, requires regional commitments. Many migratory birds spend summers in the Russian Far East and winters in Southeast Asia or Australia, stopping en route at wetlands in both Koreas, China and Japan. Tidal wetlands are also important in supporting marine ecosystems and fisheries. The intertidal organisms which live in mudflats may support up to ninety per cent of the fish living in coastal waters. In terms of tonnage produced, the North Pacific is the most important fishing region in the world.

Problems of deforestation and desertification afflict parts of Mongolia and China (see Section Five). On the other hand, there is a large regional forest stock in the Russian Far East. Regional trade in forest products is growing and is projected to increase. Expansion of the forest products trade offers an important source of regional economic development. Without sustainable management, however, the slow-growing Russian forests could be severely degraded and development opportunities squandered.

Rapid economic growth in the region is generating increasing quantities of waste. At the same time, environmental capacities to transport, absorb, decompose, dilute or recyle these wastes seems to be falling. Problems of hazardous waste management afflict each country and are also the source of transboundary ecological problems, including via riverine and coastal ecosystems.

Unless mitigated and reversed through a national and regional initiatives, environmental problems will worsen with projected high rates of regional economic growth. In this sense, the overarching ecological imperative in the region is the integration of environmental and economic policies strategies. Effective integration will require training and education not only for environmental but also for economic scholars and policymakers.

With increasing regional economic interdependence, ecology- environment integration will increasingly require attention to linkages between regional trade, investment and environmental objectives. Linking trade and environment concerns suggests not only constraints but new opportunities for economic growth through industries such as eco-tourism, sustainably managed timbers, non-timber forest products, and agro-forestry, as well as environmental monitoring and management industries.

2.4 Guidelines for Project Selection

In theory, a host of projects for regional cooperation are possible. In reality, potential projects are constrained by financial, political and other factors. Moreover, given scarce resources, projects should be selected which are most likely to succeed and to offer the greatest net benefits. Operational guidelines are needed for project design and selection. In broad terms, the projects proposed in this report are based on the following guidelines:

1) Environmental impact;
2) Contribution to sustainable economic development;
3) Efficiency;
4) Feasibility;
5) Inclusiveness;

6) Decentralization;
7) Incrementalism;
8) Fundability.

Environmental Impact: Projects should have a significant environmental impact over short, medium and/or longterm. A variety of methodologies can be used to analyze environmental impact, including environmental and health risk assessment, field studies, etc. The relative weighting of alternative environmental benefits is subject not only to scientific study but also to social value judgments which may differ between countries. Obtaining social judgments is possible through interviews, social surveys, public hearings, etc.

Contribution to Sustainable Development: Projects should seek synergies between economic and environmental objectives. Synergies may be gained through knowledge spillovers and technological spin-offs, as well as express targeting of industry growth. Training programs which increase business competencies in environmental management, for example, will increase overall managerial capabilities, improving total product productivity.

Efficiency: Projects should optimize net environmental and sustainable development benefits per dollar, time and political goodwill spent in regional environmental cooperation projects. Selecting optimal projects requires two kinds of analyses: 1) cost-goal analysis which compares financial (as well as time, political and other) costs with particular environmental objectives; 2) cost-benefit analysis which considers alternative ways of achieving the same goal. Projects which promote voluntary citizen participation, for example, may reduce costs and make goals more achievable than those that rely only on government.

To be efficient, regional environmental agreements must be enforceable. Effective enforcement entails structuring projects in ways that provide positive incentives to the key groups involved. Effective wildlife management, for example, requires that there be economic gains to local communities in wildlife protection. A guideline of efficiency also suggests that new projects avoid duplicating existing regional, bilateral, or national projects; that they maximize collaboration and synergies with existing efforts; and that they minimize overheads.

Feasibility: Projects should be financially, politically, culturally and institutionally feasible. Financial feasibility suggests that projects not be overly costly, no matter how efficient, especially in the early stages of regional cooperation. Regional projects must respect national sovereignty as well as differences in language and values. Institutional feasibility suggests that projects should not be selected which rely on weak institutional capacities.

Inclusiveness: Projects should involve all the countries involved in the regional cooperation effort. In Northeast Asia, this criterion means that all six countries should have an interest, stake and commitment to projects selected for cooperation. A project portfolio should reflect a balanced mix of mutual benefits and common concerns.

Decentralization: Regional cooperation projects should be based on a networking model, rather than a centralized, single- institution-building model. Networking suggests each country can share and build on its particular strengths. It also suggests that the economic benefits of regional

environmental cooperation be shared.

Incrementalism: Projects should generate momentum toward further cooperation in a step-by-step process. Initial cooperative projects should build on existing capacities and interests and promote rapid learning and confidence-building. Moreover, projects should be designed in a modular fashion, allowing components to be added, amended, or put on hold as interest and financing permit.

Fundability: Projects should be fundable both in the initial stages and over the long term. Projects should thus fall within the guidelines of established national, regional and multilateral funding agencies; should offer benefits so valuable that regional governments are willing to pay for them; or become self-funding in the medium-to-long term by generating revenue streams.

3. CAPACITY- BUILDING: NATIONAL AND LOCAL

3.1 Introduction and Framework

The six states of Northeast Asia have selected "capacity- building" as one of three priority areas for regional cooperation. In addition, the 1992 Rio Conference identified the need to build environmental management capacities as the crucial factor in implementing the Agenda 21 Program.

Regional cooperation can promote the building of two broad types of capacities: national and local environmental management; and regional governance of cross-border resources. While analytically and functionally separable, these two capacities reinforce each other. Strong local pollution data monitoring and enforcement capacities, for example, can provide reliable data inputs into a regional data base, as well as guarantee credible enforcement of a regional cross-border pollution convention. Likewise, vibrant regional networks of information and ideas exchange can strengthen national policymaking capacities.

Nonetheless, the garnering of capacities in one or the other dimension entails the analysis of different issues and the design of specifically-tailored projects. This Section explores issues and proposes projects related to national and local capacity- building, while Section Four does the same for regional capacity- building. Both Sections consider five key functional areas in which regional cooperation to build capacities would be fruitful:

1) Education: Scientific and managerial education of policymakers, business managers, scholars, and community groups;

2) Information: Design, collection, storage and dissemination of ecological data bases;

3) Policymaking: Training of policymakers in the integration of environmental concerns in macroeconomic and sectoral policies, including the use of market-based instruments, regulation, and industry planning/development guidelines;

4) Regime-Building: Institutional mechanisms for better environmental governance. At the national level, this suggests strengthening local governments and community consultation. At the regional level, this suggests building regional cross-border governance institutions;

5) Science and Technology: Research, development and diffusion of better environmental technologies and productive inputs.

3.2 Assessment of Existing and Required Capacities

Environmental institutions have developed substantially in the region in the last two decades. All states in the region have created or strengthened national-level environment ministries and bureaucracies and have enacted laws, regulations, and standards to reduce pollution and improve management of resources such as forests, grasslands, minerals, fisheries, etc. In addition, regional states have become party to many global and regional environmental treaties and agreements (see Table 3.1).

Of particular importance is the widespread policy commitment to integrate environmental and economic development policy objectives. This commitment entailed a shift in perspective from simply improving the "balance" to seeking an "integration" between environment and development goals. The shift was encouraged by the Rio Conference in June 1992. National Agenda 21 action plans show that each country in the region is seeking to implement a commitment to ecologically sustainable development in ways consistent with their national outlooks and social and economic goals.

Besides the principle of goal-integration, countries in the region have also adopted two other environment management principles: 1) the "polluter pays" liability principle; and 2) the "prevention over cleanup" principle that environmental assets should be conserved from the outset, rather than restored after they are damaged.

National and international measures have been supplemented with provincial and local laws and decrees relating to land use and environmental protection. Public participation in economic and environmental decision making is also a universal trend in the region, although the type and extent of involvement by non- governmental organizations (NGOs) vary greatly between regional states. In some countries, NGOs provide important professional expertise and input into official policymaking processes. Involvement by NGOs at an early stage of development project planning has also strengthened the information base required for effective project design and implementation. In other countries with a very developed NGO sector, NGOs have taken both proactive and propositional as well as reactive, oppositional roles. In still other countries, NGOs barely exist.

Although progress is generally encouraging, many national reports and studies reveal that intractable institutional problems continue to obstruct sound environmental management. Unless they are rectified, environmental problems will be greatly compounded with projected high rates of economic growth.

Table 3.1

Source: P. Sand, ed, The Effectiveness of International Environmental Agreements, Grotius Publications, Cambridge UK, 1992; and P. Hayes and L. Zarsky, Regional Cooperation and Environmental Issues in Northeast Asia, Nautilus report to IGCC, U.C. San Diego, September 1993.

Institutional problems include:

- Lack of lateral coordination within and between environment and resource management agencies;
- Lack of integration between economic and environmental policies and planning processes;
- Inadequate authority and budget for environment agencies to ensure sufficient weight in decision making processes; Lack of environmental information;
- Undeveloped managerial and administrative resources at all levels of government;
- Low levels of public awareness and underfunded and understaffed environmental education programs;
- Short time horizons which drive political and organizational decisions;
- Outdated provisions in existing environmental laws and gaps on key issues such as solid, hazardous wastes and radioactive pollution;
- Slow enactment of domestic legislation to implement international treaty commitments;
- Inefficient markets, prices that do not fully reflect environmental costs and benefits, and uncertain ownership or control of natural of natural resources;
- Potential inconsistency between national environmental measures and global trade rules.

3.3 Objectives and Dimensions of Regional Cooperation

Each nation has undertaken initiatives to build institutional capacities for environmental management. In selecting "capacity-building" as a priority for regional cooperation, they have also signalled their perception that regional efforts can strengthen national initiatives. By the same token, attempts to develop regional governance structures for common resources will be more successful the stronger are each nation's domestic management capacities. Out of the myriad of possible projects to build national capacities, this report seek to identify those which synergistically reinforce national and regional capabilities.

Successful regional cooperation cannot be achieved unless it embodies the principles of mutual benefit, respect for national sovereignty, and shared commitment. Strong endogenous national capabilities are the foundation on which successful regional cooperation can be built. By the same token, an issue area in which only one or two countries have requisite management capacities may not be a suitable candidate for regional cooperation--unless the mutual benefits are so great as to make the project attractive.

Conversely, issue areas in which national capabilities are so lacking as to make it unfeasible for a state to participate meaningfully at the outset (due, for example, to lack of finances, skills and other human resources) are not likely to spawn productive regional programs, even if training components are included. Indeed, such areas are likely to be ones of either peripheral concern in these countries; or so pressing that diversion from the national tasks at hand would be a misallocation of extremely scarce resources.

In issue areas which meet these limiting conditions, the national capacities required to participate in regional programs are of five major types, namely:

Educational and training capabilities that increase managerial, planning and scientific human resources at all levels of government, as well as among business and community groups. To do this requires investment in: 1) tertiary education to expand environment-related scientific and technical expertise, 2) environmental and management training of policymakers; and 3) primary, secondary and community environmental education programs.

