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Ecological Issues and Sustainable Development
Perspectives of Russia at the Beginning of the 21st Century

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«Ecological issues and sustainable development perspectives of Russia at the beginning of the XXI Century»

Introduction.

The information about me receiving the Grant came at the beginning of April and I began working on it from the 1st of April 2001. Duration of Project is 16 months, so this report is devoted to the period from the 1st of April 2000 till the 31st of July 2001. The Project consists of three stages.

At first there were analyzed different points of view on the environment and the development in the world and in Russia. The second stage was devoted to the estimation of ecological situation in Russia at the end of the XXth century, to the contribution of Russia to the global ecodynamics and the comparison of it with the contribution of adjacent territories.

At the third stage were investigated the perspectives of sustainable development of Russia in XXI century. We took into account the strategies of overcoming the structure crisis. Also there were revealed actual ecological restrictions of the development.

The preparation and release of the monograph «Ecological Problems and Perspectives of Sustainable Development of Russia at the Beginning of XXI Century» finishes the project. All the stages of this research were fulfilled according to the research plan and the monograph was published.

Changing of Paradigm in Ecology

Although there are serious divergence in opinions, the worlds scientific community recognizes the development of the global ecological crisis. It results in global changes of the environment: changes of gas concentrations in atmosphere, changes of different substances in water bodies, degradation of soil, fast decreasing biodiversity. Also the renewable resources do not renew in the former quality and quantity in the limits of the natural fluctuations, thus they transform into the unrenewable resources. These ecological distortions lead to the economical and social losses.

Analysis showed that people can mix ecological crisis with resources crisis - a possibility of resources exhaustion. From our point of view this approach is incorrect because science and technology provide substitution of one resources by the other ones, and the resource crisis is the consequence of ecological crisis (examples: degradation of soil, desertification, pollution of natural water etc.)
Wide analysis of foreign and Russian literature about environmental changes showed that roots of environmental crisis is the result of polluting and usage of ineffective technologies. So that’s why the solution of ecological problems seems to be in the creation of the new effective technologies which use less resources and energy.

Understanding the main ecological problem only as the environmental changes as a result of polluting it by waste created some stereotypes among ecologists, economists, engineers and businessmen. The major stereotype is the conviction that the principle ecological problem is the wastes from the goods production. Actually these very goods are the waste too but which is postponed for the future as a bad «surprise» for the future generations. Everything created and used by the humankind at last comes into waste. Waste of goods («postponed waste») may take place in few days or weeks after the fact of production - like short-term goods (especially food), or in hundreds of years (buildings). From ecological point of view Pyramids of Egypt are a long-term waste. Archeology could not exist without such waste and humankind wouldn’t be able to investigate it’s history.

Other stereotype is the idea of abolishing wastes. According to the law of conservation the wastes couldn’t be abolished. They could be hidden, «buried», transferred from one state to another (for example a solid waste can be burned, and that creates a gas waste). Also wastes can be dispersed to the environment (if it’s a gas or dust or some kind of a solution), at last they can be refined, made it less toxic, or put back into production where some goods will be created from them, but only to become waste again later.

It means that there are no eco-friendly or waste-free production and the entire global economics is a gigantic wastes creating system.

In scientific literature it is highlighted that the biggest unsolved problem now is the radioactive wastes. But actually the problem of all kinds of wastes is not solved yet. This problem directly influences the humankind ecology and the people’s health. Partially it can be solved by technological means by decreasing the concentration of wastes in the environment till the relatively secure level of the health hazard.

So at the second part of the XXth century when the «environment» was discovered the understanding that the world was changing as a result of the conflict of our civilization with the nature didn’t appear. It was formed the paradigm where «dirty» production system was considered as the main ecological problem. So it seemed that the creation of the «clean» production system which would not pollute the environment will solve it. In this case questions of preserving the natural ecosystems and wild organisms turned into the question of minor importance related with the economy (gene pool as the reserve of the development) and the satisfaction of aesthetic and recreational needs of the people. In this paradigm humankind itself creates it’s own history freely without taking into consideration the laws of the biosphere. This is a normal consequence of the ideology of Modern were the humankind is in the center of the Universe and can easily have Nature in his disposal.

