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THE EFFECTIVENESS OF CAPITAL INVESTMENTS IN THE PROTECTION OF THE NATURAL ENVIRONMENT*

Among the most important reserves for increasing the effectiveness of social production are the intensification and rationalization of the use of natural resources in combination with measures for the protection of the environment. The rational use, conservation, and reproduction of natural resources and a solicitous attitude toward nature are becoming a component part of the program for the construction of communism in the USSR.

Among the principal tasks the Draft of the Central Committee of the Communist Party of the Soviet Union for the Twenty-fifth Party Congress, "Basic Directions of Development of the USSR National Economy Between 1976 and 1980," indicates the necessity of elaborating and implementing measures for the protection of the environment and for the rational use and reproduction of natural resources. These measures include the introduction of new, effective means and systems for the extraction, enrichment, and processing of minerals in the interests of increasing the degree of their extraction from the earth,

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securing the more complete processing of mineral raw materials, and reducing the harmful impact of waste on the environment. The more active elaboration of new technological processes to reduce waste and to make maximum use of waste materials is envisaged.

It is planned to develop specialized facilities for the production of equipment and machinery necessary for the creation of highly effective purification devices and installations and to elaborate new methods and means of combating the discharge of noxious substances into the atmosphere.

The Draft of the Central Committee of the CPSU envisages the continuation of work to improve the fertility of soil and measures to improve the protection of soil against water and wind erosion, secondary salinization, dehydration, flooding, and contamination with industrial waste materials. The necessity of recultivating land after open-pit mining operations and after peat mining is emphasized. The Tenth Five-Year Plan envisages measures for comprehensive and rational utilization as well as the conservation of water and forest resources.

At a rate hitherto unknown, scientific and technical progress is expanding our idea of the volume of natural resources that can be used effectively. At the same time, not only the influence of technical progress on the multiplication of the opportunities for economic growth but also its influence on the preservation of the riches of nature and the natural environment are indisputable.

An ecological crisis is being created in a number of industrially developed capitalist countries because of the spontaneous exploitation of natural resources based on the private ownership of the means of production. However, one cannot fail to see a direct relationship between the campaign that has been broadly developed in recent years in the developed capitalist countries, which is largely political and sensational and which is conducted under the sword of Damocles of "ecological catastrophe," and the galvanization of theories based on the notion of the objective contradiction between nature and society as the main driving force of social development.

The threat of the irreversible disturbance of the balance in the nature of a number of regions is in considerable measure artificially dramatized and used to divert social thought not only from the antagonistic contradictions existing in these countries between the character of production and appropriation, between labor and capital, but also from the acute social problems that are engendered by the contemporary scientific and technological revolution. (1)

The interpretation of the ecological crisis as the inevitable consequence of population growth, technical progress, and the development of production characteristic of all industrially developed countries irrespective of their social system is used not only to "affirm" the theory of convergence but also for the revival of neo-Malthusian conceptions. Such, for example, is the study Limits to Growth (2) by American economists, which is intended to prove the impending ecological catastrophe. The reduction of the birthrate and the limiting of industrialization in the developing countries are offered as a panacea.

At the same time, works by the American ecologist B. Commoner (3) have convincingly shown that the tenfold increase in the pollution of the environment in the last 25 years in the United States is by no means due to the growth of population and of production, which increased by only 40%. The change in the structure and methods of agricultural and industrial production, the replacement of many natural products by synthetic products, the increase in the power and number of automobiles, etc., are the causes of the menacing increase in pollution. The negative consequences of these changes have not only not been eliminated by the appropriate protective measures but, on the contrary, have been aggravated by the unrestrained quest of monopolies for profit. Western scientists forecasting the inevitability of ecological catastrophe as a result of the progress of civilization are in reality extending to all mankind the laws of capitalist society, the spontaneous development of which brings man into conflict with nature.

The implementation of a series of special measures for the protection of the natural environment, the necessity for which

directly stems from the character of the social goals of developed socialism, holds a more and more significant place among the important social tasks of our society. The socialist system excludes antagonism between the goals of social production and the demands of ecology, which are directed both toward preserving and improving the environment in which man lives. Public ownership of the means of production assures favorable opportunities and conditions for making rational use of natural resources. And the planned development of the productive forces of socialist society creates prerequisites for a thrifty, economical attitude toward the environment and for considering the needs not only of today but of the distant future as well.

