

REPUBLIC OF MOLDOVA



CHILDREN'S HEALTH AND ENVIRONMENT IN THE REPUBLIC OF MOLDOVA



CHISINAU, 2010

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Vladimir HOTINEANU,
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FOREWORD



Gheorghe SALARU,
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The relationship between human activities and the environment, as well as the impact of the environmental factors quality on human health, has been and up to date continues to be as topic for discussions at various levels, including international one.

By the approval in 1984 of the World Health Organization Global Strategy Health for All, was officially recognized the direct human health dependence of environmental components condition. This document served as a basis for initiation of a Pan-European process of cooperation and holding the first European Conference on Environment and Health (Frankfurt, 1989). In the framework of the following three conferences (Helsinki, 1994; London, 1999; Budapest, 2004) have been approved a series of documents that clearly contributed to strengthening of the European cooperation on environmental protection and health. They have essentially enhanced the common cooperation effect of environmentalists, doctors, NGOs and civil society on public health and the environment issues at international, national, regional and local levels.

The Fifth Ministerial Conference on Environment and Health entitled “Protecting children’s health in a changing environment” to be held in Parma, Italy (10-12 March, 2010), has the overall goal to estimate the progress made towards achieving the environmental health goals trough solving or reducing the problems related to: impact of water pollution, air and soil on health; improving the informational system of socio-hygienic monitoring; social and economic inequity and gender; implementation of National Strategies on Children’s Health and Environment; investment in health and environment; partnership with interested stakeholders; measures to mitigate the consequences of climate change. Being a country with economy in transition, the Republic of Moldova continues to face difficulties in solving these major problems.

This report, was prepared for the Fifth Ministerial Conference on Environment and Health and it represents the result of joint activities of a team of scientists and specialists from the Ministries of Health and Environment. The report reflects the current situation on public health in the country, including children's health, and the impact of environmental factors on their health, as well as an overview of national priorities, policies and activities that were conducted to improve the existing situation.

The documents that will be approved during the Fifth Ministerial Conference, discussions, experience sharing and this national report, will serve as a basis for further strategies on children's health and the environment to be approved by the Republic of Moldova.

We do believe that our partners and colleagues, who are interested in the progress made by the country from the previous Ministerial Meeting on Environment and Health, will find this report very useful.

Also, we are convinced that only through joint efforts and involving all interested stakeholders in this process, the environmental quality factors for a better health in Europe, including Moldova, will be improved.

Also, we would like to express our special gratitude to UNEP / OSCE for supporting the elaboration of this report.

Vladimir HOTINEANU,
Minister of Health

Gheorghe ŞALARU,
Minister of Environment

The Republic of Moldova is convinced that it can and must develop in sustainable way its economical and social areas, inclusively by creating a healthy environment and, thus, to be placed among European Community countries.

I. BACKGROUND INFORMATION

1.1 GEOGRAFIC LOCATION AND CLIMATE

The Republic of Moldova is located in the South-Eastern Europe with an area of 33.8 thousand km² and borders in the North, East, and South with Ukraine and Romania in the West.

The Republic's landscape is generally hilly, gradually sloping from the North-West to the South-East, with altitudes varying between 5 and 429 m.

The climate is temperate-continental. The average temperatures range between -3.5°C in January and +21.4°C in July. The climate distinguishes by a relatively large number of warm and sunny days – 160-190 annually.

The annual rainfalls reduce by intensity from the North-West to the South-East, from 773 mm down to 444 mm respectively.

Moldova is part of the Black Sea watershed and has a large system constituting of more than 3000 rivers and streams. The two largest rivers are the Dniester and Prut, originating in the Carpathians. The country has also direct access to the Lower Danube areas.

The natural resources are little varied. The main natural value is the soil represented by different types of chernozem. The main mineral resources include the construction ones: limestone, clay, loam, sand, granite, and grit stone.

The population of the Republic of Moldova as of January 1, 2009 was 3.567, 5 thousand residents, out of which 48.2% men and 51.8% women. 1.476,1 thousands of the total population are urban residents and 2091,4 thousand are rural residents. The population density is 111.2 people per km².

Climate resources. The geographic position determines the radiation, thermal resources, the specifics of air circulation, atmospheric processes and the climate complex altogether. The solar irradiation has a real duration of 50-55% and varies between 2060 hours in the North and 2330 hours in the South.

The climate resources are especially determined by the atmospheric circulation generated in baric centres at long distances from the republic's territory. The atmospheric circulation is characterized by movement of cold air masses from the Atlantic to the East and the warm and humid air from Mediterranean Sea. Sometimes, relatively cold and dry air masses appear from Northern latitudes.

The specific peculiarities of the atmospheric circulation regime are mainly the anticyclones with a relatively weak activity of atmospheric processes, with a diversity expressed in exchange of seasonal circulations.

The wind regime is formed under the influence of baric gradients having a direct reflection on the atmospheric circulation, strongly influenced by the active layer of the surface in the modification of wind speed, direction, and duration.

Precipitations, especially abundant liquid (80%), are characterized by an essential variability in time and space.

The average temperature of 10°C per day-night sets in April. The period of active vegetation lasts 165-195 days.