Actually in the XXth century occurred a great event in the human history: it was the conflict between civilization and nature. This was the real «end of the history». Now the humankind can’t develop freely and without paying attention to the restrictions that the laws of nature impose. Biosphere now should be recognized as a system, and civilization - as a part of it.
Recently traditional point of view was changing. Now more attention is paid to the problems of biodiversity and functioning of natural ecosystems (Mooney, 1999) which are mechanisms of biogeochemical cycle of substances. Now ideas of renewable resources are introduced as «foundation of life». Economists write about «fulfilled world» (Goodland, Daly, Tinbergen, 1990), analysts and managers - about «exceeding of limits» - the concept of carrying capacity of the Earth and ecosystems, but not in the terms of demography (Meadows et. al., 1992). In demography this concept means quantity of population which the current territory or Earth itself can feed, but in ecology it means the maximum number of natural ecosystems, destruction of which will not result in changes of environment. It signs that the new paradigm begins to form.

Therefore the main attention in our investigation is devoted to the problem of natural ecosystems destroying. This process started at the beginning of civilization, more then 10.000 years ago. But the destruction of ecosystems didn’t affect environment till XXth century, that is confirmed by stability of CO2 concentration in atmosphere during that period.

Natural ecosystems carry out cycle of biogens (nutrients) - elements, which are necessary for life. Reserve of biogens which are used to form organic life (carbon, for example) is limited, so the cycle of the elements is complete: all organic elements, used for support and development of life, return to environment. This complicated process is carried out by the communities of correlated species (biogeocenoses) which form ecosystems. Competitive interaction of biogeocenoses provides stability and enclosing of cycle of biogenes. Biogeocenoses which are not capable of supporting stable cycle are pushed out (Gorshkov, 1994).

Human economic activity destroys natural ecosystems by replacing ecosystems with agrosystems, industrial systems and infrastructure. Humankind transfers the flux of organic energy to the anthropogenic channel by using energy of fossil fuels to provide food and comfort for people. That’s the way how balanced systems of cycle of biogens and its mechanisms are broken.

Broken ecosystems are the source of emission of biogens into the environment. By human agrarian activity from the beginning of the Industrial Revolution up to 1980 approximately 180 Gt of carbon were exposed to the atmosphere, and for the industrialization this number is only 165 Gt. (Houghton, 1983; Titlianova, 1994).

Changes in concentration of CO2 in atmosphere began at the end of XIXth - beginning of XXth century. This testifies disturbance of biogens’ cycle which means that human economic activity broke the biosphere carrying capacity limits (critical perturbation). At that time 20% of natural ecosystems on continents were destroyed and humankind was consuming 1% of net biological production created by vegetation. These values can be considered as the quantitative characteristics of the Earth carrying capacity. They are confirmed independently by the law of distribution of organic energy flux according to different sizes of organisms based on the empirical data. (Gorshkov, 1994) (figure).

The main ecological problems which appeared and the visible changes of the environment at the XX century are the consequences of destruction of the ecosystems. That is the system of regulation and stabilization of the environment. The local pollution as a result of industrial activity is a factor of minor importance which influences human health. Anyway this problem existed before the global changes of
stability of the environment and it’ll exist even if the humankind returns into the limits of carrying capacity. This is the permanent problem of our civilization.

From the admission of the laws of biotical regulation of the environment follows that humankind must take into account the necessity of restrictions and prohibitions based on the laws of biosphere such as the law of distribution of organic energy flux according to the size of organism. It’s obvious that humankind cannot create its history freely - it should coordinate itself with the laws of nature and primarily with the ecological laws. It means that priority in science now belongs to life sciences, ecology especially. It comes from the theory of biotical regulation that says that sustainable ecological development is possible only if humankind doesn’t exceed the limits of carrying capacity of ecosystems and biosphere.

**Ecological problems of Russia at the end of the XXth century.**

Evaluation of ecological situation in Russia at the end of the XX century, its contribution to the global ecodynamics and comparison with border territories was done at the end of the XXth century. All the estimations are based on the theory of biotic regulation of the environment, using the material collected by the author during the last ten years. Based on the collected material there was done an estimation of total areas in Russia with the ecosystems which were preserved or took only minor damage. We used to do these estimations earlier but now we managed to verify them using the material about Russian forests’ evaluation carried out in 1998. There were some difficulties because of the approach of specialists in forestry who don’t take into account the role of forests in the stabilization and regulation of environment. The main problem in Russia and also in the world is to find areas with unbroken natural ecosystems.