The attainments of the scientific-technical revolution and the mighty industrial base that we have created in our country permit the intelligent use of all types of natural wealth. Naturally this does not mean that the advantages of developed socialism are realized in this sphere without effort and independent of the course of economic and political development. All contradictions that arise in the development of the national economy between production and nature are overcome on an increasingly planned basis in accordance with the interests of the country's population and of future generations.

It must not be forgotten that the development of material production and of the infrastructure and the service sphere is impossible without some change in the environment. But they need not have either catastrophic or even harmful consequences. Moreover, they are called on to promote the improvement of the natural environment and the creation of the most favorable conditions for the life and productive activity of people.

The criterion of effectiveness of social production under the conditions of developed socialism, which is used to evaluate any planning, design, or purely technical solution, also reflects measures for the protection of the natural environment. Such an approach has been written into law by union legislative acts of recent years ("Fundamental Principles of Land Use Legislation of the USSR and Union Republics," "Fundamental Principles of Water Legislation," "Fundamental Principles of Legis-

lation on Public Health," as well as nature conservation laws adopted in the union republics and stemming from these acts). It was confirmed once again by the decision of the Fourth Session (1972) of the Eighth Convocation of the USSR Supreme Soviet and the decree of the Central Committee of the CPSU and the USSR Council of Ministers "On Strengthening Nature Conservation and on Improving the Use of Natural Resources" (1972).

The volume of the basic types of natural resources drawn into national economic circulation is continuously growing, and for this reason their rational use and conservation are especially important for the present stage of development and the future of our society. For all the debatability of the question concerning the valuation of natural resources and the possibility of incorporating this valuation in national wealth, we must not fail to consult figures that make it possible to imagine the scale of such a global valuation, if only with respect to the natural resources used. According to our calculations the overall valuation of the entire fund of agricultural land amounts to 320 billion rubles, with an average valuation of 527 rubles a hectare. Given the average valuation of 1.5 kopeks per cubic meter, the overall annual volume of water used in the national economy amounts to approximately 20 billion rubles, while the total annual runoff amounts to approximately 85 billion rubles. According to other published data, forest resources are assessed at 100-175 billion rubles, while minerals are assessed at 70-100 billion rubles.

Thus the total valuation of basic types of the country's natural resources is a minimum of 575 billion rubles and a maximum of 680 billion rubles, i.e., 34-40% of the national wealth (excluding natural resources), which is equal to more than 1.7 trillion rubles. (4) This valuation of natural resources does not take into account fisheries, the animal world, the recreational value of natural landscape, etc. Nonetheless, even in such a form it is an indication of the national economic role of the task of rationally using and conserving natural resources.

In a number of instances the prevention of the contamination

of the environment requires very sizable expenditures. In this connection there arises the problem of establishing the optimal relationship between the use of nature's resources, the scale of expenditures on their restoration, and economic development. It seems to us that under the conditions of developed socialist society, the effectiveness of social production as a whole and of individual programs slated for implementation must be evaluated with full regard to the changes occurring in the natural environment.

The urgency of the problem of combining the economic interest of personnel, the enterprise, and society in the effective and rational use of natural resources is directly associated with the task posed by the December (1973) Plenum of the Central Committee of the CPSU — the task of creating economic conditions that would make what is advantageous to the state advantageous for every working person and every collective as well. Measures for the preservation of the natural environment, and consequently the investments associated with them, have a broad range: from large-scale, purposeful, long-term programs for the preservation of individual types of resources or regional complexes of them, decisions concerning which are made at the union or republic level, to the creation of individual installations for the purification of water and for trapping discharges into the air, work on the recultivation of plots of land, and other measures carried out by enterprises. Nonetheless, on the whole the planning and forecasting of capital investments in the development and use of natural resources and in the protection of the environment are of an interbranch nature and require centralized government regulation.