A key task at all levels is to reorient education toward the integration of environment and development in national, regional and global contexts. Agenda 21 specifically urged countries to collaboratively prepare educational tools that include regional environment and development issues and initiatives, using learning materials and resources suited to national requirements. The cultural importance attached to education by all societies in Northeast Asia suggests that investment in environmental education will yield rapid and widespread benefits.

Information capabilities to gather, catalogue, store, utilize, retrieve and exchange environmental information in a timely fashion, including natural resource surveys and indicators of eco-system health needed for decision-making. Overcoming poor lateral coordination and resultant issue fragmentation on the one hand, and the tendency of line agencies to simplify an issue into one analytical framework or dimension on the other, both require that more information not only be obtained, but that it be shared in a timely fashion at an affordable cost to all relevant stakeholders.

In turn, the availability of better and more information at the national level will enhance regional projects that rely on national sources of information.

Policy development and training capabilities to design policy instruments and promote institutional mechanisms for better environmental management. Especially important are economy-wide and sectoral policies which aim to align market forces and government regulatory oversight with environmental goals. Innovative policies include market-based instruments, regulation, and environmental guidelines for sustainable industry and sectoral development. Better policymaking requires enhanced research capacities, especially research aimed at understanding environment-economy links on the one hand, and between environmental laws, environmental impacts, and economic objectives on the other hand.

Consensus-building capabilities, especially local government monitoring, enforcement, education and information capacities; and community consultation and education programs. As Agenda 21 put it, consensus should result from a participatory dialogue of relevant interest groups. Creating opportunities for participatory dialogue requires political commitment from each nation in the region. The creation of national and local arenas for dialogue, including commissions, hearings, councils, round tables, etc. would also help to garner support for regional projects of environmental cooperation.

Scientific and technological capabilities to tailor existing technologies to specific national needs; and in the long run, to research, develop, and diffuse energy-efficient and clean production and consumption technologies. Better scientific capacities are also needed to monitor and manage all aspects of environmental use, including national and crossborder air and water pollution. Scientists are particularly important in the definition of environmental problems, including transboundary ones. Their ability to communicate to an informed public is crucial to the shifts in personal and community perceptions that in turn enable political leaders to engage in strong regional collaboration.

All the countries in the region face an array of complex and intractable economic and environmental problems. Each of these problems requires a responsive national capacity suited to national circumstances. Consequently, the list of conceivable projects to build national capacity is almost infinite. Each country has tackled this problem in a systematic way by producing an Agenda 21 National Action Plan which orders priorities and defines required resources. It is essential, therefore, that projects proposed for regional collaboration be broadly consistent with the Agenda 21 strategies of each country. Each proposed project has been considered carefully in relation to the national priorities reflected in the Agenda 21 reports from states in the region.

3.4 Proposed Projects

This section outlines four projects for regional cooperation to build national/local environment management capacities:

- Northeast Asia Environment Management Training Program;

Hazardous Waste Management Training Network;

Network of Environmental Scholars and Policymakers;

Network for Local Environmental Governance.

3.4.1 Northeast Asia Environment Management Training Program

The six countries in Northeast Asia confront both similar and different environmental issues. Each country has acquired or has made a commitment to acquire strong capacities in particular areas of environment management. On the other hand, no country has all the requisite capacities, suggesting that mutual learning would be productive.

The Northeast Asia Program for Environment Management Training aims to create a decentralized network of six nationally-based "centers of excellence" specializing in one (or more) area of environmental management training. The Training Program would be aimed at government policymakers throughout Northeast Asia who are responsible either for general environmental management (for example, in Environment Ministries), for the interface of economic and environmental issues (for example, in economics-related ministries), and/or for a particular area of environmental or resource management (for example, in forestry, agriculture, tourism, etc. ministries).

Through a regional process of discussion and coordination, each country would select one issue area in environmental management in which it would act as a Country Coordinator. Issues areas selected are likely to be those in which a country has an especial expertise or interest. Examples include:

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Environmental economics;

Pollution control and monitoring;

Coastal management;

Management of inland waters;

Eco-tourism management;

Environment management systems for business.
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Country Coordinators would be responsible to design and coordinate a regional training program utilizing high-quality, relevant personnel and materials from throughout the region and beyond. Although the ultimate target population are policymakers at all levels, the priority for the Regional Training Program would be to "train the trainers," thus helping to distribute the benefits of training to national and local levels.

The Training Program would utilize and regionalize existing or evolving national and international capacities/institutions in Northeast Asia. These include UNEP's International Center for Environmental Technology Cooperation in Shiga, which is focused on inland waters; the Japan-China Friendship Environmental Cooperation Center in Beijing (now under construction), which will focus on pollution monitoring; and the Korean Institute of Science and Technology, which specializes in environmental pollution control training.

The Training Program could also collaborate with UNEP's regional GRID Program, headquartered in Bangkok which aims "to assist national governments with acquiring and analyzing environmental information." In addition, related bilateral training programs could be regionalized and environmental components added. For example, Japan has initiated a program to establish Technical Assistance centers in Vladivostok and Khabarovsk aimed at providing management training. The program could be expanded to include Environment Management Systems training and offered to business managers throughout the region.

One advantage of a decentralized yet coordinated Regional Training Program is design flexibility: both the selected areas of training and the Country Coordinators can be amended, contracted, or expanded over time. It also offers incremental funding possibilities, since funders could be asked to support the project as a whole or a particular component. Moreover, some or all of the components could be self-financing over the longer term. The operating costs of the eco-tourism and wildlife management courses, for example, could be financed via licenses or other taxes on hunters and eco-tourists. By maintaining semi- autonomy for each component of the Training Program, flexible and appropriate self-financing options can be designed. On the other hand, a Regional Coordinating or Steering Committee would integrate, coordinate and oversee the national training courses. Key tasks would be to establish curriculum guidelines and evaluation procedures for quality control.

There are two phases to the project: 1) creation of Regional Framework; 2) development of six regional Training Courses, which includes holding one pilot management training course.

(1) Phase One: Creation of Regional Framework

Selecting issue areas and country coordinators is the first step. The Second Meeting of Senior Officials on Environmental Cooperation, scheduled for Beijing in November, offers an opportunity for selection. On the other hand, governments may wish to engage in more extensive national consultations.

A Steering Committee or other institutional framework composed of official representatives of all six Northeast Asian countries would be established. The Steering Committee could select priority issue areas and Country Coordinators if the Second Meeting is not willing or able to do so. It would generate a funding proposal for the Regional Training Program as a whole; and coordinate and oversee the national training courses. After training issue areas and Country Coordinators are selected, the first task of the of the Steering Committee would be to develop guidelines for the design and assessment of each training course. Other aspects of its Work Program would be to establish reporting and coordinating procedures and to generate evaluation guidelines for quality control.

Timeline: 1 Year

Estimated Cost: $ 0.1 million

(2) Phase Two: Development of Six Regional Training Courses

Each country would take responsibility to design and coordinate one regional training course in a particular issue of environmental management. Designing the course entails surveying existing needs and capacities in each country, creating a curriculum and designing and generating manuals and other written materials. The particular design of the training program would be the purview of each Country Coordinator, subject to the approval of the Regional Steering Committee. However, a modular model, in which components may be expanded or contracted may be the most effective and efficient design. Each component could run for 1-3 months.

Once the training courses have been developed, a pilot training will be offered in each issue area. This will require support for travel and accommodations, equipment, production of background materials, etc.

Timeline: 3 Years

Estimated Total Cost: $3.9 million ($650,000/Training Course)

3.4.2 Hazardous Waste Management Training Network

A high priority issue area for regional environment management training is in the area of hazardous waste and pollution control technologies. Rapid economic growth in the region is generating increasing quantities of waste, while the environment's ability to transport, absorb, decompose, dilute, or recycle these wastes seems to be falling. In China, for example, rapidly expanding industrial production will greatly increase waste flows. Industrial wastes already comprise the principal source of water pollution in China, including hazardous chemicals and heavy metals. According to national statistics, China's total waste water discharges in 1989 reached 35.5 billion tonnes, of which 70 percent was industrial in origin. Of this, about 80 percent went into rivers, lakes, or the sea without treatment.

This story is repeated elsewhere in the region. In the ROK, for example, 2 million tonnes of hazardous waste are generated annually from 20,247 industries. The ROK reports that hazardous waste poses multiple problems for environmental managers, including disposal technologies, shortages of landfill sites, inadequate separation of hazardous from non-harzardous wastes, inadequate licensed waste treatment firms, illegal treatment and disposal, lack of source reduction and recycling, and lack of public awareness.

Hazardous wastes are often released into shared environmental resources such as rivers and wetlands. One DPRK chemical plant, for example, releases about 100,000 tonnes of waste daily into the Amnok/Yalu River. The effluent probably contains lignite, sodium, COD, zinc, etc, all of which are of concern to Chinese as well as North Korean authorities. Expensive process chemicals are not recovered before effluents are released, resulting in inefficiency as well as a degraded river system.

Regional cooperation in the field of hazardous waste management and environmental control technology should start in areas that are urgent, practical, and cost effective. Each country has identified waterborne and hazardous waste controls as urgent issues. To deal with them, massive investment is needed to improve industry management, refurbish old plant, clean up past

degradation, and adopt measures to prevent future environmental damage.

The Hazardous Waste Management Network aims to build regional research and management capacities in the field of hazardous waste and pollution control technologies. Proposed by the ROK government, the Waste Management Network is described here as a stand-alone separate project. However, it could also be considered as one of the issue areas in a regional Environment Management Training Program (proposed above).

The creation of a regional Hazardous Waste Management Network has two phases: 1) develop a Collaborative Research Framework for national and transboundary hazardous waste emissions and management; 2) develop Training and Technical Assistance Programs.

The Network would build on bilateral cooperative programs on hazardous waste management. In Japan, for example, MITI's Green Aid Plan concentrates upon prevention of air and water pollution, waste treatment and recycling, energy conservation, and alternative energy sources. Under this program, the Japan External Trade Organization is organizing Centers for Energy and Environmental Technology in developing countries, including the China-Japan Friendship Environmental Cooperation Center in Beijing. Japan's New Energy and Industrial Technology Organization (NEDO) also implements an international cooperation program which contains technical assistance elements in developing countries. In the ROK, the Environment Research Center at the Korean Institute of Science and Technology has begun an environmental control technology training program in 1994.

Phase One: Framework for Collaborative Research

The first task of the Hazardous Waste Management Network is to establish a framework for regional collaboration in information-gathering and research. A collaborative research agenda should focus on areas which makes a unique contribution and which: deal primarily with transboundary waste issues, including transnational movements of hazardous wastes: involve multiple disciplines and policy areas; involve non-proprietary research into hazardous wastes; improve management of hazardous waste.