The results of investigations demonstrated that Russia owns the world’s biggest unbroken or just slightly damaged natural ecosystems, especially forests. The total area of the ecosystems is 11 million square km, and 8 million of it are forest’s ecosystems. The second in value territory with unbroken ecosystems in the northern hemisphere is in Canada - 6,5 million km². In Europe (excluding Russia) natural ecosystems are not preserved. Forests on these territories are secondary or they are just a sylvaculture (plantation forests). Also along southern border of Russia there are territories with badly damaged and destroyed natural ecosystems - territories of Caucasus, Central Asia and China. Russia and Canada are the only countries which preserved big territories with the natural ecosystems, which are working for stabilization of environment in northern hemisphere. In southern hemisphere such big territories with natural ecosystems were preserved only in the basin of the river Amazon, but these forests are currently being actively damaged.

On all the continents natural ecosystems are preserved on 37 % of territories (without taking into account glaciers and bare territories) (Hannah et al. 1994). More then 1/5 of them are situated on the territory of Russia. This means that preserved ecosystems of Russia are of a great importance for the global ecodynamics in the northern hemisphere and they play the main role in the ecodynamics of Eurasia. So these territories are not only Russian but the world’s ecological heritage.
community should be interested in the preservation of all the natural ecosystems and work out the adequate mechanism of reaching this goal.

Russia had not only preserved big territories with undisturbed or slightly disturbed natural ecosystems, but at the same time it damaged or disturbed natural ecosystems at the territories of about 6 million km². It was the result of 70 years of centralized economic system, when the land belonged to the government. Actually it was no one's land and so the system was expanding to the new territories and extensively developing according to the principle of the «conquest of nature» which corresponded well with the ideas of «Modern age». The continental size of the former USSR and a possibility of centralized assignment of large funds for assimilation of the new territories by decreasing the life level of the population also contributed to that action.

Russia’s contribution to destruction of the global natural ecosystems is 7 %, in the Europe scale it is about 30 %, and if using Eurasia scale the amount is about 10 %. These values are not very high, but the amount of areas with destroyed natural ecosystems per capita is considerable so that is obvious that from the ecological point of view the land in Russia is used ineffectively. In Europe there is 1 ha of distortion land per capita, in China it is 0.7 ha, in Japan - 0.31 ha, but in Russia it is 4.1 ha. It means that in Russia there are great possibilities for restoration of natural ecosystems on the territories with the area of about 2-3 million km².

Analysis of data allowed to estimate the cycle of anthropogenic carbon in Russia and comparing it with the global cycle and the cycle of border territories and regions in 2000. We also met great difficulties here because «The White Book» about state of environment in Russia Federation usually does not publish data about anthropogenic carbon balance. So the balance of anthropogenic carbon was calculated using the international data base and author’s own estimations. While working on that it appeared that land use carbon emissions were poorly registered in Russia and all over the world too. Also there are some wrong estimations which are the result of not distinguishing the terms «net carbon emission» and «gross carbon emission» as a result of agricultural and industrial activity.

Taking into account the decrease in the energy consumption in Russia in 1990, Russia’s contribution into the industrial anthropogenic carbon emission is constantly decreasing. In 2000 it was 420 Mt of carbon and that is 6% of the global emission. Now the biggest sources of carbon emission are USA (1625 Mt of carbon or 24 % of global emission) and China (920 Mt. or 13 % of global emission). By the carbon emission into the atmosphere at the expense of a fossil fuel burning Russia takes the third place in the world.

Our estimations of anthropogenic carbon balance showed that Russian natural ecosystems accumulate anthropogenic carbon. They completely absorb anthropogenic carbon produced in Russia and a part of it that is produced by other countries. In temperate latitude of Northern hemisphere prevails the West winds transference of atmospheric flux of carbon and this means that in comes mainly from the European industry.

That’s why we tried to estimate the economical role of natural ecosystems and how much does the mechanism of anthropogenic carbon accumulation costs. It was based on the estimation that carbon emission in the USA can decrease by 50 % as a result of replacing the heat power plants with the nuclear power plants [Bates et al., 1990]. It
would take 50 trillion US dollars. It appears that the Russian ecosystems cost more than all the available mineral resources of Russia. According to the explored of all types of raw materials the total cost of Russia’s mineral resources is about 28 trillion US dollars and their profitable part is about 1,5 trillion US dollars (Putin, 2000).

Also it appeared that climate changes are not just the problem of the greenhouse gases emission but it’s also connected with the changes of albedo and continental and global water cycles as result of natural ecosystems destroying. The modern global rise in temperature is an obvious fact but we have no method for estimation of the antropogenic forcing of the global rise in temperature.

Analysis of local pollution in Russia and in border countries was done using annual reports «State Reports On Environmental Situation In Russian Federation». The last one was devoted to the situation of 1998 and it was published in 1999. Were also used some additional sources of information, like ones connected with Nuclear Complex of Russia in particular.