Starting in 1975, measures and, in particular, capital investments and material resources for the comprehensive and rational use of natural resources and for the preservation of the environment are made for a special section of the national economic plans. In 1975 targets were established for the first time for branches with respect to the use of natural resources and nature conservation. Accordingly, a special section has been established in each major plan for the construction of

individual projects or for the comprehensive development of a territory.

The basic goal of national economic plan targets for nature conservation is to bring about a significant reduction in the negative impact of industrial enterprises, agriculture, transport, and the public utilities of cities on the environment and to preserve and increase the country's resource potential by making rational use of natural resources. National economic plans for nature conservation include targets for the protection and rational use of water, timber and mineral resources, and land, for the protection of the air, for the protection and reproduction of fish resources, for the development of preserves and game refuges, for the activation of capacities, installations, and projects and the volume of capital investment, and for construction and installation work.

The State Plan for the Development of the USSR National Economy in 1976 envisages increasing the rate of construction of water conservation facilities, especially facilities for the purification of the sewage of industrial centers, large livestock complexes, and also the construction of stations for the purification of municipal sewage. The volume of recycling of water will be increased by 7% compared with 1975. The plan envisages measures for conserving subsurface water, including mineral water, for curtailing the volume of loose rafting of logs, and for clearing rivers of sunken logs. There are also plans afoot to activate new facilities and to expand the reconstruction of existing facilities for trapping noxious substances in the gaseous discharges of industrial enterprises, which will require an 11% increase in the production of specialized gas purification equipment.

The national economic task of conserving land resources has been concretized in the plan in the form of individual targets for ministries and agencies of the USSR and councils of ministers of union republics for protecting land against erosion through the creation of forest belts, for stabilizing sandy soil, for terracing slopes, and for the recultivation of land released from nonagricultural use. Forest conservation measures

include protecting virtually all forests against fire from the air and on the ground and biological protection against pests and diseases. Measures are envisaged for increasing the degree of extraction and for making more rational use of mineral raw materials in the working of mineral deposits by mining and processing enterprises.

Along with the implementation of measures to combat the consequences of productive activity through the creation of a system of purification facilities and devices, the plan envisages the expansion of research and development work on the creation of basically new technological processes in all branches of the national economy that would exclude or significantly reduce the pollution of the environment.

Given such a broad approach to the planning of nature conservation measures, which are becoming a very important national economic cause, special significance is acquired by the preservation of the basic position that makes it possible to get rid of the notion of the unconditional and urgent necessity of implementing any measures of this type, on the one hand, and the demand that the expenditures for this purpose have the same degree of effectiveness as expenditures in the productive sphere on the other.

Particularly urgent in this regard are problems pertaining to the measurement of expenditures required for the development, utilization, or protection of the natural environment against the effects obtained on this basis. The proposals are frequently based on the idea that the saving that can be obtained directly by drawing natural resources into production must always exceed the expenditures required for their development and utilization. The planned organization of the economy on a nationwide scale and on the scale of the entire worldwide socialist system permits — and this is its greatest advantage — the centralized redistribution of the accumulation fund in the solution of the long-term problems in the development of production. Therefore, proceeding from the long-term program for the development of society, for a certain period of time the socialist state can allow lower effectiveness in the utilization

of the individual types of natural resources and in the implementation of nature conservation measures, bearing in mind the enormous socioeconomic effect for society that may be obtained in the future. Considering the higher capital intensiveness of ecological measures, such an approach is especially important with respect to nature.

Despite the fact that the ecological situation in our country is considerably more favorable than in the majority of industrially developed capitalist countries, and the disruption of the balance between nature and production as a whole has not reached the catastrophic level, our society's characteristic concern for the good of man compels us to forecast the relatively more rapid growth rate of ecological expenditures compared with the growth rate of overall capital investments in production.

It is difficult to agree with some economists who say that the intensification of the rational use of natural resources may in itself be a source of economic growth. Such an interpretation clearly ignores the question of expenditures that are entailed in the necessary measures and consequently also ignores their effectiveness. Only effective measures that ensure a sufficient return per unit of expenditure can serve as a source of economic growth. This determines the need to continue the search that is being conducted on a broad front for the most economical solutions both in the designing and creation of special protective and purification devices and installations as well as in the transition to new and "waste-free" technology with due regard to the latest scientific and technical advances in all branches of the national economy. The correct choice of directions is confirmed by certain successes that have been scored in the purification of water and air, land conservation, etc.