The Network would be coordinated by the Environment Research Center at the Korea Institute of Science and Technology or other research institutes designated by the Senior Officials on Environmental Cooperation or other regional meeting. The Work Program in Phase One would be to:

1. develop a common definition of "hazardous and toxic waste;"
2. develop basic data bases of national statistics of hazardous waste generation, treatment, and disposal;
3. compile statistics on transboundary emissions/movements of hazardous wastes;
4. compile statistics on international trade in hazardous materials;
5. compile statistics on chemical toxicity;
6. exchange information concerning regulatory approaches, enforcement techniques, and standards, including consistency with the Basel Convention and the UNEP Register;

7. define and undertake a collaborative regional research agenda. Research issues include technological innovation, including waste minimization, stabilization, and disposal; and physical, thermal, chemical, and biological waste treatment.

Timeline: 2 Years

Estimated First Year Cost: $0.175 million

Estimated Total Cost: $0.350 million

Phase Two: Develop Training and Technical Assistance Program

The second phase would create one or more training programs in hazardous waste management and environmental pollution technologies. Training and technical assistance programs could focus on issues such as:

1. hazardous waste management policies, including tracking and accountability systems used in Japan and the Republic of Korea;
2. economics of minimization and control;
3. environmental management and operation policies including control standards, instruments, regulations, enforcement, study tours etc.
4. local waste minimization and management strategies.

Timeline: 2 Years

Estimated Total Cost: $0.30 million

3.4.3 Network of Environmental Researchers and Scholars

One of the greatest benefits of regional cooperation is the exchange of information and ideas. Knowledge-sharing across discipline and national boundaries is crucial to the task of developing intellectual, academic and policy frameworks for ecologically sound development.

Capacities for producing and sharing knowledge vary within the region. The Russian Far East, for example, has an extensive network of highly-trained scientists based in the various institutes of the Russian Academy of Sciences. Strong Russian research capacities include forest ecology, soil science, water ecology, geological sciences, marine science, and others. However, communication infrastructure is poor and travel between the Russian Far East and other Northeast Asian regions expensive. Japan, on the other hand, has an excellent communication infrastructure and strong engineering capacities. However, it lacks academic strengths in environmental economics and some of the social sciences related to environmental management.

The Network of Environmental Researchers and Scholars aims to facilitate both the production and sharing of knowledge in Northeast Asia. The proposed Network would have two components: 1) the extension of UNDP's electronic Sustainable Development Network (SDN) throughout the region; 2) the creation of four Working Groups on: i) a Higher Education; (ii) Environmental Economics; (iii) Environmental Law; and (iv) Ecological Sciences.

(1) Component One: Extension of UNDP's Electronic Sustainable Development Network

In 1990, the UNDP launched the Sustainable Development Network (SDN) initiative to facilitate dissemination and exchange of information about sustainable development. The initiative aims to establish SDNs at national, regional and local levels. SDNs combine face-to-face meetings with electronic messaging (e-mail) and electronic conferencing systems to link sources and users of information about sustainable development.

Electronic communications systems offer several advantages. They are cheaper and faster than mail systems, allowing large amounts of information to be widely disseminated. They encourage maximum participation: all users of a Network can have immediate access to the most current papers, not just the few who attend a workshop or seminar. Electronic systems also allow each user to both distribute to the whole Network and select information posted by all the other members of the Network. In remote areas where telecommunications and mail infrastructure is poor, electronic systems give researchers access to information around the globe.

In Northeast Asia, China and the Republic of Korea are exploring or have already decided to establish SDNs. Regionalizing the SDN Network will require that national nodes be established in Japan, Mongolia, the DPRK and the Russian Far East. Financial support is needed to purchase hardware and software systems in the DPRK, Mongolia, China and the Russian Far East, as well as to offer technical training for users throughout the region.

Timeline: 2 Years

Estimated First Year Cost: $0.25 million

Estimated Total Cost: $0.50 million

(2) Component Two: Network Working Groups

Four Working Groups of the Regional Network of Environmental Researchers and Scholars would be established to promote learning and exchange of ideas. The Working Groups could utilize the electronic communication network established in Component One (SDN). They would also communicate via telephone and mail and covene workshops and seminars. The lead partners in establishing and nurturing the Working Groups would be national research institutes as designated by participated governments. Timeline and cost estimates reflect seed monies to establish each Network.

(i) Higher Education: Tertiary level environmental education and training programs are crucial for strengthening expertise within each country and the region as a whole. A Higher Education Working Group would be composed of tertiary-level institutions and educators. It would aim to develop curricula, teaching methods and standards to improve environmental education, identify educational needs. In addition to environmental and pedagogical issues, the Group could discuss methods of assessing educational needs, course and certificate standards, and teacher evaluation methods. The Higher Education Working Group could collaborate with UNEP's Network for Environmental Training at Tertiary Level in Asia-Pacific (NETTLAP) and with the United Nations University based in Tokyo.

(ii) Environmental Economics: The Working Group on Ecological Economics would exchange ideas and promote education in environmental issues related to micro and macro economics, as well as institutional, industry and international economics. An issue of especial regional importance is the emergence of a regional institutional framework which links economic with environmental cooperation. Other thematic areas might include:

- indicators of sustainable development;
- industry planning guidelines;
- regional economic integration and the environment.

(iii) Environmental Law: The Working Group on Environmental Law would consider issues related to environmental legislation and enforcement, including liability, compensation, rights of redress, and jurisdiction.

(iv) Ecological Sciences: The scope of the Working Group on Ecological Sciences would embrace a range of disciplines and issues, especially those related to cross-border eco-systems in Northeast Asia. These include marine, riverine and habitat management sciences.

Timeline: 2 Years

Estimated First Year Cost: $0.25 million

Estimated Total Cost: $0.50 million

3.4.4 Local Environmental Governance Network

Local governments are playing an increasingly important role in environmental management in all regional states. Fulfilling both administrative and political functions, local governments have distinct strengths. They are often better informed about, more responsive to, and better managers of local

resources than distant, central authorities. Also, they are often responsible for primary, secondary and even tertiary education, giving them an important role in shaping community environment awareness. In Japan, for example, local governments have often been ahead of central government in imposing stringent environmental regulations and developing innovative schemes such as early environmental impact assessment procedures.

In some cases, however, local governments have been bypassed, undermined or replaced because their environmental representations proved unpalatable to central ministries; or because of battles with central authorities over the control of local natural resources. In the Russian Far East, for example, lines of authority and control over national resources, especially forests, are unclear between central and regional governments.

Moreover, local governments are often poorly funded and unable to attract trained technical staff, develop administrative skills, or build adequate information systems. Their budgetary dependence on central government represents an ultimate limit on the ability of local governments to achieve their own goals. Obviously, the best circumstance is where central and local objectives converge and the complementary capabilities of the central and local government agencies are mobilized in tandem. In the long run, the resilience and potency of local government rests on strong and vibrant local communities, requiring participatory procedures in local government.

The Japanese Government has proposed a regional cooperative project aimed at improving local environmental governance capacities and is already committed to supporting the preparation by local governments of "Local Agenda 21" policies. In China, some provincial governments, like Hubei, have prepared comprehensive programs of international cooperation and actively seek international partners in implementing these programs.

The scope within nations for a regional project on local environmental governance is vast. China, for example, has 2,300 regional and local Environmental Protection Bureaus (EPBs) staffed by more than 61,000 personnel. Local governments must approve all EPB orders to control or to eliminate pollution by a deadline, or to shut down polluting activities. The ROK is also constructing a new set of local and provincial environmental institutions as part of the Government's overall redistribution of administrative and political authority. In the three "transition economies," increasingly decentralized markets will put require increasing devolution of environmental authority to local governments. The DPRK is also beginning to address local and provincial institutional issues in its environmental management administration, as seen in its Rajin-Songbong Free Trade Zone.

A Local Environmental Governance Network would explore how to improve the environmental performance of local governments in the region. The project has two components: 1) Information Gathering and Exchange; 2) Expert Working Group on Environment Management Information Systems.

(1) Component One: Information Gathering and Exchange

The six countries would establish a Working Group to over see the Network. The first phase would be a survey by each nation of its current practices of local government environmental management, as well as ways to enhance performance. Particular attention could be paid to:

- scope of responsibility and authority, including legal and regulatory frameworks;
- relations with central government and other local government agencies (especially those with shared natural resources or common environmental problems);
- relationship to local business and community organizations; role in technological change;
- role in environmental education;
- role in pollution prevention versus remediation.

Once the surveys were completed, a regional conference of the Network would be held to distribute and discuss the results and determine a further work agenda.

Timeline: 1 Year

Estimated Cost: $0.10 million

(2) Component Two: Expert Working Group on Environment Management Information Systems

An Expert Working Group would be established to assess three areas: 1) national capacities of local governments to manage information and monitor/enforce environmental regulations; 2) capacities to implement computer-based environmental management information systems which support investigation of pollution sources, environmental impact assessment, preparation of local and regional masterplans, formulation of permit and fine fees, and monitoring; 3) technical and managerial skills of local institutions.

The project may recommend discrete training and equipment upgrades for each country. However, these are not reflected in the cost estimates given below.

Timeline: 2 years

Estimated First Year Cost: $0.15 million

Estimated Cost: $0.30 million

Table 3.2

Table 3.3

Table 3.4

Table 3.5

4. CAPACITY-BUILDING: REGIONAL

The countries of Northeast Asia are both geographical neighbors and increasingly important trade partners. Regional cooperation is needed in two broad categories of environmental governance: 1) transboundary ecological issues, that is, mitigating cross border pollution and managing common resources; 2) transboundary economic-ecological issues, that is, governing linkages between trade patterns, investment flows and environmental regulations and impacts. The long-term goal of regional cooperation in building environmental management capacities should be to develop effective governance regimes in both dimensions.

This Section examines some of the key transboundary environmental issues in Northeast Asia; considers short and medium objectives of regional cooperation in capacity-building; and describes dimensions in which regional cooperation is evolving and needed. The final part outlines four projects for enhancing regional environmental governance capacities.

4.1 Regional Environmental Issues

The most critical transboundary ecological issues in Northeast Asia are:

- marine pollution;
- air pollution;
- loss of biodiversity, especially threats to migratory species;
- forest degradation and sustainable development of Russian Far East forests;
- watershed degradation.

Marine and air pollution are beyond the scope of this report. Forest issues area examined in Section Five.

4.1.1 Loss of Biodiversity

Biodiversity can be defined at various levels: genetic diversity across and within species; ecological diversity, that is, the variety of habitats found within an area; and ecosystem diversity, or the diversity of functional roles played by various species within an ecosystem. Diversity is important at each of these levels, and provides the basis for public concern ranging from the future of a highly visible threatened species, such as the East Asian Tiger or the Crane, to habitat degradation due to chronic low-level pollution which assaults a whole ecosystem.

The Northeast Asia region is endowed with areas of high species biodiversity. It also suffers from biodiversity loss. In Japan, for example, over 700 plants are classified as threatened. Over 80 birds are classified as threatened in China and nearly 80 birds in the ROK (Table 4.1).