Since the State Ecological Committee was abolished in 2000 the State Report on problems of 1999 didn’t appear. So we had to use indirect calculations for pollution estimation for the end of 2000 year. Data for the last 10 years demonstrated that the pollution indicators were decreasing slower during the last three years as a result of the economical stabilization and increase in the economical development. So we think that for the pollution of environment in 2000 there are no significant deviations from 1998 estimations.

After 1989-1990 years when industry and agriculture in Russia reached their maximum in production of solid, liquid and gas wastes, this amount began to decrease as a result of the economical crises, reducing of the production and closing of the industrial enterprises. During the period from 1989 till 1998 emission from the stationary industrial sources to the atmosphere decreased from 35 to 18,7 million t. At the same period the traffic emission decreased from 21 to 11,9 million t.; withdrawal of water decreased from 132 to 87,3 km 3; spills of sewage decreased from 72 to 67 km3. . At the same time took place the increase in wastes per unit of gross domestic product.

But even regarding a significant decrease in the amount wastes, the level of emission of pollutants to the atmosphere of many cities is still considerably high. Number of cities where the average annual concentration of at least one dangerous substance exceeded the maximum permissible concentrations in 1992 was 171 and in 1998 was 185.

The number of air quality observation stations in the cities also decreased significantly: from 1185 stations in 334 cities in 1991 to 694 stations in 249 cities in 1998.

From 6 million km 2 of Russia’s territories with destroyed or partially destroyed natural ecosystems 2,7 million km 2 (45 %) are territories with the high level of the local environmental disturbance. 72 million of urban and rural inhabitants every year are under the influence of dangerous pollutants in the atmosphere.

The special feature of the local pollution in Russia is a West winds transference in the atmosphere makes a lot of pollutants to come from Europe to Russia and that is 6 to 8 times more, then the amount of pollutants which come from Russia to Europe. It makes worse the ecological situation in Russia and especially in it’s European part where the biggest part of the population lives.
In the biggest part of Russian territory surface and underground waters are polluted except for the North-Eastern part of Eastern Siberia. The situation is becoming even worse because the amount of cleaned waste water discharges changed from 4.6 km³ in 1988 to 2.5 km³ in 1998. The polluted waste water discharges spill hadn’t changed much: from 28 km² in 1991 to 22 km² in 1998.

The local pollution in Russia is also linked with the natural and tech disasters. The data about natural disasters and accidents on Russian territory was analyzed. This fact is of a great importance because Russian technical systems grew old.

It was hard to compare the pollution in Russia with the pollution in border countries and regions because the information about them is partial and we have a bad access to it. We used a reference book «Europe’s Environment. The Dobris Assessment» (1995) and a book published by UNEP the «Global Environment Outlook, 2000» (1999) which was prepared with author’s participation. Data about the toxic pollutants and the radioactive pollution was limited. The special attention was devoted to the Russian nuclear complex. It’s proved that it’s scale does not correspond with the possibilities and needs of Russia. The author is against the nuclear waste imported to Russia because it’s very dangerous industry which is producing 1000 times more of the nuclear emission then a nuclear power plant. Conversion of a ton of spent nuclear fuel produces 100-1000 times more of wastes of different levels of radioactivity, in sum 600,000 Cu.

**Hot spots of ecological situation in Russia.**

Analysis of Russia’s ecological problems highlighted the following hot spots.

Ecologically non-effective area with destroyed ecosystems is equal 4.1 ha. per soil. It was inherited from the centralized governmental system and from the state land ownership.

Regarding the reduction of pollutant’s emission into the atmosphere as a result of economic crises, stopping of the enterprises, and the reduction of consumption the level of pollution in lots of cities remains rather high. In 185 big Russian cities the level of pollutant’s concentration exceeds maximum permissible level in 5 to 10 times. Some cities are considered to be zones of ecological catastrophe (Karabash, Nizhni Taghil, Angarsk etc.). In Russia 72 million of people are exposed to the air pollution. From 1998 the reduction of pollutant’s emission into the atmosphere took place; but in case of the economical growth it’s going to be an increase of emission as a result of a rebirth of the enterprises with old technologies. Western winds in the atmosphere make worse the ecological situation in European part of Russia because they lead to the coming of sulfur dioxide, nitrogen oxide and other atmosphere pollutants from Central and Eastern Europe stream.