The torrential rains, draughts, desertification processes, strong winds, hails, spring and autumn frosts are unfavourable phenomena frequently met on the Republic's territory. The territory of the Republic is also exposed to some unfavourable natural processes and phenomena: erosion, land sliding, earthquake, etc.

1.2. GENERAL SOCIAL-ECONOMIC INDICATORS

The evolution of economic and social indicators during 2004-2008 revealed a trend of economic growth and people living standards improvement, in terms of upward development of agriculture, foreign trade and retail trade, communications and some services. The population income increase, both through wage increase and remittances from citizens working abroad, had a positive influence on service sector development and contributed to the appreciation of national currency in relation to the U.S. Dollar and Euro. A considerable increase of foreign direct investment in the national economy was registered.

However, the economical development was periodically threatened by money and foreign exchange market evolutions and continuous fluctuations in the world energy and food products prices. This is explained by strong dependence and vulnerability of the country's economy to external factors.

Thus, in 2006, Moldova faced two economic shocks that have demonstrated and exacerbated the external vulnerability. At the beginning of the year the gas prices went up, while in March restrictions were introduced on exports of Moldovan alcoholic products to Russian market. Under these circumstances, the decrease of agricultural and industrial production volumes has slowed down the GDP growth. At the same time, the deficit of the balance of payments has grown significantly and the inflation processes have intensified. Nevertheless, despite the unfavourable external factors, in 2006, the Government succeeded to prevent the economic decline and to fulfil its internal and external commitments.

The efforts on improvement the management of public finances continued in 2008. Actions taken in this regard aimed at creating the necessary background for shifting to a more efficient level of planning and management of public finances, as a condition for efficient activity of public sector management, securing the social rights of the population and improving the quality of social infrastructure. The total income of the state budget in 2008 was 25,5 milliard MDL against 26,1 milliard MDL of expenditures. However, the public expenditure policy remained socially oriented, so that at the end of the year the social sphere received 66.9% of the state budget.

The most important achievements from 2004-2008 are presented in the following table.

Table 1

Key macroeconomic indicators for 2004-2008

| Indicators | Unit of measurement | Years | | | | | |
|-----------------------------------------------------------------------|---------------------|--------|--------|--------|--------|--------|------|
| | | 2004 | 2005 | 2006 | 2007 | 2008 | |
| Nominal GDP | million MDL | 32032 | 37652 | 44754 | 53430 | 62840 | |
| | million USD | 2998 | 2988 | 3408 | 4402 | 6048 | |
| GDP as against the previous year | % | 107,4 | 107,5 | 104,8 | 103,0 | 107,2 | |
| GDP as ratio per 2000 | % | 131,0 | 140,8 | 147,6 | 152,0 | 162,9 | |
| GDP per capita: | MDL | 8890 | 10475 | 12483 | 14937 | 17602 | |
| | USD | 721 | 831 | 951 | 1231 | 1694 | |
| Annual average of Consumer Price Index (as against the previous year) | % | 112,4 | 111,9 | 112,7 | 112,3 | 112,7 | |
| National currency exchange rate | MDL/USD | 12,33 | 12,69 | 13,13 | 12,13 | 10,39 | |
| Export | mil. USD | 985,2 | 1091,3 | 1051,6 | 1341,7 | 1591,4 | |
| Import | mil. USD | 1768,5 | 2292,3 | 2693,2 | 3689,5 | 4898,8 | |
| National public budget Incomes as against GDP | mllion MDL | 11408 | 14528 | 17827 | 22292 | 25488 | |
| | % | 35,6 | 38,6 | 40,5 | 41,7 | 40,5 | |
| Expenditures as against GDP | mllion MDL | 11526 | 13940 | 17978 | 22416 | 26119 | |
| | % | 35,1 | 37,0 | 40,8 | 41,9 | 41,5 | |
| Industrial production (at current prices) | million MDL | 17591 | 20770 | 22243 | 26174 | 29655 | |
| Agricultural production (at current prices) | million MDL | 11819 | 12688 | 13695 | 12825 | 16410 | |
| Fixed capital investments (at current prices) | million MDL | 5140 | 7189 | 9580 | 15180 | 17710 | |
| | - as against GPD | % | 16,0 | 19,1 | 21,7 | 28,4 | 28,2 |
| | - as against 2000 | % | 141 | 171 | 2,1 | 2,5 | 2,5 |
| Volume of retail trade turnover, by all ways of sale | million MDL | 16576 | 19488 | 23361 | 28220 | 34684 | |
| Service sales volume, provided to population | million MDL | 6970 | 8210 | 9964 | 11568 | 13152 | |
| Average nominal monthly salary per employee in economy | MDL | 1103,1 | 1318,7 | 1697,1 | 2065,0 | 2529,7 | |
| Average monthly pension (by the end of the year) | MDL | 325,3 | 383,4 | 442,7 | 546,2 | | |
| Registered unemployment (by the end of the year) | thousand persons | 21 | 21,7 | 20,4 | 18,9 | 17,8 | |

A real slow rate of growth of economic activities and, consequently, of the development of the country's social and economic indicators started in October 2008. This is explained by the negative impact of global financial crisis and recession in major economies worldwide.

