Identification and description of key environmental and safety problems in the Republic of Moldova

I. Introduction

The Republic of Moldova is located in southeast Europe. In the north, the east and the south it borders on Ukraine, and in the west on Romania. It occupies the area of 33.8 thousand km^2. The extent of the territory of Moldova north - south is 350 km, that one west - east is 150 km.

In the relief of Moldova the natural combination of low plains and the raised heights mainly in the central part of the territory is observed. The maximal elevation above the sea level is 429 m (Beleneshty), minimal one is 5 m (Giurgiulesti).

The climate of Moldova is moderate continental. The average annual temperature of the air is 9.0-10°. The precipitations decrease from northwest to southeast from 591mm to 470 mm. The maximum precipitations are in Codry.

The rivers of Moldova belong to the Black Sea Basin. The Dniester and the Prut Rivers, which are the main ones, originate in the Carpathian Mountains. In the south Moldova has an access to the Danube.

On the territory of Moldova there are no large lakes. The main natural lakes are Beleu - 6.26 km^2, Dratchele – 2.65 km^2, Rotunda - 2.08 km^2, Roshu - 1.6 km^2, Byk – 1.3 km^2; the artificial lakes are Dubesari – 67.3 km^2, Stynka-Kosteshti - 59.0 km^2.

On the territory of Moldova two types of vegetation exist, i.e. forest and steppe types, and 5 biotype complexes occupied by corresponding fauna are distinguished.

Natural resources are insignificant. The basic natural values are the soils, represented by various kinds of chernozem. Other natural resources are building materials, namely granite, limestone, clay, sandstone.

Demographic situation and employment of the population

As of 1.01.2005 the population of Moldova (without Transnistria) was 3.3 mln., including females 48 % and males 52 % [1, page 38].

In urban localities approximately 39% of the population live and in rural localities 61%. The population density is 111.2 persons per sq. km [1, page 36, 38].

An insignificant increase in average life expectancy is observed, and in 2004 it was 72.2 years among female population and 64.5 years among males [1, page 42].

The factor of ageing of the population has not significantly changed over the last five years and is 13.8 and is defined as «demographic old age » [1. page 42]

Since 2000 the tendency to natural decrease (negative increase) of the population is observed in the Republic, and in 2004 it was -3396 persons. The positive natural increase is observed in Chişinău (+1173) and in the 8 out of 32 areas of the Republic [1, page 47].

In 2004 there were registered 2394.5 thousand ill persons that makes 89% of the level of 2000, and the level of registered ill persons with the first-ever diagnosis was 85% of the level of 2000. The largest number of patients is registered in such categories of diseases as respiratory diseases (453.3 thousand cases), blood circulation diseases (280.9 thousand cases), digestion diseases (275.3), nervous system and sense organs diseases (209.8), and others [1, page 195]. Active tuberculosis and malignant tumors are of special concern. So, in 2004, 3.3 thousand persons suffered from active tuberculosis as the first-ever diagnosis, and 6.9 thousand persons suffered from malignant tumors as the first-ever diagnosis were under observation [1, page 198, 205].

In 2004 economically active population in Moldova was approximately 40%. The highest level of employment is observed in agriculture (40.5 %), employment in industry is 12.3 %, in wholesale and retail trade 13.6 %, transport and communication 5.5%, construction 4%, and others [1, page 76]. In private sector the employment is 68.1% of total employed in the economy, in public sector 25.8 %, other employment makes 6.1% [1, page 78].

In 2004 the unemployed, as defined by the ILO (International Labour Office), numbered 116 thousand person or 3.2 % [1, page 75]. At the end of 2004 in the employment agencies there were registered 21 thousand unemployed. The rate of unemployment at the end of 2004 was 1.8 % of the economically active population at the able-bodied age [1, page 95].

Economic aspects

The period of the Republic of Moldova coming into being as an independent state took place under an acute social and economic crisis and radical transformations of the economic system. Disintegration of the USSR led to destruction of the customary systems of economic relations, with the economy of Moldova being previously deeply integrated into the economy of the Soviet Union. The high degree of integration was due to deep shortage of own energy sources and a raw-material base for the industry, as well as to subsidizing of the agrarian sector from the Soviet Union budget.

During the economic crisis (1990-1999) the GNP reduced almost by 3 times, industrial and agricultural production reduced by almost 2 times, capital investments reduced by more than 7 times. The economic crisis aggravated social problems, real wages and pensions considerably decreased, purchasing capacity of the population dropped, unemployment increased, the expenses from the State budget on education, public health and environmental protection were cut down. The economic recession provoked deterioration of water resources conditions, i.e. the

discharge of untreated effluents into water bodies increased and, together with other negative factors, led to pollution of superficial reservoirs; illegal felling considerably increased, erosive and landslide processes grew more active.

The process of the economic reforms implementation was not smooth, the re-structuring of the industry went slow and privatization did not bring the expected results.

A complex of environmental and socio-economic conditions arose in the Republic and threatened the stability and life sustenance of the population.

Therefore it was necessary to speed up the process of political and economic reforms implementation in order to create conditions for uniform economic growth and development all over the country.

From 2000, a stable growth of economic parameters is observed in the Republic. For the period of 2000-2004 the cumulative economic growth was 31.2 %, just so in 2000 the Gross National Product (GNP) increased in real terms by 2.1 %, in 2001 by 6.1 %, in 2002 by 7.8 %, in 2003 by 6.6 %, in 2004 by 7.3 % [1, page 255]. The total amount of industrial production in real terms grew by 63.3 % based on the 25.5 % gain from investments into fixed assets. The economic growth favored further increase in real incomes of the population, including the average wages in the economy by 92.8 %. [6, page 50]. These parameters show the positive trends in the social and economic development of the country as a result of the pursued policy aimed at the improvement of normative and legislative base of structural transformations, at sustainable social and economic development.

Economic cooperation with other countries and communities was intensified on the basis of mutually advantageous principles and increased realization of the advantages, which were offered within the framework of cooperation with the international organizations, and the transboundary cooperation intensified as well, especially within the framework of the Euroregions of the Lower Danube and the Upper Prut Rivers.

Transnistrian conflict. The Transnistrian conflict led to interruption of domestic economic relations in the country. Due to the territorial decomposition, Moldova lost control over the east border and over a significant part of the energy and industrial sectors.