While the reduction of withdrawal of freshwater in Russia from 1988 till 1998 in 1.4 times took place, the volume of cleaned wastewater was reduced in 1.6 times. It demonstrates that fewer cleaning stations in the country are left and also their bad work. It means that the increase in economy can lead to a big increase in pollution of natural water objects. Now many rivers in the cities exceed the maximum permissible
concentration of pollution in 5-10 times. It goes to a decrease in quality of drinking water.

Also the hot spot is the problem of radioactive wastes, used nuclear fuel, and the pollution of territory of 60,000 km² by radionuclides as a result of Chernobyl and Kyshtym (the Urals) catastrophes. In these circumstances the proposal the Atomic Industry Ministry about importing the used nuclear fuel is a very dangerous affair because the country is not even capable of recycling of our all own nuclear wastes. Used nuclear fuel storing depots at the nuclear stations are generally fulfilled. Besides the recycling of used nuclear fuel is the most dangerous process in nuclear-power engineering. For 1 ton of used fuel appears about 600,000 Ku of radioactive wastes. Also the problem of atomic submarine utilization is unsolved yet.

In the year 2000 the new hot spot appeared: the State Committee of Environmental Protection was abolished. It’s functions were redirected to the Department of Natural Resources. So the centralized system of environmental protection control was rebuilt. The institutions which pollute the environment now control the process by themselves. It was not the unexpected step. The tendency to avoid solving the ecological problems began since the first Russian president.

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<th>The steps of executive power in Russia in the field of environmental protection in 1993-2001.</th>
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<td>Permanent decrease of money for environmental protection from the budget of Russian Federation.</td>
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<td>Elimination of ecological topics from annual President's Messages to the Federal Assembly.</td>
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<td>Elimination of the post of President's counselor in Ecology.</td>
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<td>Abolition of the Department of Ecological Safety in the Counsel of Safety.</td>
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<td>Reduction of the status of the Ministry of Ecological Safety and Natural resources to the level of the State Committee.</td>
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<td>Government’s proposals on federal laws on the environmental protection and the ecological expertise revision.</td>
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<td>Abolition of the State Ecological Committee and passing of its functions to the Department of Natural Resources.</td>
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<td>The proposal to make an amendment to the bill of the Protection of Environment, which allows importation of spent radioactive fuel. It contradicts to the «Concept of National Safety» affirmed by President Putin. There it is pointed out that the menace is «the tendency to use the territory of Russia as the place for rebirth and burial of materials and substances dangerous to the environment».</td>
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Perspectives of sustainable development of Russia in XXI century.

Realization of decisions of the Conference on the Environment and in Rio-de-Janeiro (1992) in Russia

After the Conference in Rio-de-Janeiro, as all over the world, in Russia developed the discussion on the sustainable development. There were discussed the alternatives and the necessity of the sustainable development of the country in the
system crises. As the alternative to the idea of the sustainable development, there was propounded the concept of noosphere development by V.I.Vernadsky. There were two possibilities in that concept: the first one is the transformation of the biosphere into the technosphere under the human control, and the second one is the transference of the sustainable development into the noosphere development, that’s when the changes based on the intellect take place in the humanity itself, instead of changing the biosphere.

The other alternative was based on the idea of the special Russian way of the development, the exclusive spiritual treasures of the Russians: Spiritual Feelings, Orthodoxy, National Character. The «special way» was very close to the nationalism and chauvinism and the main ideas are the paraphrase of «Orthodoxy, Autocracy, Nationality» - the XIXth century slogan.

At last for some people the sustainable development was only the practical task to help Russia to find the way out of the system crises.

On February 1994 the Government was charged by the President to prepare the Concept of transition of Russia to the sustainable development. The working group was organized and it prepared the first project of the Concept. The author was the member of the Group, but his proposals weren’t taken into account. The project of the Concept was analyzed at the All-Russian Congress on the Environmental Protection where it was disapproved. In August 1995 the new Working Group and the State Commission under the chairmanship of E.G. Jasin were organized. Some members of the previous Group also were included and the author of the Report was among them. As the result of the long discussion two variants of the Concept were prepared by the new Working Group: the old project, but abridged and corrected, and the new one (the author participated in the preparation of it). The second project was confirmed by the Commission and later, but also with some corrections, it was confirmed by the President’s Decree in April 1996. This Decree also charges the Ministry of Economy and the Ministry of Environmental Protection with the task to prepare the Strategy of sustainable development of Russian Federation. The author was the member of the Working Group for preparing the Strategy of sustainable development. In October 1997 the «Strategy» was confirmed by the colleague of the Ministry of Economy and it was transferred to the Government, then it was approved there and it moved to the President’s Administration. Then the «Strategy» began wandering among the President’s Administration, the Government and the Ministry of Economy because of the replacements of prime-ministers, leaders of the President’s Administration and the Ministry of Economy. It was obvious that officials are not compatible and have no interest in the sustainable development. The proposal to create Commission on the Sustainable Development under the President’s control was denied, and the «Strategy» is still in the Ministry of Economy which is called now the Ministry of Economical Development and Trade.