The problem of effectiveness of ecological expenditures is especially acute for the primary branches of production, i.e., agriculture and the extractive industry (the mining branches, hydroelectric power stations, water management, forest exploitation, etc.). In forecasting, planning, and using capital investments in branches directly associated with the use of

natural resources, it is essential to consider the trend — common to the entire group of primary branches — to draw into production deposits, sectors, and volumes of natural resources that are increasingly difficult to develop and work as the scale of production increases.

This trend, as well as the necessity of increasing the share and volume of capital investments in the implementation of nature conservation measures, exerts a significant influence on the capital intensiveness of national income and on the effectiveness of capital investments in individual branches. Ferrous metallurgy can serve as a characteristic example. Thus, according to the data of V. A. Shtanskii (TsNIIChermet), additional expenditures by the branch on protecting the air and on other social goals lowered the actual profitability of capital investments under the Eighth Five-Year Plan (compared with the Seventh Five-Year Plan) by 6%, while the higher costs of the iron ore base due to the working of relatively poor and inaccessible ores lowered it by another 14%.

Against the background of the stabilization of the output-capital ratio, in recent years there has been a particularly appreciable, continuing lowering of this indicator in industrial branches directly utilizing natural resources, as well as in agriculture. Branches based on the direct use of natural resources at the present time have at their disposal more than 11% of the fixed productive capital of the national economy and account for only 4.7% of the gross social product.

The basic trend toward change in the long-term capital-output ratio seems to represent the result of the interaction of two directions: an increase in the capital-output ratio owing to the use of "the worst" sectors and resources and the lowering of the capital-output ratio based on scientific and technical progress. At the same time, one must not ignore the influence of increases in one-time and current expenditures for ecological purposes on the effectiveness of social production and capital investments.

The impossibility of simultaneously solving all environmental protection problems while preserving high rates of economic

growth and raising the level of satisfaction of the vital needs of the population predetermines the need for the systems approach. The sequence and intensity of a measure should be established on the basis of the top-priority task of eliminating pollution in those regions where there is a threat to the health of the population and where there exists the threat of irreversible changes in the environment.

The planning of environmental protection measures must be based on a technical policy that envisages not the elimination of the consequences but primarily the elimination of the very causes of the pollution of the environment, i.e., the transition to waste-free technology with closed cycles (of water circulation, air circulation, etc.). The realization of this direction entails large one-time expenditures. Thus the average cost per cubic kilometer of water in a water recycling system has been approximately 20 million rubles up to now.

Environmental protection measures are essentially the equivalent of the reproduction of natural conditions and resources. Expenditures associated with the solution of this problem, which is comparatively new to our national economy, have already reached considerable proportions. State capital investments in special measures to eliminate the pollution of the environment between 1971 and 1973 alone amounted to approximately 2 billion rubles, which was 65% higher than similar expenditures for the corresponding period in the Eighth Five-Year Plan. In 1976, 1.7 billion rubles were allocated for this purpose.

In addition to the growth of special capital investments, there is equally rapid growth in the share of one-time expenditures to prevent environmental contamination. These funds are envisaged in plans and estimates of enterprises being built in all branches of the national economy. The latter directly influence the increase in capital-output ratio and the enterprise cost of production. Thus for a number of production facilities modern purification plants capable of securing the necessary degree of purification of water used in production require approximately 30% of the overall capital investments in the project, and as much as 50% at oil refineries.

According to rough estimates, on the whole by the end of the Eighth Five-Year Plan capital investments earmarked for ecological purposes amounted to approximately 11 billion rubles a year, i.e., approximately 13% of the overall volume of investments. During the Ninth Five-Year Plan the relatively more rapid growth of such expenditures has been observed. Not only is there a need at the present time, but most important, more and more possibilities are being created for directing a considerable part of the accumulations into the preservation of the environment and the most rational utilization of natural resources. The inseparable connection of these directions is especially important, since socialist society is neither interested in damaging nature nor in increasing the cost of products as a result of unnecessary expenditures in the name of nature conservation.