This negative influence continued in 2009. As a result, the volume of industrial and agricultural production, foreign and internal trade, transportation of goods, investments and budget revenues has considerably decreased.

Under these circumstances, the new government proposed to implement a series of economic recovery measures, oriented towards:

- effective development of the private sector (through simplification of business launch procedures, facilitating the flow of credit, removing unjustified barriers to trade, etc.), which will provide jobs for those who lost them during economic crisis;
- accelerating structural reforms;
- recovery of the real sector of the economy by attracting foreign direct investment in the national economy;
- promotion of prudent fiscal policies and reforms designed to reduce inefficient public expenditures;
- protect the financial sector, through a more prudent regulation and maintain stability in the foreign exchange market;
- optimize the import structure by substitution of imported goods nationally produced ones;
- real growth of population's living standards, etc..

Nowadays, besides the efforts to stabilize the economic situation of the country, the Government of the Republic of Moldova tends to achieve the main objective of the state economic policy: to strengthen the sustainable economical growth potential in order to reduce the poverty and improve the population's quality of life.

To achieve this objective, the Government oriented its basic activities towards: (i) removal of administrative constraints for business; (ii) demonopolization of internal market and removal of anti-competitive practices in commercial trading; (iii) ensuring the reliability growth between public and private sectors and securing the rights to private property and private investments; (iv) ensuring the conditions for business financing at a reasonable cost; (v) providing incentives for capital market development.

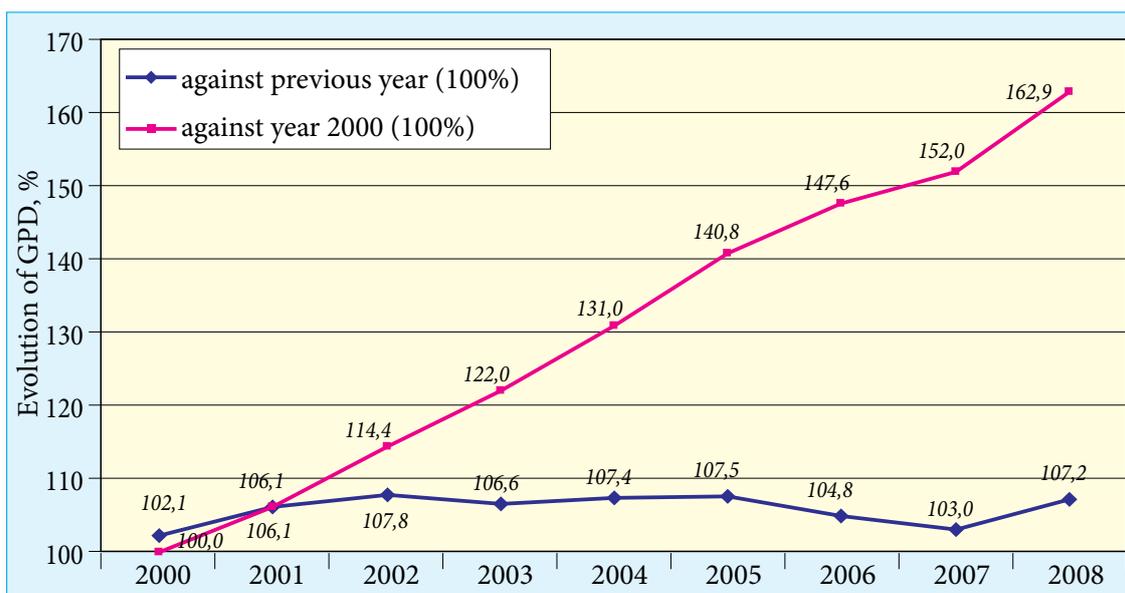


Figure 1. Evolution of the Gross Domestic Product

1.3. MEDICO-SOCIAL ASPECT OF MIGRATION PROCESS

In the Republic of Moldova the migration has a socio-economical aspect, that to a large extent is determined by the economic crisis manifested by unemployment, and/or lack of decently paid work, which would cover or meet certain needs of citizens. Although the migration process has always existed, the social and economic changes over the past 15-18 years, resulting from social reforms, transformed the internal and external migration into one of those human phenomena where the public health is deeply involved.

The official statistics (Table 2) ascertains that the labour migration (inclusively for the purpose of seeking employment) of citizens from rural area is about 67,5%, out of which women's weight is 32,1%. More than 1/2 of emigrated persons or 61,3% are married persons and often this percentage includes both spouses/parents.

