GLOCOM FRAMEWORK PAPER: Towards International Cooperation on the Northeast Asian Ocean Environment

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1. Introduction

Participants from Japan, the U.S., and other Northeast Asian countries in the Energy, Security, Environment in Northeast Asia (ESENA) Project on marine issues in the regional seas of Northeast Asia collaborated to conduct studies and engage in dialogue on ocean environmental problems in Northeast Asia. We examined changes to the ocean and coastal ecosystems resulting from industrial activities, as well as other critical environmental problems involving energy and maritime transportation of energy. These problems indicate that the environmental problems of the oceans in Northeast Asia are multifaceted and have diverse characteristics.

As both Japanese and American specialists began to work on various areas of research, it became obvious that many efforts to deal with these problems were already underway. These efforts involve both national and local governments, as well as NGOs and international organizations. In addition, we recognized that movements were underway to establish international regimes that promote environmental protection of the seas surrounding Japan. Two major conclusions can be drawn from the work on the ESENA marine project. First, monitoring networks building on the various dispersed monitoring initiatives already underway must be created. In addition, integrated knowledge databases must be constructed. Second, a mechanism must be established through which the knowledge gathered in the networks can be applied in cases of oil spills and other environmental pollution emergency situations.

To set the framework for discussion of regional seas issues in Northeast Asia it is essential to understand that the ocean's environmental problems are multi-dimensional. Related dimensions include 1) space, 2) time, 3) multidisciplinary character, and 4) valuation. Each of these areas will briefly be discussed below.

1) Space

The spatial dimensions of ocean problems include inland sea areas, coastal areas, and offshore/open sea areas. These dimensions are unquestionably important from the perspective of human activity and public ownership rights. Through dialogue we have come to believe, however, that our perceptions of the ocean environment should have more continuity in an overall ecological sense; for example, linking oceanic pollution to land based discharge and diffusion of pollutants. This continuity-based viewpoint towards environmental problems supports our claim for the creation of a more effective network for environmental policymaking, information exchange, and data compilation as well as for dissemination efforts, which are presently being carried out under separate governmental jurisdictions.

2) Time

The series of events that comprise the issue-cycles of environmental problems—surfacing of the problem, intensification of the problem, and solution to the problem—vary in duration. Of the events examined in the ESENA Project, those having a relatively short time span include oil spills, and those having a longer time frame include bioaccumulation of chemical substances across generations. Thus, we must differentiate between short-term and long-term ecological problems associated with ocean environments.

3) Multidisciplinary Character

The ocean's environmental problems involve both the natural sciences, such as biology, ecology, oceanography, organic and inorganic chemistry, as well as civil engineering and the social sciences, including economics, law, and political science. A list of the many sectors of research related to oceanic environmental problems would be lengthy varying from the tracing of oil spills involving remote sensing to the study of agro-chemicals circulating in the global atmosphere. The ESENA Project demonstrates the need to strongly encourage efforts towards bridging the differences in available information in the natural and social sciences. Furthermore, it was agreed that all relevant information should travel from researcher to the public at large at an increasingly rapid pace.

4) Valuation

To deal with environmental problems, we must equitably value ecological and appropriate social and economic variables. As an example, fishery resources have a market value; however, seaweed beds

which fulfill an important role in the reproduction cycle of those fish resources do not. Also, it has recently been confirmed that the mountain and forest ecology in the upstream areas which eventually adjoin fishing grounds also have a major impact on the overall volume of fish caught. Furthermore, it is important that a comprehensive evaluation of the available geographical and biological resources following natural and human related disasters take place.