The main threats to biodiversity in the region are the introduction of exotic species that out-compete endemic species; habitat destruction; hunting; overharvesting; and sometimes, deliberate extermination. Habitat loss is particularly significant, arising from conversion to other uses, removal of vegetation or erosion, and/or fragmentation, wherein habitat is carved into areas too small to support endemic species. In addition, future changes in global climate may further stress regional habitats.

Countries in the region have adopted two approaches to conserving and restoring biodiversity. First, they have attempted to protect so-called flagship threatened species such as the East Asian tiger, the Panda bear, or the Crane. This approach is expensive and, due to the interdependence between individual species and their habitats, is limited in what it can achieve. Measures employed under this approach include expanding legal protection afforded to designated species, developing management plans to protect them, and ex situ conservation in zoos and seed banks.

The second approach is to maintain habitat through networks of protected areas. The total protected area varies greatly between countries. Japan has the largest share of protected land, about 12 per cent of the total land area. On the low end are the DPRK, with 0.5 per cent and the Russian Federation, with 1.2 per cent (Table 4.1). The existence of protected areas, however, may not guarantee species protection. The areas may be inadequate in the type and size of habitat required to allow species to co- evolve and to reproduce successfully. This situation may be the case especially when habitats cross borders. Moreover, personnel and financial constraints may undermine management capacities. This is especially the case in the Russian Federation. Finally, protected areas may not provide adequately for the livelihood for surrounding human populations whose activities impinge on the protected areas. For these reasons, some governments in the region are considering management strategies which generate income from conservation activities, such as eco-tourism and controlled harvesting.

One of the crucial transboundary issues of biodiversity loss is the threat to migratory species, especially 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; some are nearly extinct. Pressures on these birds include the loss of wetland habit 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.

Table 4.1 Source: National UNCED reports and Agenda 21 action plans; ESCAP, Regional Environmental Conditions and Trends in North-East Asia: State of the Environment: and National Policies and Programmes, IHE/ECNEA/3 January 26, 1993, pp.10-11; World Resources Institute, World Resources,1994-95, Oxford University Press, New York, pp.316-317

Preserving migratory birds depends in part on national policies governing coastal and inland wetlands management. The freshwater Khanka Lake, for example, which spans the China-Russia border about 220 kilometers north of Vladivostok is one of Northeast Asia's most important stopping points for migratory birds. The Lake has vast marshes which host thousands of migrating wildfowl each year. Yet it is threatened by draining and conversion to agriculture, woodcutting for domestic use, pesticide pollution, overgrazing, upstream forestry and woodprocessing, fishing, and recreational abuse.

In both the ROK and DPRK, 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 are also underway in North Korea, with little consideration for the impact on migratory species. On the other hand, the DPRK is collaborating with China, Japan, and Russia on the management of ecological border areas and in satellite tracking of migratory birds. Five wetland areas have been identified and are in the process of being declared protected areas. Other states as well are moving to declare special reserves such as Lake Hanka in China or at Chorwon and Taegu in the ROK. But progress is slow.

Obstacles to efficient implementation of biodiversity management include shortages of trained staff and funds to manage the existing networks of protected areas. In some countries, ambiguous ownership or management responsibility has made it difficult to conserve biodiversity. Relatedly, multiple systems of nature reserves and highly fragmented institutional responsibility for habitat and biodiversity conservation have compounded the problems of achieving a coordinated response to reversing the tide of habitat degradation and biodiversity losses.

4.1.2 Watershed Management

Good management of river systems is crucial to promote both ecological and economic goals. Rivers support agriculture, forestry, fishing and industry, as well as habitat for flora and fauna and recreational human use. A number of river watersheds cross national boundaries in Northeast Asia, including the Amur and Ussuri Rivers, which straddle the Russia-China border; and the Tumen River, which originates in Mongolia and empties into the open sea in a large delta which spans China, the DPRK and the Russian Federation. Along the way, the Tumen has many major and minor tributaries.

A joint management project has been initiated for the Ussuri River. Financed by the United States, the project brings together experts from China, the Russian Federation and the United States to develop a plan for the sustainable agricultural development of the Ussuri. Bilateral Chinese-Russian negotiations have been held over pollution and fish depletion in the Amur River but no joint management plan is in effect.

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

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

China, Mongolia and the ROK have agreed to a set of Environmental Principles as guideposts for the design of the Tumen River project and have accepted that a goal of the project will be to achieve "environmentally sound and sustainable development." Reports suggest, however, that hinterland, deltaic and adjacent coastal areas are ecologically fragile, and note the paucity of environmental and resource data for the area. Baseline ecological data is crucial to an environmentally sustainable development plan.

A draft Preliminary Environmental Study completed in May, 1994 constitutes the first stage of environmental assessment. The UNDP-commissioned study concludes that the TREDA spans a region of "globally significant biodiversity values" and "includes a wide range of ecosystems, many of which are themselves regionally or globally significant." It also suggests that the wetlands and marine environment of Posiet Bay in the center of the coastal area of the zone are highly vulnerable to pollution. Although existing levels of population and industry are apparently not degrading this ecosystem, their expansion, the report concludes, "may not be compatible with maintenance of the ecological, tourism and mariculture values."

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

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

By the early 1970s, water pollution in the Tumen River had reached the point where even treated water was not usable for human consumption. A combination of high chemical and nutrient pollution, heavy sediment loads and low levels of dissolved oxygen have rendered the lower reaches of the Tumen River biologically dead. Agricultural land irrigated by Tumen River water have experienced reduced yields or had to be removed from production altogether due to a contamination with toxic materials. Fisheries in the Tumen have been wiped out since the mid-sixties.

Ironically, industrial polluters along the Tumen have also suffered reduced productivity because their water intake is below required standards due to upstream pollution. The sedimentation of streams from wastes and soil erosion has led to increased periodic flooding reduction in water transport capacity, and destruction of pelagic and benthic organisms. The final recipient of the pollution before it is flushed to the ocean are the wetlands at the mouth of the river, which likely have accumulated large quantities of these materials in the sediments and biomass of the wetlands, with unknown impacts on the birds and animals that inhabit the wetlands. Thus, the Tuman ultimately adds to the pollution burden of the East Sea of Korea/Sea of Japan, with potential regional impacts on coastal waters of Russia, the DPRK, and possibly even the ROK and Japan.

4.1.3 Regional Economic Integration and the Environment

Political and economic factors are generating momentum toward regional economic integration. Intra-regional trade apparently increased steadily throughout the 1980s and early 1990s, although data constraints inhibit precise estimates. According to one estimate, the (money) value of intra-regional trade among five Northeast Asian nations increased by 225 percent between 1981 and 1989, while the volume of world trade increased by only 160 percent. Increasing, but not documented, trade between China and South Korea and China and Russia in the past three years suggest even more rapid growth. Intra-regional trade accounted for 10.8 percent of total world trade in 1989.

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 percent of all Chinese exports in 1992, while imports from Japan comprised 17.9 percent of total imports. South Korea is likewise heavily integrated with Japan: imports accounted for 23.8 percent of total South Korean imports in 1992, while exports to Japan comprised 15.1 percent 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 percent 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 three Northeast provinces of China export 44 percent 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 research undertaken by the Economic Research Institute in Khabarovsk, living standards in Khabarovsk Territory would drop by 30 percent 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 percent 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 provinces seeking to attract foreign companies facing increasingly stringent domestic environmental regulations; or seeking foreign investment in the exploitation of forest, mineral and ocean resources. Common regimes also enhance the strength of monitoring and enforcement of national 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 have high sanitary and health product standards for imports. However, the region's most important regional environmental problems stem not from the use of products but from the processes of their production or harvesting. Countries do not unilaterally regulate foreign production processes of imported products. Indeed, they are barred by GATT from doing so.

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 long-term challenge facing Northeast Asia is two-fold: 1) how to develop a common regional framework for environmental management in the face of ecological and social diversity at national and sub-national levels; 2) how to manage specific issues arising from trade-environment links in the context of broad regional trade-environment agreements. Developing appropriate and innovative approaches to meet the challenge will require nurturing trade-environment research and policymaking capacities at a regional level.

4.2 Objectives of Regional Cooperation in Capacity-Building

The longterm objective of regional cooperation in capacity- building is to develop coherent, coordinated, regional frameworks to govern management of transboundary environmental issues. Frameworks encompass agreed-upon rules and penalties for breaking the rules, as well as economic incentives, voluntary guidelines, standard operating procedures, and even custom. This ensemble of formal and informal constraints and incentives may be called an environmental management (or governance) regime.

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

- [Work] towards the development of a regional convention for protection and management of the coastal and marine environment and the resources of the Northwest 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).

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

In addition to regional initiatives, Northeast Asian states have concluded a host of bilateral treaties and agreements to promote environmental cooperation, including between Japan and the Russian Federation, China and the Russian Federation, China and the ROK, and the ROK and Japan. There

are also regional NGO initiatives to promote environmental cooperation, most notably the Northeast Asia and Pacific Environmental Forum.

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

Another incipient institutional vehicle is the Northeast Asian Conference on Environmental Cooperation. This Conference has brought together environment ministry officials, as well as academics and environmental NGOs, in a series of regional meetings. A wide variety of regional networks and meetings are beneficial in sharing information and exchanging ideas. However, duplication and even conflict in undertaking government initiatives are likely to undermine the process of building regional environmental management regimes. A coherent institutional framework for environmental cooperation could also interface with a parallel process to promote regional economic cooperation.

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

The short term objective of cooperation in capacity-building is to develop the informational and intellectual infrastructure supporting all regime-building efforts. This requires developing specific information, research and technical capacities. The most important requirement is to develop standardized ecological data bases. Better capacities to gather, analyze and interpret environmental information would also promote national and local monitoring and enforcement capacities. Out of many possibilities, projects should be selected which synergistically reinforce national/local and regional capacity-building efforts.

4.3 Dimensions of Regional Cooperation

Regional cooperation is needed to develop the informational and intellectual capacities to initiate and implement regional environmental management regimes. Cooperation are required to build public support for regional environmental cooperation. Initiatives are called for in five dimensions:

Information capabilities to gather, catalogue, store, retrieve and exchange environmental information in a timely fashion. A crucial need is to develop common definitions and classifications

involved in environmental management, for example, what constitutes "toxic waste" and what is meant by "biodiversity; and to standardize data gathering systems. There is also a great need to gather basic ecological data in the region, including mapping habitat requirements, routes of migratory species, and air and water pollution paths. Developing informational capacities requires training in better methods of information gathering and storage, including Geographical Information Systems and satellite-derived images;

Educational and training capabilities to increase the understanding of national policymakers about transboundary environmental issues, including links between regional economic integration and the environment. There is also need to increase management skills at all levels: government, business and community groups. Especially important is to provide training for income-generating activities which conserve regional transboundary resources;

Scientific research capabilities to understand the sources and impacts of environmental degradation in the region, including sources of watershed degradation; regional environmental impacts of alternative economic development strategies and trade policies; and optimal strategies for building institutional frameworks for regional management;

Policy development capabilities to design regional agreements and conventions to restore degraded areas or to mitigate or prevent environmental degradation. Expertise is required in legal, economic, scientific, ecological, political and diplomatic aspects of regional environmental governance in general and in Northeast Asia specifically;

Consensus-building capabilities to regularize dialogue among the six countries of the region; and to provide opportunities for national and local policymakers, as well as community groups to be informed of and have an input into regional discussions. Among potential communication vehicles are a newsletter (translated into regional languages) and a series of public conferences. Each project undertaken for regional cooperation should incorporate a strategy of public information and participation.