Table 2

Distribution of migrants according residential areas, sex, marital status

| Distribution of migrants | Residential area | | | Sex | | |
|--------------------------------|------------------|-------|-------|-------|-------|-------|
| | Urban | Rural | Total | Men | Women | Total |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Total (thousand people) | 103,6 | 214,7 | 318,3 | 210,0 | 108,3 | 318,3 |
| Sex (%) | 100,0 | 100,0 | 100,0 | - | - | - |
| Men | 62,0 | 67,9 | 66,0 | - | - | - |
| Women | 38,0 | 32,1 | 34,0 | - | - | - |
| Residential areas (%) | - | - | - | 100,0 | 100,0 | 100,0 |
| Urban | - | - | - | 30,6 | 36,4 | 32,5 |
| Rural | - | - | - | 69,4 | 63,7 | 67,5 |
| Marital status (%) | 100,0 | 100,0 | 100,0 | 100,0 | 100,0 | 100,0 |
| Single | 25,4 | 33,8 | 31,0 | 36,1 | 21,3 | 31,0 |
| Married | 63,0 | 60,4 | 61,3 | 61,9 | 60,1 | 61,3 |
| Widow/widower | 3,4 | 1,9 | 2,4 | 0,5 | 6,0 | 2,4 |
| Divorced | 8,2 | 3,9 | 5,3 | 1,6 | 12,6 | 5,3 |
| Education level (%) | 100,0 | 100,0 | 100,0 | 100,0 | 100,0 | 100,0 |
| Higher | 15,1 | 6,0 | 8,9 | 7,3 | 12,1 | 8,9 |
| Secondary with specialty | 18,1 | 11,4 | 13,6 | 11,1 | 18,4 | 13,6 |
| Secondary Professional | 33,5 | 27,9 | 29,7 | 33,2 | 22,9 | 29,7 |

Increase of unemployment weight leads to job insecurity and points out the disequilibrium in the labour market, having also social consequences for family welfare and children's health. Approximately 33% of registered unemployed persons in the country are youth aged 15-24 years and their number increased by 20 times since 1992. It is obvious that migration is a factor for unemployment reduction. The unemployment rate would be higher if there wasn't labour-intensive migration. A survey, carried out in the late 1990s showed that 3,2% of the interviewed persons expressed their intention for employment overseas. However, according to the findings of the same survey conducted recently, 42,7% of unemployed respondents replied that they intend to find a labour place overseas. This indicates that the level of migration process, started in the past, is keeping its magnitude nowadays.

Qualitatively, the implications of migration process from demographic perspective are multidimensional: they affect the demographic, social, economic, reproduction, fertility, marriage and divorce structures. The disparities created in the demographic structure led to the depopulation in rural areas, violation of the compatriots' rights living abroad, juvenile delinquency of the children left home without parental supervision, etc.

The study conducted by UNICEF suggests that circa 30% of teenagers want to leave the country. There are no reliable statistical data on rural migration, but it is estimated that in some villages about 40% of the working population moved abroad or in urban areas. This process affected the most those rural areas where the share of families formed after one parent's leave is very significant. Often the parental care of the left-behind children is provided by grandparents, relatives or neighbors. Many of them suffer from malnutrition, leave the school or "go to the streets" (are socially excluded). Such situations are negatively affecting the education of those children who due to left behind of parental care and supervision are vulnerable to behavioral, physical and psychological risks. Diminution of the moral and spiritual ties, lack of psychological contact between parents and children hinder the normal socialization of the children.

The International Labor Organization provides data of surveys on negative social effects of the labor migration, conducted among labor migrants. Thus, the social-moral role of the family was confirmed by 33,1% of respondents; the family disintegration process was reported in 13,8% cases; deterioration of academic performances, both for secondary and higher level students, were reported in 17,3% of migrants' families; negative effects of migration on children's emotional and psychological well-being was reported in 12,5% cases; adult family members' violent behavior was reported in 11,8% cases; worsening of labor migrants' health was confirmed in 21,5% cases.

The destabilizing conditions of negative psychological climate in families are contributing to the ignorance of parents' basic functions and as result children are affected by the following deficiencies:

- Reduced growth and physical development, as compared to their peers;
- Poor personal hygiene and sanitary regime, being exposed to a higher risk of illness, trauma;
- Untimely treatment of diseases and injuries;
- Lack of medical care, particularly dental care;
- Lack of parental supervision, so much needed in this period, etc.

At the age of 3-7 years children's health is influenced primarily by social and hygienic factors (about 36,0% to 39,4%), followed by balanced nutrition and behavior regimen (about 36,0% to 37,8%) and medical factors (about 22,9 to 19,8%). It is necessary to mention the importance of kindergarten attendance (0,8% to 0,6%), the mother's educational background (0,5% to 0,7%), frequency of illness during the first two years of life, etc.

Worsening of children's health in the last decade remain in medical attention. There has been registered an augmentation of number of such diseases as anemia - by 1,3 times, endocrine affections - by 1,5 times, osteomuscular diseases - by 1,5 times.

The overall infant mortality is determined by increased chronic morbidity, increased disability, deviations in mental status of the young generation, augmentation of the number of children with difficulties in adaptation, affected indices of physical development.

These trends are defining the situation in the country. Consequently, the nutrition deficiencies lead to precarious health condition, low resistance to infections and NOx emissions, diminution of physical activity and intellectual performances, difficulties in adaptation to the requirements of physical and psychosocial environment. Also the nutrition deficiencies are stimulated by the affected social status of the family, the fact of being left behind by one or both parents, low-quality food, impact of the ecological factors, new requirements in educational process, etc.

It is worth to mention, that the migration process involves young people, economically active and having the fertile age. This fact leaves a negative imprint on medical and social situation in the country (Table 3), as well as on intra and extra family phenomena and negatively impacts the demographic processes.