2. Current State of Ocean Environmental Problems & Decision-making in Japan

2.1. Japan's Ocean Environment

Considering the explosive global population growth and the attendant increase in energy consumption, an enhancement of the continued productivity of the ocean's renewable biological resources is clearly vital. In particular, we believe that effective utilization of the large potential productivity of coastal regions is extremely important. However, pollution caused by artificial chemical substances is harming the habitat of living organisms in coastal regions in Japan as it is elsewhere in the world. This includes organic pollution accompanying industrial development and rapid urbanization. Problems such as toxic red tides, progressive oxygen starvation at lower water levels, and oil pollution caused by tanker accidents, as well as the appearance of "environmental hormones," are becoming more frequent in Japan.

Further degradation the state of the marine environment in Japan is due to deep dredging and gravel extraction, the creation of landfills off coastal areas, and the construction of large buildings next to the seacoast. These activities, among other effects, are directly leading to a loss in seaweed beds and tidelands. This has also affected the surrounding environment as is apparent in changes in ocean currents and an increase in the muddiness of water. In addition, the marked loss of beach areas through erosion along the sandy coastal regions as a result of a decline in the supply sand has become a serious matter. These problems in Japan require comprehensive measures to protect and regenerate the ocean environment. Efforts are being made in Japan today to devise more comprehensive solutions to these complex problems.

2.2. Japan's Ocean Environment Decision-Making

Forecasting and evaluating the impact of human activity on the ocean environment is still fraught with uncertainty. Therefore, it is incumbent upon us to create a system that, in addition to monitoring the environmental impact of development, will constantly monitor long-term changes in the ocean environment allowing us to effectively utilize the seas and obtain their resources. It is especially urgent to create methods and implement a unified system to monitor environmental problems affecting organisms and the ecosystem at large where these problems have resulted from an accumulation and aggregation of various environmental factors.

Currently, routine studies concerning the ocean environment surrounding Japan are being conducted under the auspices of the Environmental Agency, the Maritime Safety Agency, and the Meteorological Agency, as well as by other organizations. Some organizations are conducting base line testing primarily to protect the fishing grounds in the offshore coastal areas of each prefecture. The mutual linkage, however, between these groups is not sufficient. Few offshore surveys are conducted, and there are temporal and spatial problems related to the coverage of those surveys conducted. For example, surveys primarily cover surface areas, and detailed surveys remain extremely limited. Furthermore, surveys conducted usually concern water quality and ocean bottom research (primarily water quality). Research on ocean organisms and ecosystem are often localized and insufficient. There are also problems involved in the disclosure of data, the lack of an integrated management scheme and the absence of systems available to the public.

Against this backdrop, the Environment Agency (in particular, its Study Group for Monitoring the Ocean Environment) is conducting a sweeping re-examination of its current ocean environment monitoring system. In November 1997, the Environmental Agency formulated a monitoring network system which promotes integrated monitoring of pollution in the ocean environment. Monitoring is focused on waste dumping in the deep sea, and on pollution from land-based sources and from ships. Currently the Environment Agency is in the process of expediting new policies to meet the objectives outlined by the Study Group. Due to serious budgetary restrictions, it will not be easy to realize these policies immediately.

A major problem area in dealing with ocean pollution is that fact that protecting and managing the ocean environment cannot be separated from the issue of land and river basin utilization. Yet, Japan's current system of environmental management lacks integration. The management of forests, grasslands, rivers, seashores, harbors, ports, fishing grounds, and other natural resources areas is under the jurisdiction of various different agencies depending on the resources type or use. This poses a major obstacle for establishing an environmental monitoring system of the type described above.

Recently, coastal fisherman and others have begun a nationwide effort to plant trees on the banks of rivers that flow into sea areas with fishing grounds. In addition to providing effective environmental protection, these private activities break down bureaucratic sectionalism. Another effect is of educating society on the importance of long-term integrated approaches to environmental protection.

2.3. Japan's Ocean Environment Valuation Methods

It is necessary to identify methods, procedures and to come up with a systemic framework which would provide an appropriate forecasting method and an accurate evaluation of the impact of human activities on the ocean environment. In June of 1997, an environmental assessment law was formulated by the Japanese government and is due to be enacted in 1999. Work is underway to develop various guidelines to provide an effective implementation of this law.