The economic aspect of the problem consists in maintaining a sensible balance between production and nature. At the same time, the ignoring of nature conservation measures and the irrational expenditure of natural resources, which is frequently covered up by the incorrectly and narrowly understood cost-accounting interests of an enterprise or a branch, can in no way be justified. The social character of these two problems and of the expenditures made in the name of their solution is evident. From this stems the conclusion that the effectiveness of expenditures used for these purposes can hardly be determined only on the basis of comparison with the effect in production, no matter how precisely we strive to reflect in it the cost of the improvement in the natural environment.

The social effectiveness of expenditures on individual nature conservation measures may be determined conditionally by a number of entirely practicable indicators: the growth of labor productivity, the lowering of morbidity, and finally, such summary demographic indicators as increased life expectancy, lower mortality rates, etc. The difficulty lies in establishing direct or even correlation dependences between the state of the environment and the "human factor" in economics.

Certain difficulties in determining the effectiveness of social

production arise when the funds required to overcome the negative influence of production on the biosphere (or the saving of future funds as a result of improvements in the biosphere) are incorporated in the calculations along with productive capital. However, this does not eliminate the need to evaluate their effectiveness. What is more, the improvement of the methods of the economic valuation of these measures, with due regard to the prospective development of society and the social consequences of environmental pollution, is one of the most important ways of increasing the effectiveness of measures in the ecological complex. Moreover, here it is necessary to consider first the general "boundary" position both of the nature conservation measures themselves and of the corresponding expenditures between the productive and nonproductive spheres of the national economy.

The prevalent importance of social effects in no way means the denial of very important production effects, e.g., in well-known cases involving the extraction of valuable components in the filtration of substances discharged into the air, the purification of liquid effluents, and the processing of solid waste materials of production. A one-sided consideration of either the production effect or the social effect must be avoided. All this indicates that both types of effects, no matter how insignificant one might appear in comparison with the other, must be taken into account in making investment decisions at all levels of management.

The use of various types of natural resources, the drawing of new sources and types of minerals into production, and the transition from one technological method of extraction and utilization of natural resources to another are associated with the need for additional capital investments or a reduction in them. Capital expenditures and natural resources are essentially used as a complex but in different combinations in any variant of substitutability.

In the process of substantiating large-scale projects for working natural resources in the interests of developing production, the use of the methods of comparative effectiveness

makes it possible to elicit the optimal variant of such working, while calculations of the effect and overall efficiency make it possible to determine general and specific amounts of the effect and the profitability of projected enterprises. In assessing the effectiveness of capital investments in environmental protection measures and in using natural resources for the satisfaction of man's vital needs (drinking water, pure air, health, recreational purposes, etc.), it is necessary to use the principle of cost minimization for the attainment of goals posed by the state.

In eliciting the effectiveness of capital investments, it is possible to use the valuation of natural resources based on the same principles as the methods for determining the magnitude of capital investments, current expenditures, and effects. The valuation of natural resources that is given in terms of the categories of real expenditures should be included in calculations of the effectiveness of capital investments. This means, in particular, that calculations of the differential rent that enters into the valuation must relate to the same period, the existing prices of which are used for calculating capital investments and current costs.

When including the valuation of natural resources in the calculation of the comparative effectiveness of capital investments, it is necessary to correctly determine the base variant of use of the concrete volume or sector of natural resources based on the real technical and economic potential.

Capital investments in the preservation of the environment are essentially intended to solve the problems of the reproduction of natural resources and problems of a social nature, with due regard to the extended future. Their effectiveness cannot be determined solely by comparing expenditures against the production effect, no matter how precisely this reflects the cost of improvements in the natural environment. Only when this point is considered is it possible to use methods based on the direct comparison of expenditures with the valuation of the environmental damage eliminated (entirely or partially) with their aid. For the given social norms prescribing the quality

of the environment, the minimization of necessary expenditures serves as the criterion for choosing among the alternative variants of the attainment of the goal.