Now the problems of the sustainable development are discussed only in the scientific communities and in the State Duma where the Commission on the Sustainable development is preserved under the Committee of Science and Education. The author is one of the experts in the Commission.

It’s obvious that the state officials are not interested in working out the problems of the sustainable development, but they will report back on the achievements in this field on the Assembly of UN in 2002, like other countries which actually don’t solve
Perspectives of ecological sustainable development of Russia in XXI century.

The great amount of the preserved ecosystems on the territory of Russia helps the transition to the ecological sustainable development of the country. It is necessary to distinguish the ecological sustainable development and the sustainable development. The sustainable development can’t be reached without the ecological sustainable development. But the sustainable development besides the ecological part has the economical, social, demographic ant the international parts.

By the theory of biotic regulation of environment with main idea of the ecological or economical carrying capacity of ecosystems or biosphere, the ecological sustainable development is provided in the limits of the current carrying capacity.

The definition of the term «sustainable development».

Frequently used definition of the term «sustainable development» from the report «Our Common Future» of the Brundtland Commission is not actually determined there, but it appears as a list of the goals of the sustainable development.

The definition of the term which corresponds with the theory of biotic regulation is given in the report «Caring for the Earth. A Strategy for Sustainable Living» Publ. INCN, UNEP, WWF, 1991: sustainable development is improving the quality of human life while living within the carrying capacity of supporting ecosystems.

To achieve the ecological sustainable development in Russia it is necessary to decrease the consumption of the wooden production to the ecologically safe limits, which are 60 mln m3 of forest according to our estimation. We should return to the nature its areas which are used ineffectively. The calculations based on the law of conservation show that it is necessary to change the ratio between the areas with destroyed undistorted ecosystems by reducing the area with destroyed ecosystems from 63% to 32% of the whole territory. In Russia this area takes 35% of land and it should be decreased to 30%. It could be done by reducing the area of agricultural activity, basing on more intensive usage of them, logging areas and industries in the main territories of Russian North. Just now these tendencies are obvious: the agricultural and logging areas are currently being reduced, people leave North because the enterprises are closing as a result of the new economical situation. It is profitable because there is no need to distribute the limited resources in agriculture to the large territories. The reducing of logging areas should be compensated by more rational usage of wood. Closing of unprofitable enterprises in the North will reduce subsidies to that regions, and migration to South regions which are better for living will improve human
health and give opportunity to find jobs for people. So in Russia the process of getting within the limits of carrying capacity has just started.

**The economical sustainable development in Russia.**

All over the world and also in Russia the question about the economical sustainable development is discussed. The question is: should the economy have market or centralized system. From Russia’s own historical experience its obvious that the centralized economical system is as hazardous for the nature as the market economy. These two systems have begun from robbing the population to create the flow of funds and after that they were robbing the nature. The both systems could not solve social problems. Poverty exists in both of them, but in the centralized economical system all the people live in about the same poverty (excluding high level officials) and in the countries with market economy about 20% (for developed countries) and more 50% (for developing countries) of the population are poor people. The market economy has many disadvantages but it has one indisputable advantage: it has the best tool to inculcate innovations and also the market tool it has the ability to selforganization through a precise estimation of buying and selling prices. Biota is «the market system» too. The competitive interaction of biogeocenosis and organisms provides stability of the environment and genome of organisms and human beings. The program of competitive interaction is written in a human genome, so the market economy is not a human idea but the main principal of life adapted to our culture and civilization. So the market system will be used for the sustainable development but with some restrictions. At first there should be some ecological restrictions connected with the necessity of the economical development in the limits of carrying capacity of the Earth and also there are special social and ethic restrictions, as A. Smith wrote about it.

Now in the world there are no restrictions on the economical development. In Russia, which is in the system crises since the 1970s, there are no restrictions too. In the 1990s the crises became deeper as a result of the inconsistency, indecision and mistakes during the reforms. Now the main task of Russia is to come out of the crises. Without it there are no possibilities of reaching the sustainable development.

