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Problems of Development of the Far East and Its Environment

Arkady V. Alekseev and V.I. Ilyichev

Today's conference is another step on the long way toward forming of economic cooperation in the Far East region. At each new conference, and today's conference is the fourth one, we notice that we are moving steps ahead. So, the "step by step" policy can bring its fruit. But if mutual desire to meet with each other leads to a final aim (which we are sure will result in successful cooperation when the problems of the environment and the and the influence and aftereffects of the activity of man upon the environment are concerned), it is absolutely insufficient to have a desire alone is not enough.

So, when we access this influence-determining strategy of economic development and economic activities in the region (which, of course, should be chosen with consideration of this influence) we should determine for ourselves a proper correlation between economic and political expediency and its ecological significance (ecological consequences). All the countries of the region are facing this problem and representatives of different countries are looking for an answer.

Consider the following example. Quite recently a large group of Japanese guests visited Vladivostok (in July). Among these guests were many journalists who put forward the same question: "What is preferable for you: economy or ecology?" Certainly, the answers may be different, but giving preference to either choice we inevitably bring about new problems. It is for scholars and philosophers to find the answers to the three questions, which Jaspers put forward in his time: "Where does it come from? Where does it lead to? What does it mean?"

Since we will try to consider the problem of regional development from a practical point of view at our conference today, let us then to look into those consequences to which an imbalance between economy and ecology might lead. It is the search for a preference that leads to an imbalance. A vivid example is the Far East, where one can see strategy mistakes in the development of the region most distinctly. There was a time when the region was considered a storehouse of inexhaustible natural resources. And consequences, engendered by extractive industry, were left unattended. For this presentation let us address the real situation today in Primorye.

A rather detailed and thorough analysis of the ecological situation was done in

the "Ecological Programme,"¹ that was developed by a large group of scholars of the Far Eastern Branch of the Russian Academy of Sciences. While on this document, the authors clearly understood that any long-term Program should acknowledge multitudinous solutions during its development in order to consider man's activities with any mechanism of nature use.

The ecological situation throughout the Primorye Territory is studied within these limits, which are, because of its geographical location, lends itself well to natural and anthropogenic impacts. Its marginal location at the boundary of the continent and ocean, its mountainous relief, and its monsoon climate all play their roles.

We have already mentioned mistakes made in the previous decades in choosing strategies or directions of economic development of the region. They resulted in uneven development, which in its turn placed a definite stress on some parts of the region, and as a consequence, the emergence of "zones of ecological troubles." One of such zones can be seen not far from this building—Peter the Great's Bay. As long ago as in the mid-1960s, heavy metal limits of this Bay were already exhausted, and since the 1980s an intensive change of its ecosystem has been taking place. This event is associated not only with a rise in the amounts of toxic compounds, but also with a changing character of anthropogenic load.

Considering the national economy of the Primorye Territory as a whole, one conventionally can distinguish several large-scale complexes. These are: raw material complex, agricultural—industrial complex, fishery, forestry, water resources, water supplies, and some others.

Raw Materials Complex

Extraction and primary processing of minerals entail degradation and partial losses of land, water, and forest resources and hence, the deterioration of environmental quality for inhabitancy. In their natural state, minerals preserve their quality almost indefinitely. But during mining, when minerals come into contact with water and oxygen, they often lose some of their qualities. Large, unreasonable losses and worsening of properties are often due to imperfect mining methods and techniques. Also, highly valuable minerals are rather often used for manufacturing less valuable products. The following minerals are prospected and extracted in this territory: tin, tungsten, iron, gold, polymetals, inflammable minerals, non-metallic minerals such as (boron for instance), building materials, and so on.