A significant part of foreign debts of the country, especially by energy agents, concerns the Transnistrian region, which neither pays its debts, no brings its contribution to the budget of the country. Also, the Republic of Moldova cannot also control import of fuel across the east border. In the international scale, the domestic conflict increased the risk of the country that causes significant mistrust among foreign investors. The missing governmental control over the Transnistrian region strongly favors a growth of criminalization of the society, including spread of smuggling and the shadow economy.

Efforts for transformation and a social and economic revival are being undermined by an internal separatism.

The 1992 armed conflict put a significant loss not only to the economy of the Republic, but also to the environment. Significant areas of forest vegetation and biodiversity have been destroyed.

Of special concern is the presence of military warehouses on the territory of the Kolbasna station in the Rybnitsa District.

The report of the expert group of the Academy of Sciences of Moldova says that by 2000 the quantity of arms and ammunitions, which belong to the Russian Federation, in the Transnistrian region of the Republic of Moldova amounted to approximately 42000 tons. According to open reports of the OSCE mission in the Republic of Moldova, during the period of time between 2000 and 2004, from the territory of the Transnistrian region of the Republic of

Moldova there were withdrawn or destroyed in-site approximately 50% of arms, military equipment and ammunition.

The remaining arms are concentrated within the area of approximately 100 hectares and amount to approximately 20 thousand tons of ammunitions, which are not suitable for transportation and should be destroyed in situ.

The conclusions of the expert group is that the initiation of ammunition warehouses explosion at the Kolbasna station will result in injuries to civilians and in humanitarian and ecological disaster.

Under such conditions, the joint solution of problems regarding preservation of the environment is considerably hampered not only in the territory of the Republic, but with neighboring countries as well. There is no state control over observance, by economic agents from the left bank, of the environmental protection legislation and requirements of the international agreements, which hinders the realization of complex monitoring of the environment quality all over the territory of Moldova, and in the transboundary context as well.

With the purpose to settle the conflict, the parties conduct an active political dialogue, which involves the authoritative international organizations.

Ecological risks. Excessive use of natural resources over the last 40-50 years and far from perfect ecological management of these resources led to overpollution and to significant depreciation of the productive natural capital and to destruction of flora and fauna.

Excessive use, during several decades, of mineral fertilizers and pesticides in the agricultural purposes has resulted in an increased level of land and water pollution that negatively has affected health of the population and biodiversity.

From all reserves of underground water, which are known till now, only approximately 50% can be used for drinking without pre-treatment. A serious danger is represented by the processes of soil erosion. The area of eroded lands annually increases by 0.9 %, agricultural lands lose 26 mln tons of fertile soils.

Ecological risks are also caused by the development of the energy complex.

Energy safety. An important problem of the state is how to ensure energy safety. Problems of development of the national energy complex are caused by a number of factors, among which there are:

- energy intensity by 3-4 times exceeds the corresponding parameters in the developed countries;
- almost complete dependence (approximately 98%) upon import of primary energy resources;
- limited sources of fuel and electric energy import, natural gas continues to be imported from one country only;
- specific weight of natural gas in the total balance of primary energy resources consumption is approximately 70%;
- absence of necessary capacities for electric energy production on the right-bank of the Dniester, which may cover the local consumption;
- limited throughput of the electric communication lines, which go to the West (only three lines of 110 kV);
- structure of the transport electric grid is not favorable for ensuring energy safety of the state [4, section II].

In 2004, there were imported 2996 thousand tons of fuel equivalent of all fuel and energy resources, of which gas took 1548 thousand tons of fuel equivalent (or 52% from the import of fuel and energy resources), liquid fuel did 871 thousand tons of fuel equivalent (29%), solid fuel 164 thousand tons of fuel equivalent (5%), electric energy 413 thousand tons of fuel equivalent (14%). The imported fuel and energy resources made approximately 98% of the total domestic consumption.

In 2004, the domestic fuel and energy resources amounted to 121 thousand tons of fuel equivalent.

In 2004, the total domestic consumption was 3065 thousand tons of fuel equivalent, out of which 1107 thousand tons of fuel equivalent (or 36% of total consumption) were used for the production of electric and thermal energy, consumption in the industry and construction was 186 thousand tons of fuel equivalent (6%), in the transport sector 364 thousand tons of fuel equivalent (12%), for municipal needs 176 thousand tons of fuel equivalent (6%), sold to the population 938 thousand tons of fuel equivalent (31 %), etc. [1, page 326].

In the Republic, only one third of total electric energy is produced by local power plants. The energy system of the country consists of district power plants and small industrial power plants only.

So, in 2004, in the Republic 1022.1 mln. kW-h (one mln. kW) of electric energy were produced, with import supplies (including the electric energy supplied by the Moldavian TPS) amounting to 3367.5 mln. kW of the electric energy.

The total consumption of energy in 2004 was 4389.6 mln. kW, including the industry 859.4 mln. kW, construction 57.4 mln. kW, transport 1 mln. kW, illumination and household consumption 844.7 mln. kW, etc. [1, page 327].

The acuteness of the energy problem is aggravated by the fact, that both morally and physically out-dated technologies and equipment, significant losses in electric energy and heat supply systems, insufficient and poor-quality provision with meters and unsatisfactory implementation of energy saving measures lead to overconsumption of energy per unit GNP (3-4 times more, than in the developed countries). The total cost of consumed energy at national level equals to 36.5% of GNP, which is higher, than in the European countries.

The Energy Strategy specifies the main goals of the national energy policy for the period up to 2010, which are:

- Completion of privatization of the energy complex and creation of an energy market;
- Increase of energy efficiency and energy saving;
- Ensuring energy safety of the State;
- Protection of the environment.

Special attention will be paid to implementation of effective and less polluting energy technologies. Energy saving will be considered as the priority in reducing the energy resources consumption.

Energy safety of the country will be provided by means of foreign sources diversification of electric energy, mineral oil, solid and gaseous fuel, through development of country's own competitive capacities of electric energy production, through creation of strategic stocks of fuel, as well as through expansion of ways for energy resources import.

In the energy sector of the Republic of Moldova it is necessary to solve the problem of regional and European cooperation and integration.

Strategic documents, which regulate ensurance of national safety, including environmental safety.

Notwithstanding the uneasy economic conditions, the process of reforming the institutional base of national economy, formation of the policy of a sustainable development of the Republic is under way. During this period a lot of strategic documents and acts have been worked out on the matters of national safety, including ecological safety.

The basic document, which guarantees the right to protection of individuals, society and the state, their other rights and interests is the Constitution of the Republic of Moldova, adopted by the Parliament in 1994 and approved by the population of the Republic.