Table 3

Distribution of migrants according socio-demographic characteristics and immigration countries

| | <i>EU 27 Countries</i> | | <i>Russia</i> | <i>Other</i> |
|---------------------------------------------------------------------------------|------------------------|------------------------|---------------|--------------|
| | <i>Total</i> | <i>including Italy</i> | | |
| Number of migrants, thousand persons | 91,5 | 58,1 | 195,5 | 31,2 |
| Average age, years | 37 | 38 | 34 | 36 |
| Weight of young migrants (15-24 years), % | 16,6 | 16,4 | 23,1 | 22,5 |
| Situation before migration, economically active persons, % out of which: | 100,0 | 100,0 | 100,0 | 100,0 |
| employed | 40,7 | 40,2 | 33,7 | 32,4 |
| unemployed | 39,2 | 35,7 | 55,8 | 42,2 |

It was determined that simultaneously with diminution of birth rates in Moldova, the number of extramarital births have increased. In this regard the migration process played its role in weakening the family ties (Figure 2).

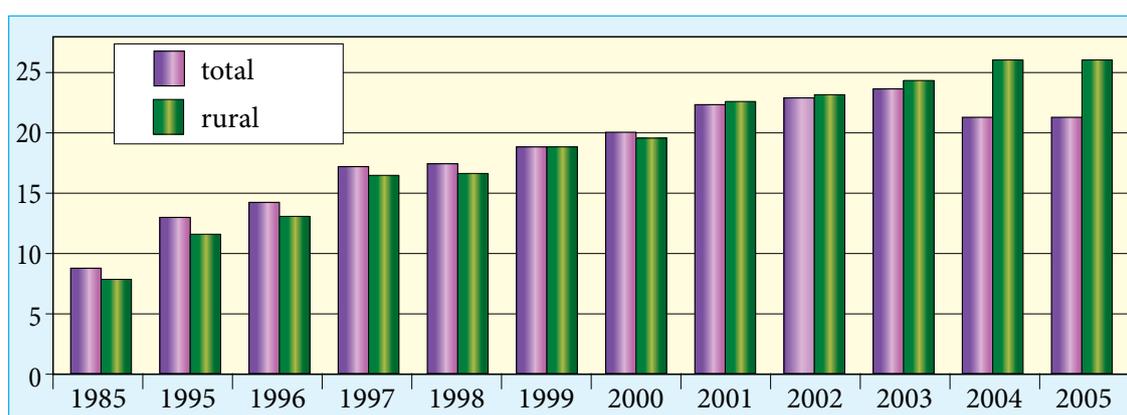


Figure 2. Dynamics of extramarital births

II. NATURAL RESOURCES

The natural resources represent an essential component of the national patrimony. The regime of their use determines to a great extent the state of environment.

2.1. WATER RESOURCES.

The main water supply sources of the Republic of Moldova are Dniester River, which covers circa 54% of the total water quantity, Prut River – 16%, other sources of surface water – 7% and groundwater sources – 23%. The water is also supplied through about 5 thousand boreholes and 132 thousands of wells taking their water resources from phreatic layer.

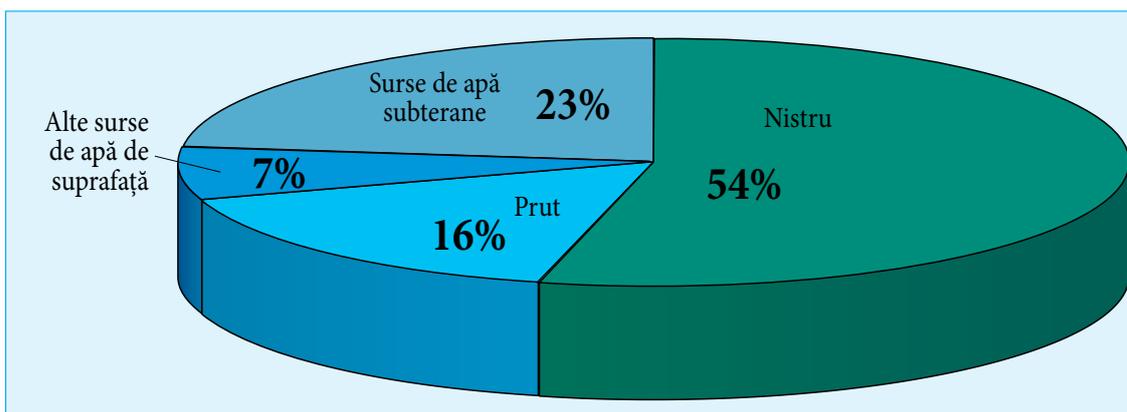


Figure 3. Water resources (%)

The average multi annual stock of country's rivers is estimated at 13,2 billion m³. The Dniester covers 77-80 % of these resources. The ground waters reserve is estimated at about 2,8 billion m³. Thus, theoretically the water potential is about 16 billion m³, i.e. 3700 m³/per capita annually. However, the available potential is approximately 1100 m³/per capita per year, which ranks the Republic of Moldova among the countries with relatively poor water resources.

Investigations showed the quality of the water in Danube, Dniester, and Prut Rivers has not suffered essential changes during the last years and fits within the quality classes II and IV. The oxygen regime is generally satisfactory, excepting some cases of insufficient dissolved oxygen during the summer time.