4.4 Proposed Projects

This section outlines four projects for regional cooperation in building capacities for regional environmental governance:

Data Intercalibration and Measurement Standardization;

Regional Biodiversity Management Program;

Regional Convention for the Protection of Migratory Birds;

Watershed Management Project.

4.4.1 Data Intercalibration and Measurement Standardization

The countries of the region use a variety of measurement and instrument calibration methods, as

well as different equipment, frequencies, monitoring parameters, and quality assurance methods. For regional exchange of environmental data to be meaningful, it is essential to calibrate instruments and standardize measurements. Without standardization, it is difficult to build mutual trust in monitoring technologies and data interpretation. Indeed, issues related to the accuracy of measurement have already generated controversy. Moreover, data reported by different nations may be simply incomparable and do little to improve mutual comprehension of transboundary issues.

The ROK Government has proposed a regional cooperation project to enhance Data Intercalibration and Measurement Standardization. The project would aim to establish a unified measuring method for exchanging environmental data between countries; and to encourage the implementation of joint research and technology implementation. The project would build capacities in environmental management in two ways. First, it would enhance the quality and flow of environmental data between countries in the region. Second, it would improve national capacities in metrics management, which is crucial not only for environmental management but strengthening the foundation for high technology industrial development.

The project could be implemented by a special commission or working group on data intercalibration, comparative studies on methods and units of measurement in each country, and dialogue and joint studies on standardizing pollution measurement units.

(1) Phase 1: Establish Regional Working Group

A Working Group of researchers and data experts from each of the six Northeast Asian countries would be established. The Group work program would be two-fold: 1) to survey existing data gathering, monitoring and classification systems in each country; 2) to develop an agenda for joint studies to improve data intercalibration and standardization.

Timeline: 1 Year

Estimated Cost: $0.06 million

(2) Phase 2: Joint Studies and Dialogue

The Group would undertake joint studies and promote regional dialogue in data intercalibration and measurement.

Timeline: 2 Years

Estimated Total Cost: $0.18 million

4.4.2 Regional Biodiversity Management Program

Developing regional capacities to manage and conserve biodiversity is a high priority.

All states in the region are parties to the Biodiversity Convention which includes ten measures for implementation including:
developing national plans and strategies for biodiversity conservation;
undertaking a biodiversity inventory;
establishing and strengthening protected areas to conserve biodiversity at all levels.

This project proposes the creation of a Regional Biodiversity Management Program which aims to improve both national and regional capacities for biodiversity conservation. The Program would pool and expand research, information and management capacities to greatly enhance the overall regional governance of biodiversity resources. It would also aim to increase the economic value of habitat conservation by strengthening the potential for ecotourism and adventure tourism.

The proposed Program consists of four components: 1) Biodiversity and Endangered Species Survey; 2) Mapping of Nature Reserves and Ecological Border Areas; 3) Wildlife Management Course; and 4) Ecotourism Promotion and Management Course.

(1) Component One: Biodiversity and Endangered Species Survey

The initial emphasis of the Program is to gather and to collate basic information on the status of biodiversity, endangered species, and critical habitats throughout the region. The ROK Government has proposed that states cooperate in developing conservation strategies for flora and fauna. Cooperation could include:

standardizing data bases and development of compatible software and consistent definitions;
examining how a biodiversity inventory can be applied in economic and environmental planning and management at a national level;
exchanging biodiversity data to construct an on-going biodiversity information exchange network;
designating species for national and joint conservation at a regional level by studying issues such as population distributions and status of critical habitats;
studying possible climate change impacts on regional biodiversity and adopting agreed measures to mitigate the effects of climate change upon biodiversity;
harmonizing national biodiversity strategies.

Undertaking some or all of these tasks necessitates commitments to both research and regional dialogue. The Biodiversity and Endangered Species Survey project would entail establishing a regional Working Group composed of ecological and social scientists from all six countries. The Group would produce five discrete surveys:

1) a forest ecosystem biodiversity survey;
2) a survey of the status and location of rare and endangered species;
3) survey of causes of biodiversity loss;
4) survey of potentially commercial medicinal and edible plants;
5) survey of biodiversity protection measures and habitat restoration techniques adopted in each country.

In addition, comprehensive national data base management systems would be designed for biodiversity and ex situ conservation and specimen collection. Dialogue would be encouraged between national governments, including all relevant agencies, as well as academics and other non-governmental organizations.

Timeline: 3 Years

Estimated First Year Cost: $0.50 million

Estimated Total Cost: $1.50 million

(2) Component Two: Mapping Nature Reserves and Ecological Border Areas

The region has an extensive network of nature reserves of many different types and status, including biosphere reserves, world heritage sites, national parks, prefectural parks, forest reserves and watershed reserves (Table 4.1). All countries have also established at least one biosphere reserve as part of UNESCO's Man and the Biosphere program (MAB). Many reserves also embody cultural and historical values that are central to national identities. In April, 1994 the MAB program held a regional workshop of specialists from five countries in the region (the two Koreas, Mongolia, China and Japan). Each country is preparing a paper on the impact of tourism on their biosphere reserve for the next MAB regional meeting.

Despite existing national commitments, however, many critical habitats for rare and endangered species of plants and animals remain unprotected; and in some cases, protected areas do not adequately protect critical habitats or endangered species. Moreover, some critical habitats cross national boundaries, yet protected areas either stop at the border or are managed differently by bordering countries.

One such area is Khanka Lake which spans the China-Russia border in Primorsk Territory. Khanka Lake is the stopping ground for a number of endangered species of migratory birds, including the scaly-side mergansur. Habitat is being lost primarily due to poor agricultural management practices. Adequate management of the Khanka Lake area requires bilateral cooperation in establishing a joint management strategy. However, regional cooperation in establishing a regional data base and developing general guidelines for cross-border management would facilitate bilateral cooperation, not only between China and the Russian Federation but other states which share borders.

This component of the Regional Biodiversity Management Program aims to map areas required for the conservation and sustainable use of biodiversity resources. When they fall within national boundaries, such protected areas are called Nature Reserves. When they span a border, they are called Ecological Border Areas. The component has two phases corresponding to two elements of mapping: 1) determining where the protected areas should be, that is, their geographical boundaries; and 2) helping nations implement the map through national and cross-border initiatives.

Phase One: The first step is the creation of a scientific Working Group which would have five primary tasks:

1) collect and systematize existing national data from national focal points on nature reserves, including their geographical boundaries, legal status, and management structure;

2) chart a regional map of required protected areas based on habitat and species information on the information produced in the Biodiversity Survey component of the Program and the use of GIS-based national maps;

3) develop guidelines and standards for national protected areas;

4) develop guidelines for joint management of Ecological Border Areas;

5) assess existing and required national capacities for management of protected areas.

The Working Group would consult with relevant government agencies, local communities, environment groups and other NGOs, and other stakeholders.

Timeline: 3 Years

Estimated First Year Cost: $0.20 million

Estimated Total Cost: $0.60 million

Phase Two: The second step is to implement the findings of Phase One, including the development and coordination of national nature reserve programs, as well as bilateral Ecological Border Area management programs. A key element will be building management capacities through training and technical assistance programs. This activity is considered on on-going program and cost estimates are not provided here.

(3) Component Three: Wildlife Management Training Course

Crucial to the conservation of biodiversity is professional, efficient and competent wildlife management. Game wardens, park rangers, forest service personnel, wildlife and environment agencies and others must be skilled in intersecting disciplines to ensure that biodiversity management goals are achieved.

A Wildlife Management Training Course would provide training in wildlife management for policymakers and "on-the-ground" managers. It would focus on issues such as: regulations and guidelines for hunting; developing economic incentives to minimize poaching; patrol and reporting techniques; self-defense; and others. The Course would draw from experiences in wildlife management elsewhere in the world and would be loosely modelled on the African Wildlife Management College in Nairobi. The course would be mobile and could be offered in different locales, including in the field. It would be tailored to local/national needs.

The estimated cost includes the production of course curriculae and manuals, recruitment and training of the teachers offering the course, and at least two offerings of the course. In the longer term, the course could be funded by a hunting tax.

Timeline: 3 Years

Estimated First Year Cost: $0.20 million

Estimated Total Cost: $0.60 million

(4) Ecotourism Promotion and Management Training Course

The nature reserves and other protected areas of the region offer opportunities for economic development through ecotourism. Eco-tourism is generally high-value tourism, with tourists willing to pay for wilderness, scenic and/or cultural experiences. However, human resources to promote and manage eco- tourism are undeveloped. Training is needed in at least four areas:

1) developing regulations and guidelines to ensure the conservation of environmental and scenic assets;
2) effective enforcement of regulations and guidelines;
3) business management of eco-tourism firms and operations;
4) national and international marketing of eco-tourism opportunities.

A regional Ecotourism Promotion and Management Course would be targeted at policymakers and ecotourism operators. The Course would consist of training programs in each of the four areas identified above, plus others as needed. The programs could be offered separately or linked together in an overall training course. The programs would be mobile, that is, they could be taken to different locales, and would be tailored for local/national circumstances. The emphasis would be on "training trainers."

The estimated cost includes the production of course curriculae and manuals, recruitment and training of the teachers offering the course, and at least two offerings of the course. In the longer term, the course could be funded by an eco-tourism tax.

Timeline: 3 Years

Estimated First Year Cost: $0.20 million

Estimated Total Cost: $0.60 million

4.4.3 Northeast Asia Convention for the Protection of Migratory Birds

Migrating birds reflect and symbolize ecological interdependence in Northeast Asia--as well as the region-wide dimensions of pressures leading to their extinction. Birds 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 the ROK, on the Korean DMZ, North Korea, Russia, and China. In the ROK, 328 of 394 bird species are migratory. South Korean scientists have studied the migratory routes of these birds by capturing, marking and releasing 821 individual birds in 1993, and surveying the status of migratory birds at 21 sites in 1992-1994, the results of which will be used to select sites to be protected under the RAMSAR Convention.

This project proposes that the states of Northeast Asia make a commitment to adopt a Regional Convention for the Protection of Migratory Birds. The Convention would utilize the information base compiled in the Regional Biodiversity Management Program proposed above. It would complement the international RAMSAR Convention.