In addition to using indicators of comparative effectiveness, it is possible to use methods that are based on direct comparison of expenditures with the damage that is inflicted on the national economy by environmental pollution and that is eliminated (entirely or partially) with their aid. However, comparison of the expenditures on its elimination is permissible only when the choice of alternatives and technical solutions does not entail a hazard to the population's health or the threat of a chain reaction of irreversible changes in nature.

In branches of the national economy one feels the influence of the increase in one-time and current expenditures that are directed toward the attainment of given ecological standards or toward increasing the effectiveness of social production. Social quality norms themselves cannot be set without regard not only to the technical but also to the economic possibility of their attainment in any given period. The impossibility of resolving nature conservation problems in the preceding period must not justify extremes of another type — the immediate establishment of standards at the level of "absolute purity." The protection of natural conditions should be understood primarily in the sense of preserving the "productivity" of the natural environment and the possibility for its prolonged utilization for the life of generations to come.

The social effects of improving the use of natural resources and environmental protection are no less important than the production effects. However, the formulation of the goals must always be based — even in long-term planning — on the consideration of society's real possibilities with respect to the allocation of the requisite share of accumulations. The priority character of social goals of nature conservation under the conditions of developed socialism must not lead to the slackening of the rates of economic growth and thus to the postponement of the no less important goals of improving the well-being of the people. It is specifically this factor that makes impossible

the instantaneous satisfaction of all demands of an ecological character and that could lead to a sharp change in the structure of capital investments and current expenditures both in individual branches and in the entire national economy as a whole. At the same time, the elaboration of such social norms that even now would avert irreversible disruptions in the environment and that would promote its improvement in the future is vitally necessary. Such an approach corresponds to society's greater future possibility of allocating part of its accumulations for ecological measures.

It should be noted that factors determined by the environment of the planned or projected development of production are key factors influencing deviations from normative effectiveness. They are reflected in regional differences of capital investments per unit of output, transport costs, current expenditures on fuel and energy, wage levels, etc. It is specifically this point that permits us to speak of the influence of rent factors on the effectiveness of capital investments not only in agriculture and in the extractive industry but in all areas of the national economy as well.

The requirements of preserving and even improving the natural environment have in recent years been one of the most dynamic directions of growth of capital expenditures in all branches of the national economy. Evidently, the higher expenditures in the present stage stem from the necessity of paying "old debts" to nature from the time when society did not have the resources for this purpose, when everything was sacrificed in the name of the most rapid creation of the necessary production base. But just as the time has come for the implementation of a broad housing construction program designed to resolve the most important social problems based on the ever rising comfort level, so the time has come to resolve another group of problems associated with the rationalization of natural resource utilization.

The need for this type of capital expenditure stems from noneconomic factors; but every planned or projected variant of environmental protection measures, even if it is implemented as

part of purely productive investments (for example, the introduction of "water-free" technology or recycled water supply, etc.), is subject to economic substantiation based on the cost minimization principle. In individual branches where it is impossible to clearly subdivide the expenditures, capital investments of this type must nonetheless be considered in substantiating possible deviations from the norm of comparative effectiveness.

Examination of the complex of ecological measures offers convincing evidence that in addition to measures for reducing the volume of water consumption and for the purification of effluents per unit of output, general measures capable of significantly increasing the effectiveness of ever mounting capital investments for these purposes are very important. First and foremost among them is the centralization of management of the entire production complex associated with the implementation of these measures.

Uniform technical policy in the realm of nature conservation, the elaboration of which is urgently essential both for increasing the effectiveness of resources allocated for this purpose and in view of international agreements concluded in recent years on a number of nature conservation matters, also requires the creation of a central agency.

In order to increase the effectiveness of capital investments in nature conservation it is essential to take a number of both organizational and economic measures. While questions relating to the acceleration of the construction of ecological projects can be resolved within the general framework of reducing delays in capital construction and accelerating turnover of capital investments, and moreover, they are already being resolved through the compulsory inclusion of purification facilities, primarily of any enterprise put into operation, the effective utilization of these facilities requires additional decisions.