During the heavy floods in the summer of 2008, the water chemical composition of the Dniester and Prut rivers hasn't been essentially changed. The concentration of heavy metals Hg, Pb, Cd didn't exceed the permissible limits, while the increased content of biogenic substances in the water was explained by adjacent land erosion by pluvial waters.

According to the quality analysis of underground waters there were determined ions of ammonia, nitrates and considerable quantities of nitrites (sometimes exceeding the MAC). In some of the Southern districts of the country high level of nitrogen compounds in the underground water may be originated from natural factors. According to statistics as of 01.01.2007 the general exploited reserves of underground waters in Moldova have been estimated at 3,468 thousand m³/24h.

Serious sources of underground water pollution are the following: the waste disposal close to water sources, infiltrations from landfills, non-functioning of wastewater treatment plants, digging of holes for unauthorized disposal of household waste, drains along the roads, etc.

In order to implement the priority objectives on population's water supply and sanitation, the Strategy on Water Supply and Sanitation of the Localities in Moldova and the Program on Water Supply and Sanitation of the localities in Moldova by 2015 were approved in 2007. These documents contain specific measures for selected localities to be implemented by local and central public administration bodies.

2.2. THE SOIL

From the perspective of economic security, the Republic of Moldova has the sufficient amount of pedoclimatic resources, with a valuable potential for regeneration and sustainable development of agriculture.

The soil is mainly composed of chernozem - about 73%, forestry soil and soil of the river valleys approximately 11% each, colluvial soil – about 4%.

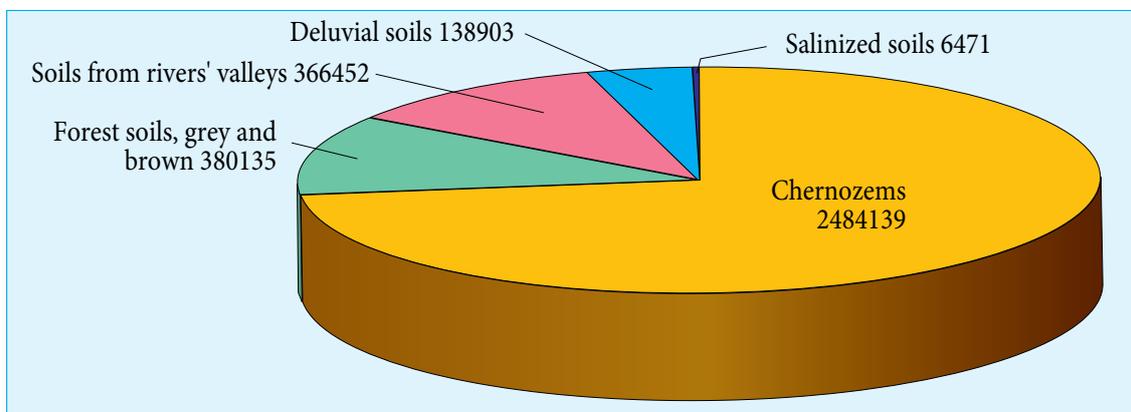


Figure 4. Soil Resources (ha)

During transition to the market economy and reforms in agricultural sector carried out in 1990s, the breakdown of land stock between the land owners has changed substantially. Per types of ownership, the land stock divides as follows: state property – 22,8%, public ownership of territorial administrative units – 21,9% and private ownership – 55,3%.

The economic and energy crisis, implementation of agricultural reforms, along with appearance of many land owners that didn't have the necessary agricultural equipment and specialized knowledge, use of old technologies and the drastic reduction of fertilizers (organic and mineral), wear and tear of irrigation systems - have all led to intensified process of soil degradation.