The project would draw on existing regional research and monitoring capacities. Non-governmental organizations 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. It also attended a DPRK-Japan symposium on migratory bird conservation in 1987 during which both countries agreed to participate in banding projects on Chinese Egrets. The International Crane Foundation has worked closely with counterparts in China. The joint research work has created the opportunity for a series of meetings between official and private researchers which has improved greatly communications between specialists.

Multiple bilateral treaties between countries in Northeast Asia have been signed and implemented in the past decade. The ROK has proposed to supplement bilateral relationships with a regional, multilateral treaty to protect migratory birds and their habitats. An important issue for a regional convention would be how to incorporate the existing and forthcoming bilateral agreements between the states within the region; and how to design protocols for signature by extra-regional states.

In addition to exploring the scope, content and format of a Regional Convention, the relationship needs to be determined between the proposed convention and existing bilateral migratory bird treaties and with the proposed East Asian flyway under the Berne Convention. As a follow-up to the RAMSAR Conference, workshops are planned on an Action Plan in East Asia for Conservation of Wetlands and Migratory Birds involving, among others, the Asian Wetland Bureau, Japan and Australia, and with participants invited from China, Mongolia, Republic of Korea, and the Russian Federation. Other countries with a possible role and interest in an East Asian flyway include Indonesia, Kampuchea, Laos, Malaysia, Myanmar, Papua New Guinea, Philippines, Thailand, and Vietnam.

Regional disputes over island territories may block the signature and implementation of bilateral and multilateral agreements to conserve migratory birds and their habitats. Ways could be found to set aside such extraneous issues, especially in bilateral agreements. Nonetheless, these issues could complicate the negotiation of a single text for a multilateral agreement.

States will also have to grapple with the fact that much of the information and activity on migratory birds and their habits is decentralized and local. In China, for example, the National Bird Banding

Center at the Chinese Academy of Forestry compiles information on migratory birds. Research conducted under the Chinese Academy of Sciences and provincial capabilities such as the Liaoning and Heilongjiang Province Resource Institutes conduct important monitoring of migratory birds and their habitats.

Relatedly, the special role of non governmental organizations needs to be addressed. NGOs have been instrumental in financing and organizing critical research and habitat restoration projects. The Japan Bird Society and the Socio- Ecological Union of Russia, for example, have succeeded in establishing a 5,000-hectare bird reserve at Murviouka in the Russian Far East.

Finally, the Tumen River Area Development Project encompasses crucial wetland stopover points for migratory birds. To ensure consistency, special attention needs to be paid to the interrelationship between commitments under the proposed convention, and the proposed Tumen River development plans.

A practical approach to exploring the proposed convention would be:
Establish a working group to develop and discuss draft Convention texts;
Conduct a basic inventory of migratory bird species and critical habitats;
Develop a network to exchange information, develop joint methods and undertake collaborative research. The network should develop electronic communication links between scientific research institutions within the region;
Provide an extensive program of training and technical assistance to policymakers, wetlands managers, and others.

The draft Convention should include the following substantive articles:

1) definition of evidence of migratory bird presence;
2) list of species covered by the Convention;
3) prohibition or mutually acceptable limitations on hunting such birds;
4) special measures to preserve endangered species such as controls on importation of antagonistic flora and fauna;
5) obligations to inform other parties of pending extinctions;
6) controls on trade;
7) data exchange, conferences, mutual visits, and joint research;
8) designation of habitat conservation areas;
9) coordination of other measures to preserve migratory species such as pesticides that threaten reproductive success and airline routes.

Timeline: 5 Years

Estimated First Year Cost: $0.5 million

Estimated Total Cost: $2.5 million

4.4.4 Watershed Management: GIS/Remote Sensing Pilot Project

The need for watershed management arises from interconnected soil, water, and land-use systems. In particular, upstream land use generates downstream impacts in terms of sedimentation, water flows, and water quality issues with ramifications for downstream states. A major objective of a watershed management program is to improve the quality and usefulness of spatially referenced information such as maps, aerial photographs, and satellite imagery. This function can be supported by a Geographical Information System (GIS) which integrates baseline data (physical and social) relevant to watershed planning and management.

Typically, a GIS links cartographic software with tabular database software organized on a modular, topic-specific basis. Modules would normally include: basic information such as administrative boundaries, transportation, communications, settlements; terrain and soil; land cover/land use such as forestry; hydrology; and socioeconomic information such as farming, demographics etc. The GIS can store, retrieve and produce maps, statistical reports, and satellite imagery received through remote sensing. Satellite remote sensing can offer a GIS a source of up-to-date, instantaneously acquired, wide area data that no other technique can provide.

This project proposes developing a Watershed Management data framework using GIS/Remote Sensing. The framework would be based on the Tumen River watershed as a Pilot Project. It could later be used to promote management in other regional watersheds, including the Amur and Selenga Rivers in the Russian Far East.

On three counts, the Tumen River watershed is an especially good candidate for a pilot project. First, it spans four of the six countries in Northeast Asia and already supports a considerable amount of industrial activity in China, the DPRK, and Russia. Second, the Tumen contains ecological resources of global, as well as regional value. Indeed, the zone slated for the most intensive development includes a number of internationally significant wetlands that also serve as transit points for migratory birds. Third, the Tumen is highly polluted and in great need of better management (see Section 4.1.2 above). Indeed, restoration of the Tumen River is a classic instance of the need for sustainable development planning. Environmentally sustainable use of the river and its related resources can provide the institutional framework and economic means to clean up the river. Cleaning up the river in turn will make development feasible and enhance industrial as well as natural productivity.

In addition to promoting better watershed management, the project aims more generally to improve GIS/remote sensing capacities. While all countries in the region have commenced GIS activity, capabilities range from incipient to highly advanced. Capabilities are even more uneven in remote sensing. The project would blend the global capabilities of Japan's earth observation remote sensing satellites and its links to those of the ESA and NASA to the ground stations within the region, or to interpretation centers where no autonomous ground stations exist (such as the Russian Far East).

ESCAP has established the Regional Remote Sensing Program which has strong Working Groups in Southeast and South Asia that could supply relevant experience to the proposed project.

The first step would be to designate national focal points and a regional steering committee. This

could be undertaken by the Second Meeting of Senior Officials on Environmental Cooperation or other regional body. This steering committee would define the scope of the GIS/Remote Sensing task and allocate responsibility to different parties. In China, for example, the National Centre for Remote Sensing has already established the Yellow River Basin GIS project. It includes sub-systems for different users such as water resources prediction, land erosion, flood risk prediction, and agricultural monitoring. The system includes economic, environmental, and human settlements information. This and work conducted already in Japan and the ROK could serve as models from which the basic framework for a Tumen River Watershed Management GIS project.

The second phase of the project would be implementation, that is, the creation of a GIS for the Tumen River Watershed. A Working Group composed of scientists and researchers from each of the six countries would be established. Participants would first undergo training in GIS and remote sensing to ensure a comparable level of expertise. Training could provided by regional institutes, including China's National Remote Sensing Center and the supporting technical institutes of Japan's Earth Observation Committee.

After training, Working Group members would hold an initial meeting to coordinate and discuss the tasks allocated to them; exchange information concerning computerized systems; and identify ways to overcome technical obstacles to integrated layers of data from different national sources and in different software. They would then conduct the work in their own research institutes. The Working Group would hold two more meetings in the course of producing an integrated Tumen River Watershed GIS.

The resulting Tumen River Watershed Management GIS would be used in subsequent work to identify the watershed-wide measures needed to restore the Tumen River to a level where it can support the anticipated development in its lower reaches. The project could also produce a sub regional atlas.

Timeline: 3 Years

Estimated First Year Cost: $0.20 million

Estimated Total Cost: $0.60 million

Table 4.2

Table 4.3

Table 4.4

Table 4.5

5. ECOSYSTEM MANAGEMENT:

DEFORESTATION AND DESERTIFICATION

5.1 Introduction

Forests and grasslands cover about eighty percent of the total land area of Northeast Asia. Forests contain vast potential wood resources, a crucial input into the region's rapidly growing economies. They also provide important ecological services by protecting watersheds and river basins, providing species habitat, and storing organic carbon. Ecological services can offer economic and social benefits in the form of opportunities for recreation and reflection. Grasslands offer pasture areas, habitat, and soil-fixing services.

All countries in the region are undertaking efforts to improve forest and grasslands management. Nonetheless, some areas are afflicted with or are vulnerable to severe degradation, including the bountiful forests of the Russian Far East. Given regional diversity of topography, experience, and management capabilities, there is great scope for regional cooperation in promoting better use of forests and grasslands.

Leaving aside the issue of demand-side management, that is, promoting non-wasteful consumption patterns, there are four key regional issues of sustainable forest and grassland management:

Reversing degradation and restoring degraded areas;
Meeting the region's growing demand for wood and wood products;
Creating a sustainable forest management regime in the Russian Far East;
Building regional capacities for better forest and grasslands management, especially the requisite information base.

5.2 Deforestation, Desertification and Degradation

Forests cover about 33 per cent of the land area in Northeast Asia, ranging from 80 per cent of the Russian Far East to 10 per cent of Mongolia (Table 5.1). In terms of growing stock, an estimated 16 billion m3 of stem wood are growing on 165 million hectares of forests. Over half the growing stock and nearly half the forest area in Northeast Asia are in the Russian Federation.

Table 5.1

LAND USE IN NORTH EAST ASIA, 1991 (million hectares)

The principle cause of deforestation in Northeast Asia is change in land use, particularly the conversion of forests to farms. Land conversion accounts for 90 per cent of the loss of the region's forest cover. Most forests either regenerate naturally or are reforested after harvesting. Deforestation occurs when forests are permanently removed from an area of land. The harvesting of forests, either for timber or other resources, need not lead to deforestation provided that natural regeneration or replanting is successful. In several countries, particularly China, re-forestation efforts are underway.

Whether natural or artificial, however, regeneration can be patchy, generating temporary or permanent forest degradation. If severe enough, degradation can lead to deforestation. In some areas of high demand in the region, forests are being over-cut, generating a different species mix and/or a sub-optimal annual yield. Other forms of degradation result from creaming the most valuable species or removing only the best forms of the desired tree species, leaving behind a poor parent crop for natural regeneration.

After land conversion, the primary causes of forest degradation in the region are fire, insect damage and disease. Once an intense fire has taken hold it is difficult to control, especially when it sweeps across borders. Caused by lightning, by accident or deliberately started. uncontrolled, major forest fires have devastated millions of hectares, especially in China, Mongolia and the Russian Far East. In Mongolia, between 1963 and 1985, an average of 154,000 hectares, or 1 per cent of the forest, was destroyed or seriously damaged by fire annually. The timber destroyed or damaged was roughly ten times that removed by harvesting.

Insect damage to trees, caused by beetles and caterpillars of moths and butterflies, is another source of forest degradation. In Mongolia, an estimated 100,000 hectares of forests were affected annually by insects and diseases each year between 1978 and 1990. The forest service formerly used aerial sprays against insects and diseases, but due to lack of funds, it now treats affected areas on foot with backpack sprays. However, biological pest control methods may be both more effective and more environmentally sound.