Article 37 of the Constitution guarantees the right of each individual to the life- and health-friendly environment, as well as to the safe foodstuffs and domestic goods, it also guarantees the right to free access to trustworthy information regarding the condition of natural environment.

The strengthening of the Republic of Moldova as an independent state put forward necessity of bringing the system of national security in line with the provisions of the Supreme Law of the State, with the principles of foreign and domestic policy, with the international norms of national, regional and universal security. In this connection the Parliament of the Republic adopted in 1995 the Concept of National Security of the Republic of Moldova, which is the basis of the state policy in the field of national security, development of corresponding statutory acts, improvement of administrative structures, etc.

One of directions in ensuring national security is ensuring environmental safety.

Issues of environmental safety were discussed at the meetings of the Supreme Council for Security under the President of the Republic of Moldova, whose new composition was approved by the Decree of the President of the Republic of Moldova «On Establishing the Supreme Council for Security », No. 82 dated 30.05.05.

The policy of ensuring environmental safety is formulated in the Concept of Environmental Policy of the Republic of Moldova (2001), in the National Environmental Safety Program and Action Plan (2003) and in the other programs and action plans.

The Energy Strategy of the Republic of Moldova till 2010 (2000), the Medium-Term Strategy of Social and Economic Development of the Republic of Moldova up to 2005 (2001), the Program of Government Activities for 2001 - 2005 “Restoration of Economy Is Restoration of the Country”, the Concept of Military Reform (2002), the Concept of National Border Safeguarding (2003), the Concept of Development and Allocation Schemes of Power Plants on the Territory of the Republic of Moldova for the Period up to 2010 (2003), the Concept of National Policy (2004), the Program of Government Activities for 2005-2009 «Modernization of the country Is Well-Being of the People» (2005), the National Program «Moldavian Village» (2005) and other documents formulate goals, tasks and methods of ensuring national security of the Republic.

With the purpose of working-out a general political basis of ensuring a sustainable development of the Republic of Moldova, the Strategy of Economic Growth and Decrease of Poverty Level was adopted by the Parliament in 2004.

The current legislation is aimed at preventing and decreasing environmental pollution that promotes preservation of ecological safety, however it does not contain sufficiently clear legal definitions of key expressions and does not specify legal interaction between the environment and safety.

The Republic of Moldova has signed several international conventions, which create mechanisms for ensuring ecological safety, preventing conflicts and resolving transboundary disputes:

Convention on Transboundary Long Distance Air Pollution

Convention on Environment Impact Assessment in Transboundary Context and the Protocol on the Strategic Environmental Assessment

Convention on Transboundary Impact of Industrial Incidents

Convention on Protection and Use of Transboundary Water-Courses and International Lakes

Protocol on Liabilities and Compensation of Damages to Transboundary Water-Courses Caused by Industrial Incidents.

In 2002 the Republic of Moldova joined the Pact of Stability in Southeast Europe.

With the purpose of safeguarding peace and stability, of promoting cooperation in settling the conflicts, etc., the leaders of Georgia, Ukraine, Azerbaijan, Moldova (GUAM) have signed the Memorandum of Cooperation.

At the present stage of development, the preservation of the environment is one of components in the state policy. The policy under way, which is aimed to decrease ecological risks, to improve the environmental situation, decrease negative impact on the environment at the national scale, as well as to promote cooperation on the matters of a sustainable use of natural resources, decrease of negative impact on the environment in the transboundary context will allow to prevent conflicts between the states and to strengthen the regional security.

II. Ecological hazards

Water resources

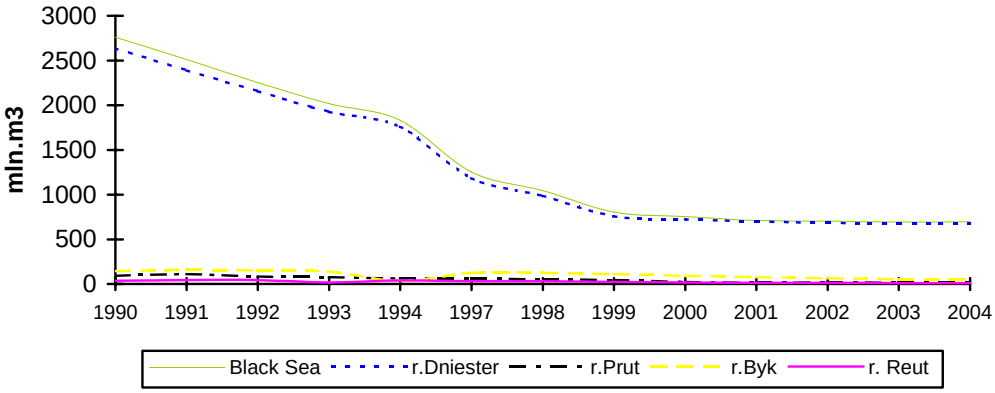
The water resources condition is of special concern in the Republic. Water resources are of high value for the life and health of people and for the condition of ecosystems, and they are an indispensable condition for a sustainable economic development and safety of the state.

Geographically, the Republic of Moldova is situated in a region with a low annual average level of atmospheric precipitations and with limited water resources. The major rivers, the Dniester and the Prut, belong to the Black Sea Basin. The basic reserves of underground waters are in subbottom water-bearing horizons of the Dniester River. Local droughts may happen in the country. The southern part of Moldova is partly subject to problems of water resources shortage.

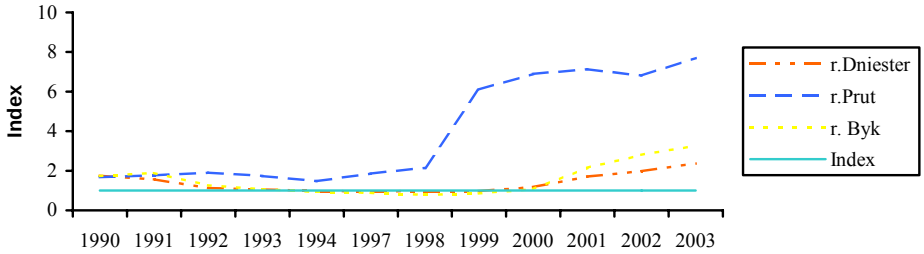
Quality of water in major rivers (the Dniester, the Prut) is evaluated as "moderately polluted", in the Reut and the Byk Rivers - as "polluted", and the water of majority of small rivers belongs to the "heavily polluted" category.

The main problem concerning the quality of superficial waters is the presence of nitrate and ammonium. Also the biochemical oxygen demand concentration in many parts of the Prut and the Dniester Rivers is very high.