Mining of major deposits are carried out by large industrial enterprises such as Dal'polymetal, Bor, Primorak'ugol, Spaskcement, and some other concentrating mills. The industrial enterprise "Dal'polymetal" is situated in Dal'negorsk district. The main works are concentrated in a narrow belt in the valley of the Rudnaya River (ore-river) from its first tributaries to its mouth. Ores have been mined and processed there since 1907. It should be noted here that for reasons of ecology it was necessary to move the first settlement to a new place in 1913. This enterprise produces zinc, lead, tin, cadmium and indium. The industrial enterprise "Bor" is in the town of Dal'negorsk. It provides three-fourths of the state's consumption of boric products. The industrial activities of these two enterprises, "Dal'polymetal" and "Bor," resulted

in an ecological crisis in that zone. The concentrating mills of Kavalerovo district are processing and manufacturing the majority of tin from 15 deposits within the territory. Primorye concentrating mills are also situated in the upper reaches of the Dal'naya River. During the last 20 years, these mills have been combining both open-cast and underground mining. Yaroslavsk's concentrating mills specialize in processing fluorspar. Coal deposits, are the source of "Primorye coal," mined by the amalgamated enterprises of Primorak'ugol. About 35 million tons of ore or ore products are mined each year in the territory, as well as more than 15 million tons of minerals for general use. The volume of excavated rock totals about 97 million cubic meters each year. Until recently, the problem of economic expediency of mining various types of ores had not been resolved in view of the violated ecological situation in mining areas because norms and standards of ecological damage were not well determined.

All the nature-preserving problems that arise during mining, transporting, and primary processing of mineral raw materials are divided into the following aspects:

- Geological/geomorphological: degradation and exhaustion of deposits; relief changes; intensification of unfavorable geomorphological processes.
- Land changes: loss of productive agricultural and forest lands; deterioration of lands.
- Water problems: changes in hydrology and drop in underground water resources; pollution; changes in hydrochemical composition of underground and surface land waters; sea water pollution.
- Atmospheric changes: pollution of the atmosphere (chemical, mechanical, and thermal); changes in dynamics of air mass movement.
- Soil changes: loss in soil fertility because of their contamination impoverishment, drying up, and so on.
- Biotic changes: degradation and deforestation; contamination of agricultural crops; disappearance and degradation of animal and plant populations; fall in fish reserves; benthos degradation.
- Landscape/recreational changes: degradation of recreational properties; deterioration and irretrievable loss of unique objects, such as old relics of nature, history, and culture.

The relative significance of different nature conservation problems can be determined by the length of time necessary for the rehabilitation of the landscape and environment after anthropogenic action is stopped. It should be emphasized that natural environment after each individual disturbance may require hundreds of years, or just dozens of years to restore itself in principle. It appears that only the mechanical pollution of natural waters and the atmosphere can be rather quickly removed.

Each type of mineral, genetic type of deposits, is characterized by specific problems arising in the course of development and primary processing. As for tin and polymetal deposits, this problem concerns, first of all, the contamination of surface and underground waters because of changes in their hydrochemical composition. Underground coal exploitation results in hydrogeological changes and a drop in underground water supplies, as well as changes in relief. Consequences of the open-

cast working of coal leads first and foremost to impoverishment and losses of lands (frequently cultivated lands) and consequently, to decreases in land fertility.

In order to choose concrete measures to eliminate negative influences, it is necessary to have a complete understanding of the relationships between the mining industry and individual deposits. This requires special studies, modern apparatus facilities, and monitoring of background variability.

Agricultural—Industrial Complex

The agricultural—industrial complex, one of the leading complexes in Primorye Territory, includes not only cattle-raising and crop-growing but also processing, manufacturing, and service industries. Our farmers produce not only foodstuffs for local consumption, they are also engaged in growing soybeans and rice, in fur farming, and in beekeeping.

Among the principal ecological problems connected with this complex, are the following:

- State of soil layer and ways for rational land use.
- Restoration of soil fertility.
- Protection of landscape in agricultural zones against impact of unfavorable natural processes.
- Conservation and improvement of qualitative environment.