**The social sustainable development in Russia.**

The global social and economical system of the XXth century didn’t manage to solve the main social problems: poverty, hunger, separation between the rich and the poor - all of them remain and even grow. The centralized administrative system also failed to solve them in spite of a comprehensive paternalism. From 1960s Russia began to lag behind the developed countries in all social indices: from the level of salary and pension to the level of kids’ mortality and duration of expected life. The transfer to the market system uncovered all these deficiencies and the system crises made them deeper.

The social sustainable development demands the reconstruction of economy for solving the social problems in the limits of the ecological restrictions. The main purpose of the sustainable development is to make higher the quality of living standards. It is necessary to increase the index of Sustainable Economic Welfare (Weitzacker, Lovins,
Lovins, 1997), which is decreased all over the world while the gross domestic product per soil increases.

The main demand of the social sustainable development includes the improving of the quality of living standards, of the human health, developing of a social activity. The important aspect of the social sustainable development is the sustainable demographic development, which doesn’t mean the increase in population, but the improving quality of population, especially children (health, level of education and culture, mental stability, humanity etc). In the modern complicated world children need a special care, love and respect. They should be harmoniously prepared to live in the rapidly changing world. The quantity of population should be balanced within the carrying capacity of the Earth.

Now in Russia the social situation is far from the demands of the sustainable development. The paternalistic system doesn’t solve the social problems because it lacks funds. The social promises doesn’t correlate with the budget possibilities of the country. The solution of the social problems according to the demands of the sustainable development will be possible only after coming out of the system crises. During this process the social system should be reformed. At the same time population of Russia is acceptable with the carrying capacity of ecosystems. That’s why the Russian population is to be kept stable, and this means that it’s necessary to support families with two children.

Demands of the social sustainable development.

- Improving the life quality (keeping the unemployment at the natural level, equal possibility to receive education and professional training for everyone, providing with living-space and pension, justifiable distribution of expenditures and profits in the society, self security).
- Increase the level of health (preventative treatment of diseases, equal possibilities to receive medical treatment for everyone, reducing of morbidity and mortality, especially for children, reducing of all types of injuries, preventative treatment and struggle against smoking, alcoholism and drugs).
- Improving the environment (providing working and living places with the fresh air, fresh water and the necessary living space, absence of physical pollution, long vacations with the possibility to spend them in the conditions of a wild nature, providing with the ecologically clean food and ecologically secured goods of daily use, increasing the duration of healthy life).
- Developing of a social activity (ensured rights and freedom, participation in the important decisions at all levels of power, that should be institutionally provided by the state, cooperation of all main groups of population and civilians at all levels and in all directions, making accessible all the cognitive and cultural objects and information sources, especially on the problems touching life of all members of the society).

Scenarios of Russia overcoming the system crises.

After a victory of democracy in Russia in 1991 the government failed to achieve stability in the country, where communists had a great support of the population and rebuilt their party. That’s why during the Eltsin’s presidency there was a war between the democratic legislative power and the executive power, where communists had the
majority. At first this war was going out of the law limits (putsch of 1993) but later it existed legally. As a result of the war, the Reformers’ mistakes, low professional level of many officials, and corruption, the reforms were sabotaged and pulled back.

During this unstable period many scenarios of overcoming the system crises were brought up and later they were united in the book «Russia: the Strategy of the Sustainable Development in XXI Century» (co-authors, 1997. The author participated), later they were analyzed and the ecological appraisal was added. Six scenarios were proposed there: the liberal-democratic economy, the unstable economy, the autocratic economy, the planned economy, the national-patriotic economy and the social economy. But after the president Putin’s arrival the situation became more stable. For the first time in the Federal Assembly communists and all the left powers were in minority, and this way the number of possible scenarios decreased. So it would be impossible activate the scenario of «directive economy», very few chances has the scenario of «national-patriotic economy», in the period of overcoming the crises the scenario of «social economy» is also only slightly possible. We’ll stress that in the last years actually existed the scenario of «unstable economy».

Three scenarios are possible now. The first one is the «scenario of structural reconstruction» with taking into account some demands of the sustainable development. Its task is to renew the material basis of the perspective branches of industry on base of high-tech, to use market to make active the innovation process, intensification and resource preservation, to use the scientific potential of Russia, to increase the competitive abilities in the world market, to gradually exclude the economical support from selling raw materials, to intensify the agriculture and the personalized social support (income dependent). To achieve it the following conditions are necessary: equal conditions in market competition, unregulated economy, favorable conditions for residents and non-residents investors, ensured private property for land, the administrative reform to stop despotism of bureaucracy and reducing the number officials, to introduce the ecological restrictions to territories with undistorted ecosystems, to develop the economy at lands which were already used for industry or agriculture, to support the stability of population by regulating the emigration and supporting the families with two children.