According to the annual report of the State Ecological Inspectorate for 2004 [2, pages 31-32], a decrease in the organized discharge of effluents into superficial reservoirs is observed.



Since 1999 the organized discharge into the Prut River of organic substances (expressed in biochemical oxygen demand concentration) at the above-standard rate is observed due to lack of biological treatment at water-treatment facilities of Ungeny town [2, page 31].



The majority of sources of underground water do not meet the water quality standards and are characterized by a high content of chemically harmful substances (fluorine, iron, hydrogen sulphide, chlorides, sulfates, heavy mineralization).

The main reasons of water resources pollution are:

- Discharge of not sufficiently treated and polluted effluents due to lack or destruction of water-treatment facilities
- Washout of mineral fertilizers, herbicides and/or pesticides and other polluting substances from the territories of warehouses and non-organized garbage dumps
- Agricultural use of lands, which are situated within the water protection zones (WPZ) or within the afforestation shelter belts; lack of proper sanitary zones
- Dumping of cattle-breeding and household wastes on the territories of farms and settlements
- Emergency discharges of effluents from the enterprises.

The unsatisfactory condition of water resources provokes negative impact on the health of the population.

At present, more than 50% of the population of the country use potable water, which does not meet the sanitary norms due to exhaustion and deterioration of water resources, absence or an unsatisfactory condition of the outdated systems and technologies applied for water treatment. The water-treatment equipment requires modernization and repair, inter alia in order to cut down expenses on the electric energy, which average 34% of operational costs.

The centralized water supply system is used by approximately 81% of urban population and 17% of rural one. The remaining agricultural population uses water from wells and springs.

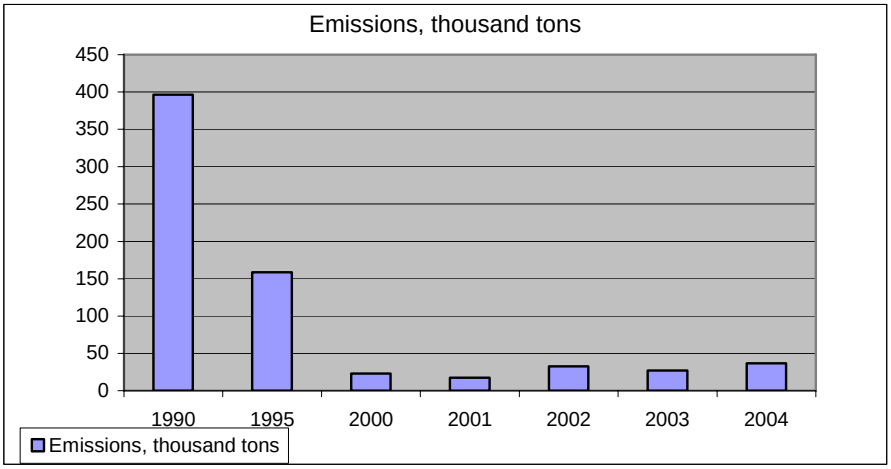
More than 80% of wells and 50% of springs are unsuitable to be used as sources of potable water. In rural settlements 67% of water pipelines do not meet hygienic norms and are in a poor condition.

The actual situation of the population provision with quality water supplies, wastewater disposal systems and with quality water resources urges a solution of these problems at the national level. For this purpose the Concept of National Policy for Water Resources for the period 2003-2010, the State Program of Water Supply and Wastewater Disposal Systems of Towns and Municipalities of the Republic of Moldova up to 2006 with further Extension up to 2015 (2005), the National Program «Moldavian Village» (2005) have been worked-out, the main tasks have also been set in the Strategy of Economic Growth and Decrease of Poverty Level (2004).

Atmospheric air

Due to recession of industrial production, the emissions of polluting substances from fixed sources decreased from 396.5 thousand tons per year in 1990 to 36.6 thousand tons in 2004 (Moldavian TPS included), Figure 1.

Figure 1.

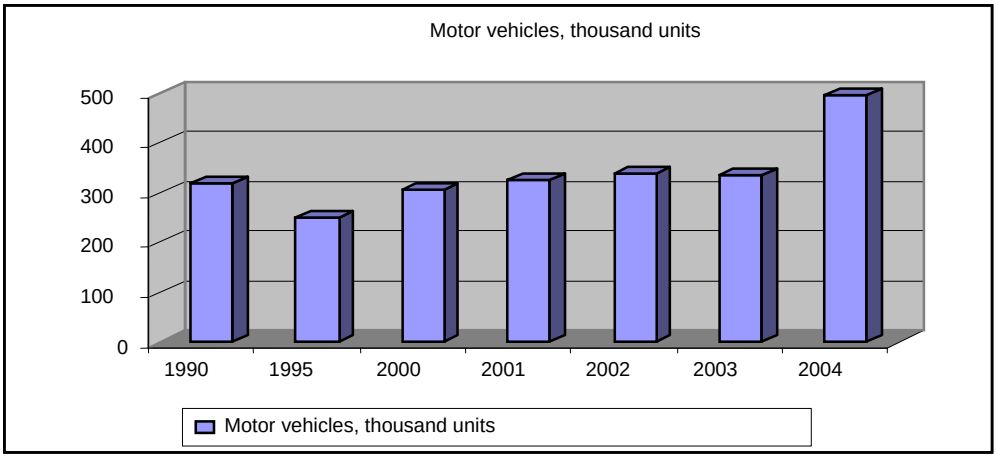


In 2004 the emissions (without Moldavian TPS) amounted to 17.5 thousand tons, out of which solid ones 4.4 thousand tons, sulfur dioxide 2.2 thousand tons, oxides of nitrogen 2.5 thousand tons, carbon oxide 5.1 thousand tons. (1, page 26)

The major sources of pollution in urban environment are the emissions from motor vehicles, TPSes and boiler-houses. The highest specific weight (80%) is produced by motor vehicles, which in 2004 amounted to approximately 150.0 thousand tons.

Over the last 10 years the number of vehicles in the country has grown almost by 2 times and this tendency of growth is keeping (Figure 2). According to the State Ecological Inspectorate, in the Republic of Moldova there are registered approximately 500 thousand transport units, approximately 65% of which being older than 15 - 20 years [2, pages 43, 52]

Figure 2



At present, there are approximately 50 kg/year of toxic substances emitted by motor transport nation-wide per one inhabitant, not including emissions from railway and air transport. In major cities this percentage is as high as 115 - 120 kg/year. Such situation seriously threatens ecological safety of the country and the health of the population.