Fishery and Off-Shore Complex

Today fishing and the off-shore complex, together with mineral and forestry complexes, are the basis of the Primorye economy. Among the ecological problems to be solved in view of the work of these industries are those connected with fish catching, fish farming, mariculture, and the pollution of sea and river environments.

Water Complex

When we analyze the situation of fresh water resources and providing the territory with water, we see that areas with maximum population density (Vladivostok, Artem, Ussurliskly, Nadezhdinskly, and other districts) possess the least transit resources of river discharges. This presents a great problem with water provision and, hence, a tense ecological situation since these areas suffer from industries most of all.

Forestry Complex

The major ecological problems arising from close relationships between forestry and other bio-resources, are typical, because they result from the economic activities of people. These problems are:

- Decline in social functions of forests.
- Weakening of protective functions of forests, that leads to changes of hydrological conditions, water quality, and other results.
- Deforestation with further complete transformation of landscapes and damaged ecosystems.
- Deterioration of forest quality, their sanitary state, and so on.

The foregoing discussion of course, is just a brief coverage of current problems, for this list is far from completion. These are urgent problems and they require great attention, as seen in the work on the "Ecology Programme" by the scholars of the Far East upon the decision of the local authorities. This program was widely discussed in the press and by scientific societies and received broad social and public resonance. All these concerns are got signs of our times, when the responsibility toward future generations is realized not only by scientists, but also by people in power. Surely, solutions of ecological problems due to imperfect technologies or mistakes in planning of industrial development of territories are not equal. But as a whole, today's approach uses preliminary ecological expertise in the creation of legislative measures and standards for the development of separate regions.

One such example is work that was carried out not long ago at the Sakhalin Research and Project Institute for Oil Prospecting.² This project was aimed at working out a scientific approach to managing the state of sea-water contamination when developing oil and gas-shelf deposits of Sakhalin Island. Taking into account actual nature conditions, an emphasis was made on rational sea use. It was a complex approach to the problem. It considered not only pure academic estimates of transformation rates, migration and accumulation of oil hydrocarbons in the geochemical systems of freezing seas, but calculations of ecological load caused by the oil—and—gas complex facilities, estimation of an assimilation capacity of a shelf zone, and the risk level as well as others. These projections made it possible to foresee the ecological state of the marine environment and to give recommendations on a nature-preserving strategy.

The preceding example depicts actual management of the territory with consideration of the true, current needs of the national economy and future prospects. an approach that should be followed when determining policy to explore new areas as well as to develop existing ones.

TUMEN RIVER PROJECT

The Tumen River Project is one example of the active of management of the Tumen River territory. It is understandable that this great project, which has no analogy in modern times, would generate discussions among specialists and different kinds of professional people.

At the present time a part of the coast from the mouth of the Tumen River to Sivuch Bay is a dynamically balanced lithodynamic system. This system is not practically broken by the activities of man, its balance is maintained by sand and pebbles carried by the Tumen River. Waves and coastal currents drift this material throughout the beach and shoals in a northwesterly direction, forming and protecting a curved accumulative part of the coast from erosion. As a result of constant re-washing of the drifted material, there has formed a deposit of titanium—magnetite sands with a total iron reserve of 4 million tons. The northern part of this area with its unique national landscapes belongs to the State Marine Reserve.

In connection with a proposed development of the Korean and Chinese territories in the lower Tumen River and the upstream construction of a deep seaport, the solid discharge will be regulated. Therefore, the drifting of sand and pebbles to th shore will

be stopped. By analogy with other areas under similar conditions, one could suppose that the river bank, which was earlier changed with deposits of solid material, will be eroded along the coast to Sivuch Bay. The beach deposits of titanium—magnetite sands, as well as sand and pebble opite of Sivuch Bay and areas farther to the North, will be destroyed. And the extent of these changes cannot be predicted because this area has not been well studied.