Grasslands account for approximately 47 per cent of the total land area of Northeast Asia (Table 5.1). The bulk of the grasslands are in Mongolia and Northeast China, stretching from the coniferous forests in the north to the Gobi desert areas in the south and west. They cover several habitats and are the grazing (and browsing) areas for many species of domesticated as well as wild animals. Mongolia, for example, has an estimated 25 million domestic animals (excluding fowls), about ten times its human population.

A full assessment of grassland degradation has not yet been undertaken, including estimates of changes in range productivity. In Mongolia, range degradation is held somewhat in check by a strongly limiting winter-spring animal feed constraint, and lack of manpower to increase animal numbers. Unlike China, little land has been converted to arable farming. China has more than twice the number of livestock than Mongolia, even though it has only 80 percent the amount of grassland. This contrast suggests either that Chinese grasslands are overstocked, or that there may be scope for a considerable increase in productivity in Mongolia. While animal numbers have remained static in Mongolia, they more than doubled in Northeast China 1952 and 1988 (from 22.2 million to 52.5 million).

The Great Wall of China marked the natural division between arable and pastoral lands, with very low human population densities in pastoral areas. China's population has increased from 150 million in 1660 to over 1.1 billion today, generating migration pressures not only into towns but also into grasslands. Encouraged by governments, farmers raised crops on lands that are marginal for arable agriculture, reducing available grazing areas even while animal numbers have increased. These densely populated areas account for the greatest concentration of degraded agricultural land. Moreover, some pastoral areas are also marginal for grazing. Putting animals on these areas has led to adverse results both for the cattle and land. Many of these areas are now considered

unproductive or even deserts.

Land degradation has also been wrought through the deliberate lighting of grass fires and other deliberate management policies. For example, the number of pikas, a kind of prairie dog, have been greatly reduced by poisoning, because it was thought they were in competition with the cattle. In reality, pikas eat unpalatable grasses, preventing these plants taking over the rangelands. By drastically reducing the numbers of pikas, the carrying capacity of the land deteriorated rather than increased. Similarly, in order to provide better social services, pastoralists were encouraged to settle in one place. The invariable result was overgrazing of the land around the settlements in a kind of halo effect.

There is debate as to whether degradation is the result of increasing animal numbers or are caused by a combination of poor animal husbandry, fluctuating weather conditions and misguided government policy. Misguided policies can be corrected, and animal husbandry practices can be improved. Degradation can also be mitigated by reseeding some of the areas in combination with the planting of "silvo-pastoral" trees and bushes. To counter desertification is more difficult and far more costly. China has tried to erect a green wall of trees to hold back the desert--with limited success. Failure occurred when the wrong species were selected, or because the desert simply over-whelmed the trees. In areas of acute wood shortage, trees may have been cut down for fuel, posts or winter feed.

5.3 Wood Demand, Supply and Intra-Regional Trade

Forests provide many important economic and ecological services, including as a source of wood for industry, housing and fuel. In 1991, the consumption of wood and wood-fuel in Northeast Asia totalled an estimated 181.4 million m3 (roundwood equivalent). Industrial wood consumption accounted for about 58 percent of the total and fuel-wood for about 42 per cent. Patterns of wood consumption differ greatly among countries in the region, with fuel-wood accounting for about two thirds of Northeast China's consumption and industrial wood accounting for nearly 100 percent of consumption in Japan (Table 5.2).

Demand for wood products is positively related to increases in income. Demand for wood and wood products has grown rapidly with high rates of GNP growth in the region and is projected to increase substantially in this decade. Between 1991 and 2000, total wood demand is expected to increase to about 217 million m3 (roundwood equivalent), an increase of nearly 20 percent. Increasing consumption of industrial wood in China alone accounts for more than two thirds of the projected growth in regional wood demand (Table 5.2).

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

Sustainable forest management requires detailed and up to date information about wood supplies, especially removal and regeneration rates. If tree removal rates exceed growth rates, then forest capital is being depleted. In Northeast Asia, the growing stock per hectare varies considerably between countries, primarily because of differences in the age class structure of the forests. In the Russian Far East, Northeast China and Mongolia, forests are relatively old, with an average age of more than 80 years. On the other hand, most forests in northern and southern Korea were devastated in the 1930s and 1940s. In addition, lack of fossil fuels for household cooking and heating, especially after the last two wars, led people to cut and collect any burnable material, including roots and forest floor sweepings. This practice further degraded the forests, resulting in a low average stocking volume of 13 m3 per hectare.

In both the DPRK and ROK, considerable restocking and replanting efforts have been undertaken since the late 1950s. The average age of the forests is still less than 50 years, hence the relatively low standing stock. In contrast, these forests have high annual growths, as opposed to the mature forests in the Russian Far East. Similarly, many of Japan's forests were severely degraded during the last war and massive restocking, replanting and conservation programs were subsequently undertaken. Japan has the region's second highest removal rate (after China), despite the fact that 30 per cent of its forests are under 35 years old with only thinnings available, and about 30 per cent are protected forests with logging restrictions.

Table 5.2

REGIONAL WOOD CONSUMPTION, 1991 and 2000 (million m3)

Lack of complete data, however, makes it difficult to know whether tree removals exceed tree growth. A comparison of available FAO figures suggests that tree growth exceeds tree removals in all Northeast Asian countries. However, it is likely that both figures are underestimated. Trees outside the forest and small diameter trees are excluded in estimates of annual growth. On the other hand, consumption is generally underestimated, especially in the case of self-cut/self-collected fuelwood and poles; and/or where there are many small rural wood-using industries. Many World Bank demand surveys show consumption to be greater--in some cases, substantially greater--than removal records suggest. The degree of difference is greatest for wood-fuel. In China as a whole, the FAO estimated consumption of wood-fuel as 192 million m3 (roundwood equivalent) in 1991, while a World Bank 1988 estimate put wood energy consumption at 419 million m3 (roundwood equivalent)--a difference of more than 200 percent.

The Russian Federation is the only net exporter of roundwood and wood products in the region. China, Japan, and the ROK are net importers, while the DPRK and Mongolia are largely apparently self-sufficient (though there are undocumented reports of wood exports from Mongolia to Russia, as well as DPRK imports from Russia and exports to China). Japan is the most import-dependent, obtaining 75 per cent of its wood requirements from external sources. China is the second largest regional importer of wood products in absolute terms but imports only 7 per cent of its demand. The ROK, on the other hand, imports two- thirds of its total wood needs.

Northeast Asia is particularly important as an export market for wood products from the Russian Far East. About 80 per cent of Russian Far East wood exports go to East Asia. A strategy of increasing intra-regional wood supplies rests primarily on expanding trade between the Russian Far East and

the rest of Northeast Asia.

5.4 Sustainable Forest Development in the Russian Far East

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

The bio-diversity resources of the Russian Far East forests have global, as well as regional and national value. According to foresters and biologists of the Russian Academy of Sciences, the Russian Far East contains several areas of bio-diversity "hot spots." Some of these areas span the Russia-China and Russia-DPRK borders. In these areas, a large number of species of both flora and fauna, including many endemic species, are found. One such area is the Bikin River Watershed in Primorski Krai.

According to one estimate, the Bikin Watershed is home to more than 1500 species of vascular plants, 65 species of animals, and 225 bird species. Included are rare and endangered species such as the Siberian tiger, Himalayan black bear, scale-sided merganser, Amur cork tree and others. A scientific research team at the Pacific Institute of Geography in Vladivostok has received funding from the United States Forestry Service to undertake a planning study for the conservation and sustainable development of the Bikin River Watershed. Part of the study will entail undertaking a more complete bio-diversity survey.

Russian and international environmental groups have raised concerns that the Far Eastern forests are under threat from foreign and domestic logging companies. Foreign logging companies have been given concessions to cut up to one million m3 of wood per year on 200,000 hectares (containing in excess of 20 million m3). A further concession of 250,000 hectares is under consideration. Although concessions specify selective felling methods and require reforestation, scientists and environmental groups have documented cases where companies used clearcutting methods and did not replant. In one internationally- known case, pressure from Territory governments and environmental groups suspended logging operations of the Hyundai Corporation near the Bikin River Watershed.

Is logging compatible with wildlife conservation and environmental protection? If so, on what scale and under what management regime? The estimated annual growth in the entire region is about 180 million m3 of wood, while the logging rate is only one million m3 per year. However, in many old growth forests, there is zero net annual growth, because annual increment is equal to mortality. Climatic and soil conditions in the Russian Far East make forests especially vulnerable to degradation. Cold temperatures and low levels of sunlight make tree growth rates very low. High levels of humidity prevent degraded forests from turning into deserts but can turn them into swamplands. The combination of forest fires and clearcut logging techniques dramatically decrease turnover of organic material on the forest floor. According to research undertaken by the Far Eastern Forestry Research Institute in Khabarovsk, some areas of logged forest have lost nearly 100 per cent of living organic material.

There is potential to cut far more wood than is being removed today without squandering the forest resource -- provided that forests are under sustainable, multiple-use management plans. Sustainable management requires enforceable regulatory frameworks for logging, tourism and other forest uses. It also requires upgrading capacities for controlling forest fires, which in some regions pose the greatest threat to the forests. Investment is needed in fire detection, prevention, and control, including aircraft and equipment for volunteer fire brigades.

Investment is also needed to improve local sawmilling technologies; develop non- timber forest industries, including eco-tourism and plant products; and, most important, strengthen the oversight capacities of the Territory Governments, which are underfunded and understaffed. Moreover, economic incentives often undermine rather than promote conservation. Poorly paid and unmonitored game wardens, for example, have been found to be poachers of tigers and other threatened animals.

Russian Far East forests are likely to be the major supplier of forecasted increases in wood consumption in Northeast Asia. Whether or not this expansion takes place under environmentally sustainable--or degrading--management depends primarily on the character and enforceability of Russian domestic policies and regulations. However, trade and investment policies of regional trading partners could play an important role in fostering environmentally sustainable and economically optimal forest management.

A recent report by the London Environmental Economics Centre to the International Tropical Timber Organization (ITTO) stressed the importance of trade-related incentives for sustainable forest management. Although focussed on tropical timbers, recommendations pertain equally to temperate and boreal forest products. The report found that negative incentives, that is, trade restrictions, do not improve and even undermine sustainable forest management. Positive incentives, on the other hand, can complement and reinforce sound domestic management. The report recommended:

a country certification scheme, which would aim to certify that producer countries were implementing policies, regulations and management plans as specified by the ITTO "Year 2000" sustainable management agreement; better market access for timber exports from producer countries which meet the requirements of the certification scheme; additional financial assistance required for implementing national sustainable management plans and policies; species protection for specific tree species in danger of over-exploitation through offtake export quotas.

Such recommendations are feasible in the context of the producer-consumer country framework of the ITTO. No such global framework exists for temperate or boreal forest products and there is no regional forest framework in Northeast Asia. Nonetheless, they provide a useful starting point for further research and regional discussion. Appropriate and effective policy options in a regional framework would likely differ, perhaps substantially.