We have in mind the full legal and economic equalization of purification shops of the enterprise with shops engaged in basic production, including material incentives for personnel in such subdivisions. This principle stems directly from the idea

that at the present time, and especially in the future, the evaluation of the work of any enterprise, association or branch cannot be based solely on indicators of basic output. It must inevitably include indicators characterizing the contribution of an enterprise, association, or branch to the solution of the nationwide problem of nature conservation.

In our opinion the successful solution of this problem in the long run will require the formation of specialized associations engaged in the designing and construction of purification plants and facilities as well as in the elaboration of new, waste-free technology and specialized machine-building organizations for the production of the corresponding equipment. Essentially, we are discussing the initial stage in the formation of a branch whose task will be not only nature conservation but also secondary processing of the waste materials of a number of production processes in the interest of extracting useful components. The formation of such a branch is one of the important tasks of the period that lies ahead.

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In the majority of cases the problems of securing the most effective development and utilization of large volumes of natural resources — land, water, timber, as well as large deposits of natural ores with multiple uses — cannot be resolved within the framework of a medium-term plan. The problems are formulated and concretized in the form of specified national economic programs: regional programs if the point at issue is the development of the natural resources of some single region; national if the utilization of a natural resource within the nation is envisaged; and international if a program calls for supplying resources to a number of countries (for example, to member nations of COMECON).

No matter what methods are used to forecast capital investments, they must all take into account the specific features of natural resources as the object of investment. The universally recognized necessity of singling out the extractive industry in

forecasting the volume of production and of capital investments has recently been supplemented by the necessity for a second group of capital investments related to practically all branches of the national economy — capital investments for the protection and reproduction of natural resources. Nature — especially in its long-range aspect — more and more appears not only as the raw material factor in the development of the economy but also primarily as something whose condition, preservation, and in a number of cases, restoration assures the necessary vital environment for the development of society, collectives, and individuals. It is difficult to exaggerate the social significance of tasks pertaining to the protection of the natural environment and hence of capital investments directed toward the creation of the corresponding fixed capital.

However, it is expedient to note that while the first traditional raw material direction of investment is associated with the creation of new and with maintaining existing objects for the utilization of natural resources, the second is associated with the protection and restoration of the natural conditions necessary to life and production. It is also necessary to note the close interrelationship of the raw material and conservation (ecological) directions of capital investments associated with natural resources, which generates a certain arbitrariness in the division of goals and the very objects of capital investments.

Despite all the difficulties entailed in the forecasting of capital investments in branches directly using natural resources, as well as expenditures on environmental protection, the forecasting of these investments is an indispensable element in the overall forecast of investments and the entire forecast of the development of the country's national economy. What is more, the significance of this forecast goes far beyond national boundaries, since the rationalization of the use of natural resources presupposes the use of the advantages of the international division of labor. Collaboration in the solution of fuel and raw material problems as well as in the conservation of natural resources is one of the central tasks in the Comprehensive Program for the Further Development of Socialist Economic

Integration, which envisages the coordination of the long-term plans and forecasts of the development of COMECON member nations.

Forecasting in the realm of nature conservation must necessarily take other international factors into account. The relaxation of tensions in international relations and the associated reduction in expenditures on defense will make it possible to direct considerably more resources into the solution of ecological problems. The protection of the environment under the conditions of relaxation of international tensions has become one of the most important directions in international collaboration. Most vivid evidence of this was provided by the corresponding section of the Concluding Act of the Conference on Security and Cooperation in Europe, which was signed in Helsinki by thirty-five heads of state, and in the speech by L. I. Brezhnev, secretary-general of the Central Committee of the CPSU, at the Seventh Congress of the Polish United Workers' Party, at which the protection of the environment was advanced as a problem that all peoples of the world are interested in solving.

Notes

1) See "Marksizm-leninizm i problema sokhraneniia okruzhaiushchei sredy," Problemy mira i sotsializma, 1972, no. 6, pp. 10-29.

2) Limits to Growth, New York, 1972.

3) See B. Commoner, Zamknutyi krug, Gidrometeoizdat, 1973.

4) See L. Volodarskii, "Statistika i ekonomicheskaia teoriia," Voprosy ekonomiki, 1974, no. 6, p. 8.