Despite these efforts, the indices and standards of judgement for evaluating the ocean's biological environment and ecology have yet to be determined. Furthermore, many areas lack sufficient clarity in terms of citizenry participation and informational disclosure. Also, the creation of a system in itself remains as an urgent priority. For the effective long-term use of the ocean's coastal regions a proper economic evaluation of this environment as well as of its ecology is required. It is also important that this evaluation be taken into consideration when using and administering coastal regions. This is an integral aspect of determining which party is liable for the damage and, thus, responsible for the costs involved in the environmental damage. It is also important to create standards for calculating the cost of environmental damage in cases of environmental destruction.

Exxon was sued $US 2.3 billion in damages for its destruction of the environment in the *Exxon Valdez* oil spill. In this case court awarded damages in the area of $US 300 million. In contrast to this, there were no formal claims made following the *Nakhodka* oil spill despite the consequent decrease in tourism as well as considerable damage to the ecosystem. As a result of the *Exxon Valdez* accident, research concerning effective and accurate measures for damage assessment involved in assessing the total value lost as a consequence of environmental disasters have improved dramatically. Recently, in Japan, the Contingent Valuation Method (CVM) was used to measure the value of Yakushima Island. It was thought necessary to establish a basis upon which the cost of environmental damage could be calculated. For this, it is necessary to implement a theory which demonstrates how the environment can be protected and managed as a global commons, while at the same time providing effective and efficient problem solving mechanisms.

A similar problem can be seen in the, "time assessment" analysis process which re-evaluates the public value of dams as well as other government construction projects. This problem is also endemic to the conflict involving the development of the Isahaya Bay, the Fujimae Tidelands as well as the Aichi Exposition Field. Furthermore, these problems are relevant to the mitigation efforts involved in limiting the negative impact of coastal developmental projects and in the cost-benefit analysis of oil spills.

3. Lessons from the *Nakhodka* Oil Spill

The *Nakhodka* oil spill was the most serious oil spill which the Sea of Japan (East Sea) has ever experienced. It provided numerous challenges to the national and local governments of Japan, and to other actors. The lessons learned from the spill are summarized below.

- There was great duplication of effort of national government agencies in dealing with the effects of the *Nakhodka* spill. This duplication generated further confusion among local governments responsible for taking concrete action after receiving instructions from national agencies. Lesson: lines of responsibility among national and local government agencies must be spelled out more clearly.

- Sadly, no studies of the long-term environmental impact assessments of residual heavy oil have been initiated in the wake of the spill. Such studies can contribute to formulation of measures to deal with future damage caused by heavy oil spills. Lesson: long-term research on the environmental impacts of oil spills must be conducted in Japan.

- The accident occurred during the winter season. This, combined with limitations on the monitoring of the direction and impact of the oil slick as it drifted, caused delays in the implementation of effective emergency response measures. Also, imprecise data used to computer simulate the oil slick lead to a low level of simulation accuracy. Further complicating this situation is the fact that certain data, acquired from the area, could not be publicly disclosed due to the institutional constraints. Lesson: more precise data and more accurate computer simulation models need to be developed.

- Damage from the *Nakhodka* spill was minimized in part due to the clean up efforts of over 770,000 volunteers. However, administrators lacked field-specific knowledge about collecting heavy oil. As a result, problems still remain in some areas preventing the coastal areas from fully recovering as a result of mistaken instructions. Lesson: knowledge about clean up methods need to be gathered, and means of getting this information to volunteers need to be devised.

- There exists no legislation in Japan on compensation for damage caused by an oil spill such as the *Nakhodka* spill. This is in part related to the fact that there are inadequate market valuation methods for calculating the economic losses caused by an oil spill. Furthermore, handling cases involving people who have experienced secondary or tertiary damage is virtually nonexistent. Lesson: clear-cut compensation legislation must be enacted in Japan.