Changing some tasks or disregarding some mechanisms can transform the actual scenario into the scenario of «unstable economy» or «autocratic economy». The first transformation will be possible if too much is based on the economical support from selling raw materials, which depends upon the unstable world market, and the second comes along with the transition of democratic to the autocratic system. Sometimes some signs of this transition can be noticed.

The second one is the «Gref’s scenario». It’s well known as the «Gref’s Program». This one was worked out very well by many professionals who took part in it’s realization. In the economical and social parts it is close to the «scenario of structural rebuilt» but it also includes the problems of federalism, judicial and executive powers. But it doesn’t take into account the ecological restrictions and the problem of stabilization of quantity of population. This scenario may be transformed into the «unstable economy» or «autocratic» with the same conditions as the scenario of «structural reconstruction».

The third one is the scenario of the Central Intelligence Agency (CIA) represented in the report «The Global Tendencies of 2015». It should be called «the
degradation scenario». It is based on the prolongation of the tendencies which prevailed in Russia in the last years for the next 15 years. It’s main features are: the depression is so strong that raising is impossible, the demographic degradation, the health services are destroyed, the social protection is very weak, disintegration of the economical infrastructure, features of autocratic administration take place, slow realization of reforms, the agriculture is ineffective, the weak foreign policy etc. All this is ascertain of some tendencies real and unreal which not necessarily can be prolonged. In this scenario there is an attempt to show Russia as an enemy which reflects the corporate interests of some groups of people in the USA but not the interests of the American people. The scenario of degradation is profitable for the state officials of Russia as a reminder about the mistakes which were done and about the image of Russia in the USA, and what should be done to make them to be wrong in their supposition.

The sustainable development in Russia.

There is no need to create any strategy or program of the sustainable development in Russia until it overcomes the system crises. The demands to the sustainable development in the ecological, social and demographic areas are determined, so it will be possible to create different scenarios of the sustainable development based on them, but only when the time comes. But without changing the people’s thinking and establishing the new values there will be no sustainable development. The values of the Modern time became obsolete. After the conflict of civilization with the nature these values became wrong because they do not take into account the laws of biosphere. Anyway, some new values should be accepted by the humankind because the surviving of the humanity depends upon them as they are the result of scientific research.

<table>
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<tr>
<th>The new values</th>
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<tr>
<td>- preservation of humanity on Earth;</td>
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<td>- supporting of life and health of every individual;</td>
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<td>- healthy style of life based on the scientific achievements;</td>
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<td>- stable population corresponding to the carrying capacity of the ecosystems;</td>
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<td>- the quality of the new generations;</td>
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<td>- regarding nature not as the resource but as the basis of life;</td>
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<td>- supporting the stability of natural ecosystems and the environment;</td>
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<tr>
<td>- development in the limits of carrying capacity of the ecosystems;</td>
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<td>- supporting ecological prosperity;</td>
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<td>- supporting social prosperity;</td>
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<tr>
<td>- directed sustainable development;</td>
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<td>- directed globalization in the interests of the sustainable development;</td>
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<td>- the global solidarity.</td>
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Our civilization is a kind of a «venture enterprise» which stands for a high-risk enterprise. The sustainable development is going to turn it to a civilization with a low risk level. Russia is a part of the «venture enterprise» with a very high risk level. But the sudden changes and quick changes of thinking of the most active people are typical traits of Russia. So the perspectives of its transition to the sustainable development in XXI century are good.
Conclusion

The results of the first stage of the project were used in the book «Ecological Problems of Russia and Border Territories» (Moscow, «Nosophere», 2000). It was prepared together with M.D. Ananicheva.

Some results of the work of the first stage of the project were used in the project «Concepts of Ecological Security of Russian Federation» which was prepared together with V.I. Danilov-Danilyan. In August 1999 the project was presented in the Council of Security of Russia.

Together with V.I. Danilov-Danilyan and M.C. Zalikhanov there was written a book «The Ecological Security. The Main Principles and the Russian Aspect» (Moscow, The International Non-Governmental Independent Ecological and Political University, 2001) where the results of the work on the project were used. From October 2001 the author used to give a course of lectures «The ecological security» in the Moscow University and used the results of the project in the course of lectures «Ecology and economy». According to the plan of the work the author prepared and published the monograph «Ecological Problems and Perspectives of the Sustainable Development of Russia in XXI Century» which includes all the results of the work on the project.

K.S. Losev