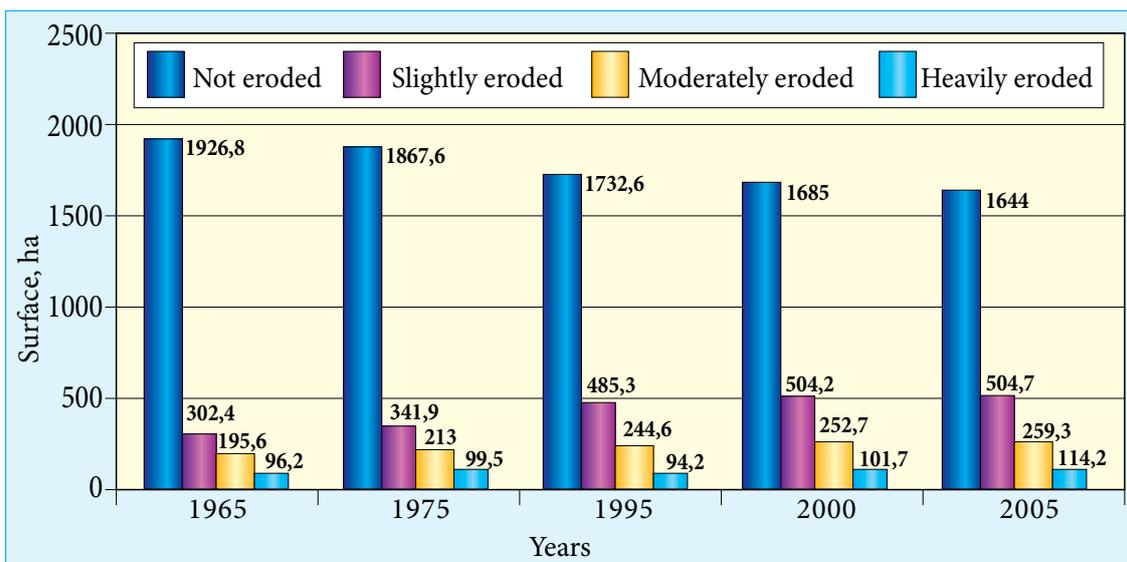


Figure 5. Soil Erosion (thousand ha)

The soil degradation is also conditioned by erosions, ravines, landslides, and floods. The eroded soils occupy about 877 644 ha, out of which 504 777 ha are slightly eroded; 259 332 ha are moderately eroded and 114 165 ha are heavily eroded.

A negative influence is also produced by the soil dehumidification processes. The humus content in the majority of agricultural land has decreased to 1,8 – 2,0%. These soils can be improved by use of chemical and organic fertilizers, the application of which has essentially decreased during past years.

2.3. FLORA

The country's flora is diverse. It has 5513 plant species: vascular plants -1989 species, non-vascular plants -3524. According the floristic composition forest ecosystems are the richest, followed by steppe ecosystems. The landscape diversity includes: forests, steppes, meadows, rocky and aquatic areas.

Forests: The forests are one of the main renewable natural values and have a special strategic importance, being a part of the natural heritage.

The Republic of Moldova falls within the category of countries with a small area covered by forest. In early 2008 have been registered 440,1 thousand ha of forestry plantations, which is 13.0% of the country's territory.

The forest flora includes 1008 species of vascular plants, of which 60 are included in the Red Book of the Republic of Moldova. The Republic's forests fall within the 1st functional group, having exclusively an environmental protection function.

The Millennium Development Goals, the Strategy for Sustainable Development of National Forestry and the Law on Improvement of Degraded Lands through Forestation – all these documents foresee the extension of areas covered by forestry vegetation up to 15%. Concrete steps are undertaken in this direction. During 2004-2009 on annually basis, in line with the Program for greening the country, elaborated under the National Day “A Tree for Our Lasting”, were carried out forestation activities having as aim restoration and stopping the soil degradation, were planted forestry protection belts of agricultural fields, etc. In this period the forestry enterprises planted new forests and renewed the old ones.

In order to implement the Program's activities the National Environmental Fund has allocated circa 9168,0 thousand MDL in 2006; circa 13087.0 thousand MDL in 2007; circa 8701,0 thousand MDL in 2008 and circa 5214 thousand MDL in 2009.

The aquatic and paludal vegetation is less widespread. Its area constitutes 94,6 thousand ha or 2,8% of the country's area. This area has considerably reduced during 1960-1980, because of drainage works and straightening the riverbeds of small rivers.

2.4. FAUNA

The fauna of the Republic of Moldova comprises 14800 of animal species: 461 vertebrate species and 14339 invertebrate species. The vertebrate fauna comprises 70 species of mammals, 281 species of birds, 14 species of reptiles, 14 species of amphibians and 82 species of fish.

The diversity of fauna is determined, to a large extent, by the functional status of the natural ecosystems. As a result of the anthropogenic pressure the majority of the natural ecosystems suffered essential changes, but the biggest modifications were done in the steppe meadow and aquatic ecosystems. This process had a negative impact on the community of vertebrate and non-vertebrate animals.

The excessive use of ecosystems and the excessive grazing in the last 10 years accelerated their degradation processes. According to the 1st edition of the Red Book of Moldova (1978), 29 of rare animal species were registered, while in the 2nd edition of 2006, the number of rare animal species increased up to 116.

Hunting Resources. The surface of the hunting grounds is 2.520,287 ha, including 204,072 ha of forests, 2.216,615 ha of agricultural lands and 99,600 ha of aquatic basins and marshland.

Due to inefficient management of the hunting species effective, the number of hunting mammals and birds remains at a low level. At the same time the socio-economic conditions during the last years and the poaching considerably affected the hunting species effective. The number of deer is about 3000, and the number of boars is about 1400. The highest number of the hunting species is the hare, but in the last years its density also has considerably decreased.

Fishery Resources. The Dniester and Prut rivers and the reservoirs Dubasari and Costesti-Stinca, the lakes Manta, Beleu, Cahul and Cuciurgan, are considered as high category fishery basins, where the genetic fund of valuable species of fish is preserved.

The anthropogenic factors have essentially modified the reproduction and living conditions of fish species. Especially this refers to the Dniestr River, where by Ukraine is being exploited the Dnestrovsk Hydropower Plant (DHP). The DHP was constructed for power generation reasons, without taking into consideration the environmental concerns.

2.5. NATURAL PROTECTED AREAS

According to the Law on Natural Areas Protected by the State in the Republic of Moldova there were established 11 categories of natural protected areas, out of which 8 correspond to the International Union for the Conservation of Nature classification (scientific reserve, National park, natural monument, nature reserve, landscape reserve, multifunctional management areas, biosphere reserve) and 4 categories are of national interest (botanical garden, dendrological garden, landscape architecture monument, zoological garden).