Thus, in view of this 21st century project to explore and develop a special economic zone in the Tumen River basin, careful management of the territory is absolutely necessary. It should include not only monitoring of the environment in the southern part of the Khasan district and adjacent areas, but also the use of various types of modelling (such as numerical modelling and laboratory modelling). In order to foresee the variability of the environment in connection with the industrial development of the lower Tumen River, it is also necessary to monitor the spreading of solid components and the drift of various chemical substances in the mixing zone of river and sea waters. Only data on modelling and monitoring the environment will allow the projection of all the expenses that participants of the project will have to bear in order to protect nature and preserve natural mineral resources. This problem is especially urgent because we cannot predict at this time the force of stress and ecological impact that can strike the environment as a result of the accelerated development of the region. But as for the project's plans and prospects, regarding this region where the three borders meet, is still a "clean sheet of white paper." And what we write down today on the economic and sociological exploration of the area, future generations will read in the 21st century.

This project is so new it has yet to be begun. But we do have a the set of conceptions (such as ecological, trade etc.) Although there are different conceptions and points of view from the different country-participants.

The determination of the principal project positions and an estimation of the project's political, social, and ecological influence on development for the countries from the Asian—Pacific region should be made beforehand. It is obvious that the project will give real support for the development of trade and economic relations. The regional political climate should be developed very well. Economic relations between Russia, Japan, the Republic of Korea, PRC, DPRK, and Mongolia will be a result of economic development. But as to the general forecast of the regional development when the Tumen River project is realized, we can make the following partial forecast:

- The volumes of future trade routes from the West to the East and vice versa should be up to 2000 and 2010. These volumes will be tied not only to the growth of national incomes of the regional countries, but also to the real increase of their exports to continental Asia and Europe.
- The determination of the active influence zone for the activity of participating and associated countries (in an international sense and a national sense) in the framework of a future project on the development of the country regions.
- The consideration of the reverse influence of European markets on Northeast Asia regional activity as influenced by business activity, within the framework of the project.

- The estimation of other joint regional projects, such as the Bakhalin—Primorye—North Korea—South Korea pipelines, the projects connected with the production of methane gas from the coal mines on Bakhalin and Primorye, and so on.
- The incoming of respective technologies the region due to the project's realization.

Of course, many people in Primorye have discussed the Tumen River project as an alternative to the projects of the Vladivostok and Nakhodka developments. This would be a mistake as both of these directions in the framework of future regional economic development would be the two sides of the same coin for the region, but not as alternative projects.

The last problem is connected with the project's results. The Tumen River project can initiate the decrease of anthropogenic influence on the industrially developed regions of the Russian Far East and stimulate the energy system development, the growth of transport routes, and the development of the transport system infrastructure. The Far East region of the former Soviet Union, now Russia, has always had problems with the high level specialist and labor potential at all times. The statistical estimations made during the last decade make the following projection concerning the domestic migration of the population. There will be an exchange in the specialist and labor potential during the five-year period. The regional development in the frame of the Tumen River project will give a real influx of labor resources into the region by population immigration from the central and Siberian provinces of Russia.

It is obvious that our problem list is not complete, but of all the problems, the ecological consequences should be the main ones to consider. The last ones have to determine the future of the Tumen River project; as we said above, the region of the project has low anthropogenic influence. The future ecological impact on the region should be screened in the maximum manner.

Peculiarities of the area, such as its geographical location as a frontier territory of different states and as a transition ocean—continent zone add specificity to the environmental problems. These problems are no longer the problems of only one state: solutions are now closely interconnected and interdependent.

From this point of view we must not limit our discussions to only regional peculiarities, but must also address the possible advantages of regional cooperation. In view of the environment, it is absolutely necessary to consider frontier territories as one entity. Probably, it will be necessary to form a single ecological outlook for the region. Certainly, such an approach supposes the enjoyment of equal rights for state-participants, and, hence, a single economic strategy.