Average annual concentrations of oxides of nitrogen in the municipalities of Chişinău, Beltsy and in the town of Tiraspol exceed maximum allowable concentration by 1.5 times.

The basic sources of air pollution are:

- Too long operation of vehicles
- Use of bad quality fuel
- Uses of coal and black oil without proper outlet filters
- Application of out-dates technologies in the production sector.

Consequence of atmospheric air pollution is the increase among the population of such diseases as lungs cancer, diseases of the upper airways, the allergies, etc.

Emissions of harmful substances into the environment can be cut down by increasing, in the energy balance, the percentage of the energy sources not related with burning, and namely: energy of small rivers, wind, biomass, solar radiation, etc.

An improved national policy in the area of energy effectiveness and energy saving, use of cleaner fuel and of non-conventional methods of energy production may promote more effective utilization of limited resources that will result in undisputable economic and ecological effect.

With the purpose of controlling emissions into the atmosphere and taking measures on reducing atmospheric air pollution, the following strategic documents are adopted in the Republic:

- The Program of Reducing Atmospheric Air Pollution coming from Motor Vehicles (2001)
- The National Action Plan on Environmental Hygiene (2001)
- The National Program to Ensure Environmental Safety (2003)
- National Strategy on Emissions Reduction and Persistent Organic Pollutants Neutralization and the National Action Plan for Implementation of the Stockholm Convention provisions regarding POPs (2004), etc.

With the purpose of developing activity aimed at the decrease of harmful emissions into atmospheric air and of supporting the international initiatives on this matter, the Republic of Moldova joined the European initiative «In Town Without My Car», and being a Party to this

initiative, organized on September, 22 for two years the Car-Free Days in several towns and cities of the country.

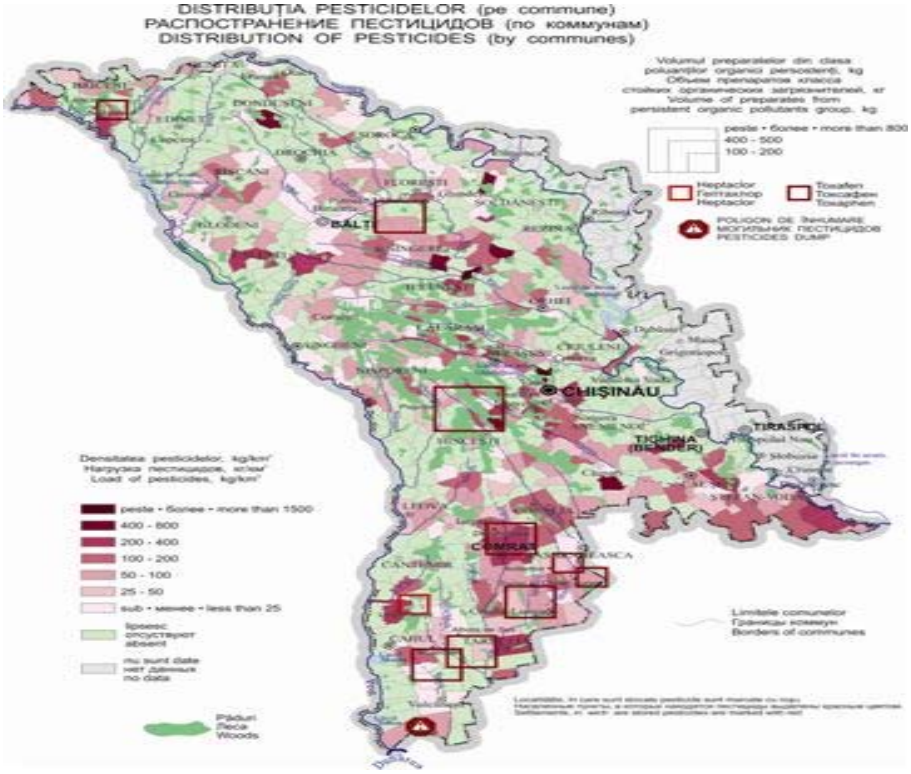
Wastes management

The serious problem in the Republic of Moldova is accumulation and storage of municipal and industrial wastes.

At present, in the country there are dumped more than 30 mln tons of waste products, more than 6 mln tons out of which are the wastes produced by construction materials manufacturers, food-processing industries and other economic activities. Existing areas for wastes dumping (with total surface area of approximately 1000 ha) are insufficient to provide ecological safety. In the majority of rural settlements and in small towns there are no special grounds for wastes storage at all. Under such conditions the significant part of wastes is dumped illegally on the grounds, which are not intended for this use (on road sides, on river banks, in ravines, etc.). The waste management in rural settlements is performed at extremely low level. According to the State Ecological Inspectorate, more than 2 thousand grounds for wastes storage does not meet the requirements of the environment protection legislation.

Serious environmental pollution hazard is represented by toxic substances and waste products, including pesticides with the expired period of storage. The total amount of pesticides with the expired period of storage is 1712 tons, and they are stored in 340 warehouses, 80% of which are in poor condition.

The map shows pesticides stocks on the territory of the Republic (IBRD/GEF Project No. TF051208 «Actions on the Stockholm Convention Implementation against POPs in the Republic of Moldova)



Besides, in the energy sector there are 23.9 thousand tons of oils containing actually or potentially biphenile polychlorides (BPC).

As at the end of 2004, according to statistics, in the Republic there were stocked approximately 8 thousand tons of toxic waste products. In Moldova there is no available ground (range) where to bury the toxic waste products. High density of population and several other

factors does not allow construction and operation of such range, therefore the waste products from some enterprises, which often contain hydroxides of heavy metals and other toxic substances, are disposed of, without proper permission, to the dumps of common municipal wastes.

In order to minimize waste products, with their maximal utilization within the economic circulation (processing, use) and ecologically reasonable allocation, the National Program of Industrial and Municipal Waste Utilization (2000) has been adopted.

Land resources.

The soils are the main natural resource and national wealth of the Republic of Moldova, which use feeds 75 % of national economy.

As on 1.01.2005, the land fund was 3384.6 thousand hectares (th.ha), including: lands of agricultural value were 1951.8 th.ha (58%), lands under settlements-308.6 th.ha (9%), reserve fund was 553.8 th.ha (16%), lands for industrial, transport, communication and other special purposes – 58.5 th.ha (approximately 2%), lands under forest fund or requiring the environmental protection – 428.5 th.ha (12.6%), lands of water fund – 83.4 th.ha (2.4%) [1, page 19].