- There is no means of regulating ships that sail on the open seas near Japan. Only ship that shop over in a Japanese port are subject to regulation. Lesson: international cooperation on regulation of oil-carrying ships in the regional seas of Northeast Asia need to pursued.

Comprehensive environmental impact assessments of the *Exxon Valdez* oil spill off the Alaskan shoreline in 1989 were implemented under the leadership of NOAA and Environment Canada. In

contrast to this, the scale of comprehensive environmental impact studies implemented to study the *Nakhodka* oil spill were limited due to restrictions placed upon the extent of the supervisory agencies' authority. Thus, the surveys carried out in this case were much smaller in scale as compared to those conducted following the *Exxon Valdez* incident. In the future, it will be absolutely necessary for the appropriate agencies to collect data in similar cases of disaster (according to a Cabinet decision responsibility for collecting data on coastal damage was assigned to the Ministry of Transportation).

The guidelines created by the NOAA as a result of the lessons learned from the *Exxon Valdez*accident have also been implemented by South Korea. Japan should not seek to formulate its own guidelines. The best policy for Japan would be to expand the existing NOAA guidelines, and continue in its cooperate relationship with South Korea and Russia regarding the areas surrounding the Sea of Japan (East Sea Region). It is urged that we learn from the lessons of the*Nakhodka* accident and in particular concentrate on the following issues:

- Seek to establish a liaison network for the Sea of Japan region using the Internet as a tool.
- Creating a database of past recovery methods and setting up an effective means of making database information available.
- Strengthen ties with NGOs, and study effective means of communication; specifically by creating an electronic bulletin board using virtual maps, and using NGOs as facilitators for communication between public and private sectors.
- Support recovery operations using ecological fragility evaluation maps.
- Assign qualified recovery project volunteers as well as providing adequate materials and equipment for clean up projects.
- Estimate the market value of environmental damage.

Besides "domestic cooperation," international cooperation is vital to solving ocean pollution problems. The Sea of Japan (East Sea) provides a ripe setting for the pursuit of international cooperation in Northeast Asia on ocean pollution issues. The Sea of Japan (East Sea) is considered to be a typical closed sea area and it is at present a "clean closed sea." It is prone to pollution problems, however. It has a deep basin and slow water turnover time. Thus, it is easy for polluting substances to accumulate. Furthermore, the sea is threatened by pollutants of all types flowing from the Korean Peninsula, the Russian Far East, China, and Japan. Consequently, the establishment of an international monitoring system is urgently required. For this purpose, the Sea of Japan (East Sea) could serve as an appropriate case study.

Two areas ripe for cooperation include: 1) enhancing oceanographic observations during disasters, and 2) improving the oceanographic weather observation system in cases of harsh weather. The initial response to the *Nakhodka* oil spill was based on the assumption that damage to the coastal areas would be limited. This was due to the assumption that heavy oil would be carried by ocean currents flowing north. It turned out to be a false assumption. This is an indication of the lack of a proper early warning system intended to provide adequate response mechanisms to accidents. As a result of heavy oil slick simulations carried out by NGOs utilizing oceanographic observation equipment as well as radar and satellite images from governmental agencies, it was made clear that enhancing the disaster observation and prediction systems, and improving the oceanographic weather observation system in cases of harsh weather are necessary.

In the case of enhancing the disaster observation and prediction systems, it is necessary to establish a mobile satellite data receiver as well as the creation of a competent network to host the data.

Oceanographic remote sensing in the Sea of Japan (East Sea) during harsh weather conditions relies to a great extent on meteorological conditions. It is impossible to provide constant observations using visible sensors such the NOAA. The combination of Synthetic Aperture Radar (SAR) implemented during the *Nakhodka* oil spill and H-F radar is required in order to establish an observation system that is not dependent upon meteorological conditions. This is needed to observe the course of ships and the formation of heavy oil clump, and to track ships that do not enter into Japan's ports. These observations are to be supplemented by drift simulations.