Unfortunately, for the time being there is no stability in the state, and the direction of its development has not yet been defined. Will the Primorye Territory of the Russian Far East continue to be a supplier of raw materials, or will its specific features permit it to become the gate of Russia in the Pacific Rim, that is, a link which can help Russia integrate into the Asian—Pacific community? Naturally, the latter is the most appealing and promising. But behind these prospects one can define negative signs from the point of view of the environment. If we look at the Russian economy today

as a possible integrated part of the Asian—Pacific region, we shall see that it falls in with countries with underdeveloped industrial structures. After the integration of the state with the underdeveloped industrial structure into the world economy community, there generally is a fast shift of labor and fund-consuming technologies into the newly integrated state. This shift of technologies is into the newly integrated state, from the states with economy models of mass production systems. And, as a consequence of such transfer, a dramatic increase of environmental tension takes place, as observed in Southeast Asia. Surely, if we try today to build an open system, which is to integrate into the world community, a complete refusal to transfer technologies is impossible. That is why we should be prepared to protect the environment and to withstand the future ecological impact which will be brought about by intensive development of regional economy.

What does mean to be prepared? Of course, it is difficult at this time to imagine the entire scope of nature-protective measures. We have not even begun our work, but we can discuss supposed plans. One thing is certain: we need sufficient investments, the broadest monitoring of changes of the environment, and based on that, the management of the territories.

It is reasonable to refer here to the activities of the Pacific Oceanological Institute of the Far East Branch of the Academy of Technological Sciences of Russia and the Institute of Marine and Coastal Sciences of Rutgers University in New Jersey, U.S. These two organizations are planning to provide a comparative analysis of the shelf zones of the Primorye Territory and of the Atlantic coast near New Jersey addressing the following issues.

- Both sides should submit theoretical studies, combining ecological and social studies, and should establish the linked effects of anthropogenic and natural changes in the basins of the Amur, Ussuri, and Mullica rivers. What kind of problems may arise?
- Scopes and degrees of changes in nature and human systems—how both sides assess and determine future prospects?
- Multidisciplinary ecological investigations in the context of interaction of human and nature systems: What methodology can work here? How can they be used in applied purposes?
- The social and political control over different parameters and management of prospects; system management goals and others.
- Environmental studies and education; public relations, training of environment experts, and positions of both sides of the problem.

We think that similar joint development could be conducted in the Far East too. It seems reasonable and promising to invite scholars, businessmen, and manufacturers from all the countries represented in this area for such studies. This collaboration may be organized on bi- and multi-lateral basis. The Russian side represented by the Pacific branch of the Academy of Technological Sciences of Russia, could carry out organizing and coordinating functions. The dominating part of modern technologies, which should be converted from the military complex into civil production, are concentrated within this Academy. In turn this Academy forms its infrastructure

though other institutions with absolutely different principles of activity. That is, today within the Academy of Technological Sciences appear new collective units, whose activity is aimed at the solution of these very problems. The latter establishes principally new forms of financing for this infrastructure, based mainly on private activity, which permits it to be flexible under the market economy. All coordinating work aimed at the development of the region, and especially of applied problems, should be concentrated in the Northeast Asia Economic Forum, which at the last meeting in Changchun, was fixed as a coordinating mechanism.³

NOTES

1. *Long-time Programme of Environmental Protection and Rational Exploitation of Natural Resources of Primorye Territory up to 2005 (Ecological Programme). Parts 1 and 3.* Contributors Staff, FED, RAS, Vladivostok, 1992.
2. M.N. Mansurov, *Management of Sea Environment State during Oil & Gas Resources Development.* Doctor of Sciences Dissertation. FEDRAS, Prosidium, Vladivostok, 1992.
3. Won Bae Kim and Burnham O. Campbell, eds., *Proceedings of the Conference on Economic Development in the Coastal Area of Northeast Asia, 29—31 August 1991, Changchun, China* (East—West Center and Sasakawa Peace Foundation, 1992), p. 221.