In the recent decades, the highly fertile soils have been exposed to the increasing degradation as a result of human activity, reducing areas of protective afforestation, destruction of erosion-preventive hydro-engineering facilities, natural cataclysms, irrational use of ground resources, ignoring scientifically proved methods of agricultural crops culturing (especially during the period following the privatization of agricultural lands) and other factors that led to essential decrease in soils efficiency.

Besides, under the present conditions it is likely that the further intensification of degradation and deterioration of the environmental situation in the Republic of Moldova will continue.

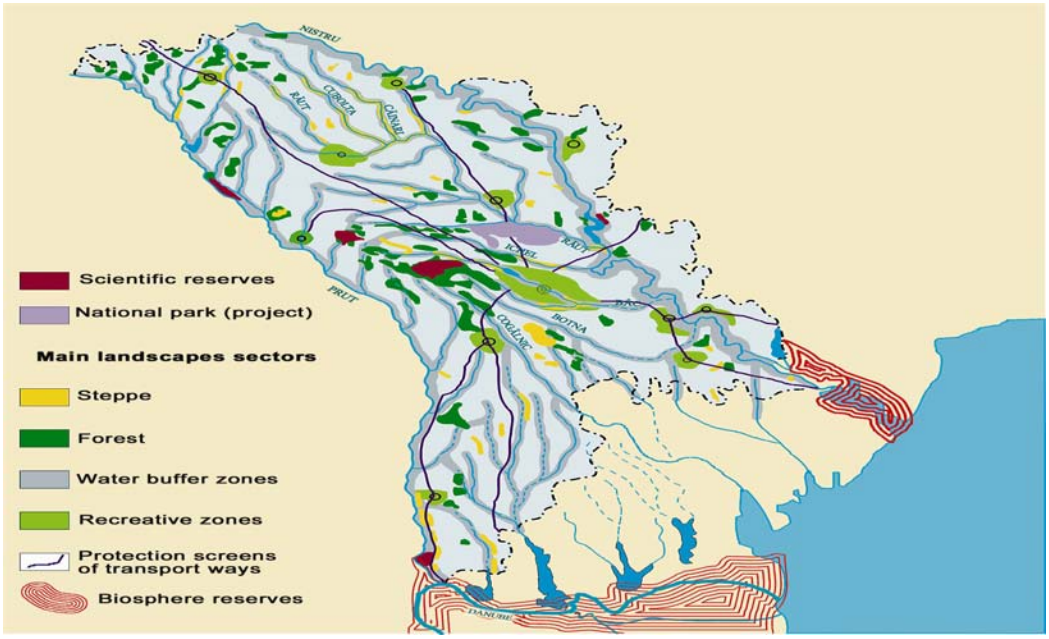
Now the processes of a various degree of degradation are observed in 56.4% of all agricultural lands. The area of erosive lands grows every year by 0.9 %, and the agricultural lands lose 26 mln tons of fertile soil. As a result of this, the annual damage to the economy of the Republic amounts to more than 3 billion leu. The process of degradation of land resources essentially reduces the potential of agriculture and national economy development as a whole.

With the purpose of erosion prevention, improvement of degraded soils, development of heavily degraded soils the Government of the Republic adopted the Program for Land Cultivation and Soil Fertility Enhancement (2003).

Forest resources. Biodiversity preservation.

As on 1.01.05, the lands belonging to the forest fund of the Republic of Moldova occupy the area of 428.5 th.ha (12.6 percent of the country's surface area), including forests – 362.7 th.ha (the forest covering of the territory is 10.7 percent [1, page 19] or 0.11 ha of forests per capita.

The forests are distributed very unevenly: in the Central Zone approximately 60 percent, in Northern zone approximately 26 percent and in the Southern Zone, which is specially subjected to droughts and erosion and which is characterized by lack of water resources, only 16 percent. The map shows the main environment protection territories [11].



Forests of the Republic of Moldova are classified in the first group of protection, since they have exclusively the nature protection functions. However the percentage of forested areas is insufficient to effectively ensure the functions of environmental protection.

Highly dangerous are illegal tree felling and illegal cattle pasturing, as well as pollution of forest fund with household building and other wastes.

In 1992-1999, the illegal tree felling in the forests, which are under responsibility of the state forestry bodies, was approximately 174 thousand m^3, that makes approximately 1400 ha of the area covered with forests. Due to this the forest fund, which is under responsibility of said bodies, has lost approximately 1 percent of the forested areas. At the same time 13 percent of the forests, which belong to other owners [9], were destroyed.

Illegal cattle pasturing, which caused approximately 6 percent of forest losses in 1990-1995, reached significant scale [9] due to livestock increase in private sector.

The forest sector annually delivers to the national economy approximately 360 thousand m^3 of forest. At the same time, the demand of agricultural population in fire wood is satisfied by 70-80 percent [9].

The forests, which belong to other owners, in particular, to local bodies of public administration, make 1.4 percent of national forest fund and are classified under the category of field- and soil-protect. In these forests, which were planted over the last 30-50 years on the lands not suitable for agricultural use, the forest regime is not kept, maintenance is carried out occasionally, the forests suffer from illegal tree felling and illegal cattle pasturing, they are subjected to pollution with waste products, etc.

Pursuing the policy of forests multi-functionality preservation and of rational use of forest production and of adhering to the requirements of the international conventions, the National Strategy of the Long-Term National Forestry Sustainable Development of the Republic of Moldova (2001), the State Program of Forest Restoration and Forestation of the Forest Fund Land for 2003-2020 (2003) have been worked-out.

In the National Report «Goals of the Millenium in the Republic of Moldova », approved by Governmental Decision in 2005, the long-term task has been set: the percentage of the land under forests shall increase from 10.3 % in 2002 up to 13.2 % in 2015.

In the Republic of Moldova the system of the natural territories protected by the state is created and the provisions regarding their organizational structure and fields of activity are prepared. The area of reserves protected by the state is 66467.3 ha or 1.96 % of the country's surface area [11]. Low percentage of these territories as compared with the total territory of the country and their dispersed allocation do not ensure effective preservation of biodiversity.

A series of shortcomings, which complicate preservation of the whole forestry biodiversity, is observed. Highly important are urgent optimization of the network of protected territories, improvement of and adherence to the current legislation, adherence to the rules of forest fund management, carrying out nation-wide actions aimed at restoration of forests, creation of national ecological network, development of regional cooperation with Romania and Ukraine on biodiversity preservation in transboundary reserves and green corridors.