Rather than countries, for example, a Northeast Asia certification scheme might certify individual producers/companies. Rather than providing better access for timber products, a regional approach might develop a broader strategy of Environment Trade Preferences which reward progress toward sustainable forest management with better market access for manufactured or other goods. Countries could also develop forest investment guidelines for their own companies undertaking logging operations in the Russian Far East.

5.5 Proposed Projects

This section proposes four projects for regional cooperation to promote sustainable forests and grassland management:

Regional Seed Research and Distribution Program;
Regional Forest and Grassland Information Base;
Trees for Life: Grow a Tree Project;
Sustainable Forestry and Agro-Forestry Network

5.5.1 Regional Seed Research and Distribution Program

All the countries in the region are replanting or establishing areas with tree seedlings. China, for example, has an ambitious afforestation program in which it plans to establish some 70 million hectares over a thirty year period. To be maximally successful, such programs require high-quality tree seeds suitable for local growing conditions. Moreover, to meet the demands of a rapidly growing and more wealthy regional population, the productivity of forests and grasslands must be improved. Better planting material is crucial to increasing productivity.

The provision of high-quality seeds of the desired species is a priority in any tree planting or grasslands reseeding program. Many projects, however, use seeds of unknown or unevaluated origin. Some national forest services, for example, in Mongolia, lack adequate testing and storage facilities or the ability to clone species. Other countries in the region, such as Japan and the ROK, are well versed in seed collection, storage and cloning.

The region possesses many forest stands that have not been investigated for trees of superior growth or disease resistant qualities. Some stands have been identified for seed collecting purposes, but collaboration on a regional basis could be very profitable. Furthermore, there is need to establish or expand tree breeding orchards to supply seeds of known origin and quality, not only to the region but to other areas.

Good seeds are also required for optimal tree-planting outside the forest, especially in concert with agricultural crops. Farmers utilize tree products for a multitude of uses such as fuel, fruit, food, fodder, fencing, crop support and building purposes. On-farm tree harvesting can bring in additional farm income. Moreover, trees and shrubs stabilize the soil against wind and water, improve the local microclimate, and assist arable and pastoral farm production. The deep roots or trees tap lower soil horizons and pump minerals to the surface, via the leaves. Many trees also fix nitrogen and improve the soil carbon ratio. Nitrogen rich leaves can be mulched into the soil or used as protein rich animal feed.

Japan and the ROK have tree breeding facilities with about 30 years of experience. In China, several institutions are looking into aspects of grassland science, including improved grass species. However, the breeding of suitable "farm trees" for arable and pastoral agriculture has been neglected. Winter feed is a critical bottleneck and protein rich fodder from shrubs and trees could be one promising new source.

This project proposes the creation of a decentralized, commercial Regional Seed Research and Distribution Program. The Program would be based within national research institutes designated by each of the six Northeast Asian countries. The Program would aim to research, breed and eventually market high-quality tree and grass seeds and seedlings.

The Program has two phases: 1) the development of an Information Base and Business Plan; 2) a five-year program of Capital and Human Resource Development, which includes the creation of seed-breeding greenhouses and demonstration plots for agro-forestry, and the acquisition of management and marketing skills. The third phase of the project is the launch of a self-financing, commercial operation.

(1) Phase One: Information Base and Business Plan

The first step is to establish a regional Seed Program Team whose tasks would include two broad components: 1) gathering the technical information necessary for the Program; 2) developing a Strategic Business Plan to outline a five-year development strategy.

The required information base includes:

Actual and potential tree/shrub seed stands and grass collection areas, by location and species, throughout the region;
Existing and desired facilities for collection, storage, testing, replication and distribution of seeds, cuttings, cultivars and cloning material;
Requirements for national and local planting programs by species for trees, shrubs and grasses, on all types of forest and non-forest land, including degraded forest and farm lands;
Trained personnel who can undertake identification of superior stands of tree and grass species and collection of seeds and other genetic material for testing and breeding purposes;
Trained personnel who can undertake seed testing, storage and distribution; and who can propagate genetic material by cloning. Existing and required regional research, breeding and cloning facilities, including laboratories, greenhouses, etc.

The Business Plan would develop a five year strategy to launch the Program and make it commercially viable. The Plan would entail identifying markets and marketing strategies, optimal capital investment, and requisite technical and managerial training.

Timeline: 1 Year

Estimated Cost: $0.50 million

(2) Phase Two: Capital and Human Resource Development

The second phase entails investment in establishing facilities, launching research and breeding efforts, and training personnel. Required facilities include greenhouse, seed orchards and demonstration plots for agro-forestry. Training is required in all phases of Program management,

including investment planning, administration and marketing. Training may also be required for Program researchers and technical staff.

Timeline: 5 Years

Estimated Total Cost: $5.0 million

5.5.2 Regional Forest and Grassland Information Base

Northeast Asian countries have a long and deep experience with forest management and have developed important scientific and administrative management capacities. Differences between countries offer potential benefits in regional cooperation: each country has something to learn and something to teach.

There are significant gaps, however, in the capacities required for sustainable forest and grassland management. The greatest need is to develop a detailed, up-to-date and standardized information data base covering a number of crucial informational requirements, including land use, tree growth and removal rates, biodiversity surveys, soil conditions, and others. Capacities also need to be strengthened in utilizing data. Although forest inventories are undertaken regularly in most Northeast Asian countries, the ability to analyze, compile and interpret the data quickly and accurately is often lacking.

This project proposes that the six countries of Northeast Asia collaborate in developing a standardized Regional Forest and Grassland Information Base. The Information Base would be based within national research institutes designated by the six Northeast Asian countries. Researchers from the six institutes would form a regional Working Group to survey and pool existing information, assess additional informational requirements, develop guidelines for standardizing information, and design and undertake surveys and other means to fill information gaps. The Working Group would meet three times and would be linked electronically.

Timeline: 2 Years

Estimated First Year Cost: $0.25 million

Estimated Total Cost: $1.0 million

5.5.3 Trees for Life: Grow a Tree Project

Environmental education is perhaps the most cost-effective way to promote the sustainable use of natural resources in the long term. Environmental education in primary schools should be an essential goal for all countries.

The Chinese Research Academy of Environmental Sciences, under the partial sponsorship and

direction of Tree for Life Canada, will start a project in September 1994 in Northern China entitled "Trees for Life: Grow a Tree Project". The Trees for Life Project aims to: 1) provide resources, material and information to primary school teachers and children about the ecological role of trees; 2) prepare packages that can be used by school teachers to teach children about planting seeds/cuttings, and to raise seedlings in school or 'kitchen' nurseries.

China has proposed that this project be enlarged and expanded to primary schools throughout the region. Schools could adopt issues of special environmental interest or severely degraded local areas. Material could be circulated amongst schools and countries and flora and fauna of each area could be described and mapped. In particular, teaching materials could focus on regional issues of forest use and conservation.

There are two phases to the Project: 1) establishing a framework for regional coordination and developing Teaching Materials; 2) disseminating the Project in primary schools, including Teacher and Administrator Training.

(1) Phase One: Regional Framework and Teaching Materials

To regionalize the Trees for Life project, it is necessary to establish a regional Steering Committee to develop and oversee the project. The Steering Committee would:

obtain the permission of each ministry of education to run such a project and to keep them informed and involved at every stage of the project's development;
identify similar or related existing or proposed school programs;
identify existing or proposed related teacher training course;
identify related government extension programs and community groups;
provide guidelines for the design of teaching materials and teacher training;
provide guidelines for project evaluation;
prepare a five year action plan, including a detailed budget.

Teaching materials, including teacher manuals, student books and materials, and seed packages, would also be developed in Phase One. Teaching materials could consist of standardized component covering global and regional tree-related issues, and a nationally or locally developed component focussed on national or local issues. Alternatively, a range of materials could be developed in modular form, allowing teachers or school districts to decide which modules to cover.

Time Horizon: 1 Year

Estimated Total Cost: $0.75 million

(2) Phase Two: Dissemination in Schools

Phase Two focuses on "planting" the Project within primary schools. This includes training of primary school teachers, as well as Education Ministry officials and school administrators, who make

crucial decisions about curriculum and teachers' time allocation. It also entails covering any additional costs placed on a school or school district by the Project, including overhead, administration, transportation etc. (Note: Since Phase Two follows after Phase One, no first year cost estimate has been provided.)

Time Horizon: 2 Years

Estimated Total Cost: $2.0 million

5.5.4 Sustainable Forestry and Agro-Forestry Network

The countries of Northeast Asia have substantial expertise in various aspects of forest and grasslands management. This expertise is housed in various government ministries, as well as government, academic and NGO research institutes.

This project proposes the creation of a Sustainable Forestry and Agro-Forestry Network encompassing policymakers and researchers throughout the region. While lead agencies would be national forestry ministries, they would work closely with agriculture, education and environment ministries, as well as university, industry and NGO based researchers. The Network would have two objectives:

1) to exchange ideas and promote learning;

2) to undertake collaborative research toward promoting sustainable forest development, especially in the Russian Far East; sustainable grasslands development; and agro-forestry.

One promising area for information exchange and collaborative research would be the use of biological methods of pest control. There is also substantial scope to expand agro- forestry practices in the region. China's national Agenda 21 strategy, for example, does not mention agro-forestry. The neglect is due, in part, to bureaucratic and organizational fragmentation. Each department is concerned with a particular crop, or a specific research area for that crop. Trees are considered the remit of the forest service while farming is the concern of the agriculturalists.

However, annual and perennial crops can be usefully combined, as farmers all over the world have demonstrated. Policy makers and technical experts need exposure to agro- forestry practices in similar ecological and climatic zones, as well as a codification of regional practices. Research on appropriate regional agro-forestry practices would strengthen the work of the Seed Research and Distribution Program proposed above.

The Network would operate by establishing Work Groups on particular topics (Table 5.3). The regionalization of the UNDP's electronic Sustainable Development Network, proposed in Section Four (above), would greatly enhance communications among researchers throughout the region. Workshops and seminars are also a useful way to facilitate exchange of information and ideas.

The six governments would designate a national research institute or ministry to act as the national node for a regional network. One of the institutes could be designated as the Network Coordinator, a position which could rotate among the six institutes.

Time Horizon: 2 Years

Estimated First Year Cost: $0.50 million

Estimated Total Cost: $1.0 million

Table 5.3

FORESTRY NETWORK: POTENTIAL INFORMATION AND RESEARCH TOPICS

Table 5.4

Project Proposal: REGIONAL SEED RESEARCH AND DISTRIBUTION PROGRAM

Table 5.5

Project Proposal: REGIONAL FOREST AND GRASSLAND INFORMATION BASE

Table 5.6

Project Proposal: TREES FOR LIFE: GROW A TREE

Table 5.7

Project Proposal: SUSTAINABLE FORESTRY AND AGRO-FORESTRY NETWORK

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