The state policy on the matter of biodiversity preservation is formulated in the National Strategy and the Action Plan for Biodiversity Preservation (2001).

III. Ecological risks related to transboundary use of natural resources.

Transboundary environmental problems in the Dniester River Basin.

The Dniester River is the major river in the west Ukraine and Moldova. It belongs to the Black Sea Basin. The total length of the river is 1362 km. The surface area of the Dniester River Basin is 72. 1 th.sq.km, out of which 52.7 th.sq.km or 73% is within Ukraine, 19.4 th.sq.km or approximately 30% within Moldova. The Dniester River Basin covers significant territories (from 13 to 80%) of 7 regions of Ukraine and major part (59%) of Moldova. The population in the Dniester River Basin amounts to more than 7 mln. people, including more than 5 mln. people on the territory of Ukraine and more than 2 mln. people on the territory of Moldova. 62 urban settlements and 95 rural settlements are situated within the Ukrainian territory of the Dniester River Basin, and 2 municipalities and 41 urban settlements are situated within Moldova on the right-hand and left-hand banks of the river. High density of population, more than 110 people per 1 km^2, is observed in this region.

Main reasons of environmental problems in the Dniester River Basin are related to the political and social-economic factors, including the following:

- Social and economic crisis
- Transnistrian conflict
- Low technological level and heavy deterioration of productive capacities, including fixed assets of environment protection value that does not meet the requirements of ecological safety
- Inefficient use of natural resources
- Shortage of domestic investments
- Out-dated water management system, including organization of water use according to the basin principle
- Insufficient development of social and engineering infrastructure of settlements, including systems of water supply and waste water disposal

Transboundary problems in the Dniester River Basin are caused by the following negative transboundary factors [16, page 61]:

- Transboundary influence of runoff regulation on the quantity of water resources in various sites of the Basin with further negative water-management and ecological consequences

- Transboundary influence of physical, chemical and microbiological pollution runoff regulation on the condition of hydrobiological resources, in particular on the ichthyofauna, in the direction Ukraine - Moldova
- Transboundary influence of chemical and microbiological pollution on the water quality and on the condition of ecosystems
- Influence on the Black Sea ecosystem due to polluting substances, which inflow with the Dniester River runoff
- Negative influence on landscape and on biodiversity of the Basin, including the unique marshes reserves in the lower reaches of the Dniester River

The main sources of the Dniester River Basin pollution from the side of Ukraine are mining, chemical, machine engineering, oil refining enterprises, etc.

The majority of ecologically hazardous enterprises are situated in the upstream Dniester (in Lvov and Ivano-Frankovsk Regions), where 70 % of runoff is formed. In Lvov and Ivano-Frankovsk Regions there are four powerful mining and chemicals enterprises (Mining and Chemicals State-Owned Plant GGKhP "Sera" (Rozdolskoye), Mining and Chemicals State-Owned Plant GGKhP "Polymineral" (Stebnitskoye), State-Owned Mining Enterprise GGRP «Podorozhnensky Rudnik», State-Owned Enterprise GP «Potash Factory», JSC OAO "Oriana"), which negatively influence the environmental condition of the Dniester River and permanently threaten the recurrence of ecological disaster [16].

On the side of Moldova the main sources of pollution are the enterprises of energy sector, building materials manufacturing, metallurgical works in Rybnitsa, cement works in Rezin, as well as public utilities and others.

Transboundary environmental problems in the Prut River Basin

The total surface area of the Prut River Basin is 27540 km^2, out of which 8300 km^2 are within the territory of Ukraine, 10900 km^2 within Romania and 8250 km^2 within the Republic of Moldova.

The length of the Prut River within the territory of the Republic is 695 km, with approximately 800 thousand inhabitants living within the river basin. The major towns are Rakhul (44 thousand people), Ungeni (40 thousand) and others.

The pollution problems of the Dniester River are generally typical for the Prut River too.

- Unsatisfactory water quality, including the drinking water supplies
- Unsatisfactory sanitary - ecological and hydrological condition of small rivers in the Prut River Basin
- Decrease of biodiversity in the water ecosystems of the Basin
- Low technological level and high degree of deterioration of water-treatment facilities or their absence, and as a consequence, discharge of polluted effluents
- Insufficient development of social and engineering infrastructure of settlements, including systems of water supply and waste water disposal
- Out-dated water management system, including organization of water use according to the basin principle

Based of a bilaterial agreement (between Romania and the Republic of Moldova), the monitoring of superficial waters quality of the Prut River is carried out jointly.

The control of quality of superficial waters of Prut is carried out by the Public Hydrometeorological Service and the territorial environmental agencies.

In the Republic of Moldova the emergencies early warning system is available on the transboundary Prut River only. The reason is that the Prut Basin is a part of the Danube Basin and this AEWS warning system has been developed and operates in continuous mode only for the Danube Basin.

The Warning Center in the Republic of Moldova has got the identification number P-10 and is situated in the Telecommunications Division of the Public Hydrometeorological Service where the experts and the trained personnel are on 24 hr duty.

Unfortunately, on the other transboundary river Dniester such warning system is not available that complicates operative information exchange, prevention or warning in case of transboundary technical incidents or extremely high pollution.

Necessity of such system operation in the Dniester became evident during the incident involving pollution of a Sivka River affluent with calcium hypocloride at the end of December, 2005.

The Ukrainian Party, according to the requirements of the international conventions, should immediately inform the environment protection bodies of Moldova on the pollution of the Dniester River. However, the explanation regarding the case of pollution has been made only upon official inquiry from the Ministry of Ecology and Natural Resources of the Republic of Moldova.

To solve the problems of transboundary water resources pollution and for sustainable management of transboundary water-courses, it is necessary to develop both strategic documents and undertake concrete actions with involvement of corresponding bodies of Ukraine, Romania, Moldova, including representatives of the Transnistrian region, and to carry out joint projects with participation of the international organizations in order to diminish the risk of instability in this region.

Transboundary pollution of atmospheric air

Geographically situated between the industrial countries, the Republic of Moldova is polluted with harmful substances by transboundary transport of the polluted air masses actually from all directions. 60-80 % of atmospheric precipitations come from the border countries. 60-70% of emissions from local sources with high smoke flues are transported with the air masses outside the Republic.

The transboundary impact on the air is manifested in:

- Hotbed effect;
- Depletion of ozone layer;
- Acid rains.

External sources of pollution influence the air basin and any external industrial incident can aggravate the ecological situation in the country.

Given that the air quality in the urban settlements actually levels maximum allowable concentration, any industrial incident can grow into ecological disaster.

V. Transboundary cooperation

The international cooperation of the Republic of Moldova at regional level is based on bilateral agreements in the field of preservation of the environment, concluded with Romania, Ukraine and Belarus. These agreements stipulate the creation of joint working groups with the purpose of coordination of the activity in the field of preservation of the environment and sustainable use of natural resources.

The Republic of Moldova borders with Ukraine and Romania and jointly uses the water resources: of the Dniester River - with Ukraine; of the Prut River- with Romania.

Joint regulation of water resources, environment protection is carried out on the basis of agreements on cooperation, which are voluntary initiatives of the governments of the countries or of the environment protection ministries. Among them there are:

The Agreement between the Government of the Republic of Moldova and the Government of Ukraine on Cooperation in Joint Use and Protection of Boundary Waters (1993.) A Draft Agreement with the Government of Ukraine on Cooperation in Fish Resources Protection and Fishery Regulation in the Dniester River Basin has been worked out.

The Agreement between the Ministry of Ecology and Natural Resources of the Republic of Moldova and the Ministry of Water and Forestry Resources and Environment Protection of Romania in the field of Environment Protection and Sustainable Use of Natural Resources (1997).

The Interstate Program of Long-Term Economic Cooperation between Ukraine and the Republic of Moldova for 1998-2007, in which the joint actions on environment protection are planned as well (1998).

The Agreement between the Ministry of Ecology and Natural Resources of the Republic of Moldova, the Ministry of Water and Forestry Resources and Environment Protection of Romania and the Ministry of Environment and Natural Resources of Ukraine on Cooperation in the Nature Territories under Special Protection, which are situated in the Danube and the Lower Prut Rivers delta (2000).

The Agreement between the Government of the Republic of Moldova and Romania on Cooperation in the Field of Fish Resources and Fishery Protection in the Prut River Basin and in the Water Reservoir of Stynka-Kosteshti (2003).

The Action Plan Republic of Moldova - European Union (2005) provides for wider political dialogue and cooperation on foreign policy matters and safety**.** For this purpose it is necessary:

- To continue and develop political dialogue and cooperation with the European Community regarding the solution of the Transnistrian problem, and on the regional and international issues, within the framework of the Council of Europe and the OSCE as well.
- To cooperate with the EU in order to increase the efficiency of institutions and multilateral conventions, thus strengthening global management, co-ordination of actions in the field of elimination of threats to safety and solution of developmental problems.
- To promote cooperation for ensuring enforcement of the EU sanctions.
- To carry out an active dialogue between Moldova and the EU in the field of implementation of the European security strategy.
- To expand opportunities for Moldova joining the declarations concerning foreign policy and collective safety in the EU.

The Ministry of Ecology and Natural Resources concluded a number of agreements on cooperation with its counter-parties in China, Italy, Poland, Estonia, Latvia. Within the framework of the Program of Economic Cooperation between the Republic of Moldova and the Russian Federation for 1999-2008 the cooperation is carried out in the field of environment protection.

Problems of the transboundary environmental pollution, of adequate use of natural resources can be solved by joint efforts only, promoting cooperation and applying in decision-making the standard international norms and rules.

Cooperation in the field of environment protection can become a powerful tool of conflicts prevention, of establishing mutual understanding and keeping good-neighbourhood, including creation of models of collaboration and cooperation, which may be applied in the other regions in the future.

VI. Further steps

To solve the environment and safety problems in the Republic, a complex approach is required.

The transboundary character of environmental pollution determines the promotion of regional cooperation for relief of ecological tension and of threat to safety, which is caused by it.

With the purpose of environment protection and safety ensuring it is necessary:

- To strengthen political will at interstate and international levels
- To promote uniform regional policy on prevention of transboundary pollution and conflicts
- To actively participate in the UNEP / UNDP / OSCE Initiative on the Environment and Safety, considering it as a joint mechanism bringing the solution to the problems of safety, environment and regional development
- To work-out a strategic document on the development in the Republic of the process of environment protection and safety
- To improve legislative and normative base taking into consideration the European instructions and standards
- To strengthen executive discipline
- To intensify transboundary cooperation
- To promote national and transboundary monitoring and information control systems
- To promote adoption of the safety factor in the business management practice
- To implement interstate measures basing on the successful experience

Structure of the Ministry of Ecology and Natural Resources

The Ministry components are:

- The National Institute of Ecology (subordinated to the Academy of Sciences of Moldova and to the Ministry of Ecology and Natural Resources)
- The State Ecological Inspectorate with environmental agencies "Nord", "Centru", "Sud", “ Gagauz Autonomous Territory ”
- The Public Service Hydrometeo
- The State Agency on the Geology of the Republic of Moldova "AGeoM".

With the purpose of implementation of the policy of European integration, changes were made in the structure of the Ministry: the Division of Science, Technical Assistance and European Integration has been established.

The Ministry of Ecology and Natural Resources is the central authority of public management in the branch and together with the subordinated organizations works-out and pursues the policy and the strategy of the State in the field of environment protection and rational

use of natural resources, ensures environment protection, regulates the use of natural resources, performs monitoring of environment components quality, etc.

Each subordinated division of the Ministry is given certain functions and implements relevant tasks in the field of protection and sustainable use of natural resources.

The State Ecological Inspectorate (with territorial divisions) performs the state control and supervision of adherence to legislative and statutory acts in the field of environment protection and use of natural resources (except for underground resources and underground waters) by economic agents of any type of ownership and from any department, and by physical persons too, including foreign ones; issues environment protection permits to economic agents, carries out the state ecological expertise and monitoring of environmental factors.

The State Agency on the Geology of the Republic of Moldova "AGeoM". The agency organizes the works of mineral and raw-material base development, geological study of underground resources, coordinates the issues related to granting the right to use mineral resources; maintains the Republic Fund of Geological Information and Mineral Reserves Balance, performs the departmental control over protection and rational use of mineral resources.

The Public Hydrometeorological Service. The main tasks of the Service are:

- Organization of ecological monitoring, collection, analysis and systemic supply of information regarding condition and quality of environment;
- Observation, making and distributing the forecasts: meteorological, agro-meteorological, hydrological, level of atmospheric air pollution;
- Forecasting the dangerous meteorological phenomena and warning the state authorities, the population, the economic agents on the character and the dimensions of possible dangerous meteorological phenomena etc.

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