The largest percentage of the state protected areas belongs to the landscape reserve (52%) and scientific reserves (29%).

To extend the ratio of natural protected areas as against the total country's territory, there have been introduced 94 705 ha of wetlands of international significance, especially, the Lower Prut and Lower Dniester Lakes and Unguri-Holosnita under the National Fund of Natural Protected Areas.

Consequently, the surface of natural protected areas increased from 66.476,7 ha or 1,96% from the territory of the country up to 157.227,4 ha or 4,65%, excelling the percent (2,4%) established by Millennium Development Goals in the Republic of Moldova.

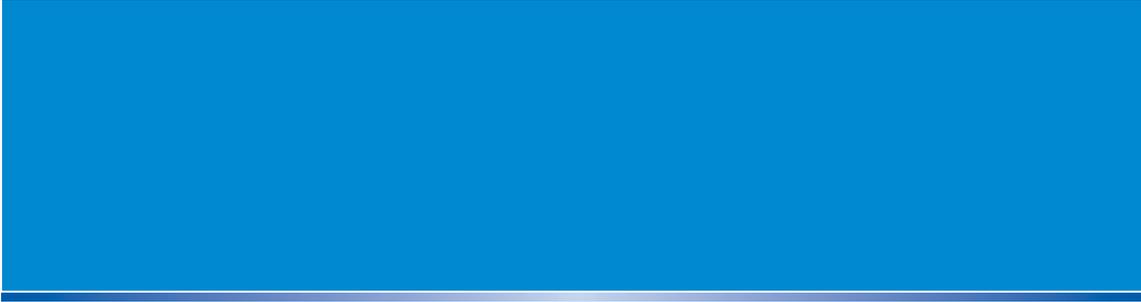
2.6. MINERAL RESOURCES

The base of the raw mineral resources of the country is mineral non-ferrous substances. During the decades, the construction industry was entirely and constantly supplied with explored (and exploited) reserves of necessary primary raw material. Nowadays the reserves are sufficient for further development of this sector of national economy.

The following types of mineral substances/rocks are widely spread in the country's territory: *Calcareous stones/lime stones, sandy and argillaceous limestone, marl and gypsum, granite-granodiorite, dauk, sands, clays, sandy and argillaceous limestone with gravel additives, diatomite, tripoli stone/rotten stone, diatomite and bentonitic clays, etc.*

Presently 425 deposits and subsoil sectors are explored, registered and included in the State Balance of Mineral Resources, out of which 180 are explored; about 60 are ready for exploitation. The remaining mineral resources from beds, included in the List of Reserve Objects, are liable for supplementary research and follow-up exploitation.

The underground waters of different types, including drinking and mineral waters, some of them with curative qualities, are widely spread in the Southern part of the country. The underground waters with increased content of iodine, bromine and other chemical elements were revealed at a depth of 700-1200 m. Actually a large variety of mineral and table water produced in Moldova is being used for food and curative purposes at national level and is being exported.



III. THE QUALITY OF ENVIRONMENTAL FACTORS THAT IMPACT PUBLIC AND CHILDREN HEALTH

3.1. SAFETY OF DRINKABLE WATER

According to WHO data, 25-30% of human health disorders are consequences of adverse influences caused by the quality of the environment. Water has the greatest impact on health among all the environmental factors. Water can be a specific antidote to several troubling and inconvenient health problems if its quality complies with sanitary standards. However, if the water consumed is bacteria contaminated or contains chemical substances in excessive amounts, it can present a significant health risk for human health that, immediately or after a certain time, will lead to the diseases emergence. Given the immaturity of adaptation mechanisms, as well as anatomical and physiological particularities of developing bodies, children may be considered as the most vulnerable population layer to the impact of environmental factors, especially of contaminated water.

The European Action Plan “Children’s Environment and Health”, approved during the Fourth Ministerial Conference on Environment and Health in Budapest (2004) establishes four Regional Priority Goals. The Priority Goal No.1 aims to prevent and significantly reduce the morbidity and mortality arising from gastrointestinal disorders and other health effects, by ensuring that adequate measures are taken to improve access to safe and affordable water and adequate sanitation for children (by 2010).

The Republic of Moldova faces difficulties in achieving this priority. This is due to limited resources available for improving of water quality, modernization of water supply and sanitation infrastructure, both at community and school levels, improving the management of drinking water resources.

The need of modernization of water supply and sanitation infrastructure in country’s localities is specified in the Strategy on Water Supply and Sewerage in Settlements of the Republic of Moldova (2007). According to this strategy, measures will be implemented to ensure by 2030 the entire population, including children, with improved access to water supply and sewerage systems. However, the document lacks indices of public access to the improved water supply and sewerage systems.

The target 10 under Millennium Development Goals, call for halving by 2015 the proportion of people without sustainable access to safe drinking water and basic sanitation, as compared to 1990. According to this target, Moldova is committed to meet the following access indicators: 68% of people with improved access to water supply and 58% with improved sanitation systems. These arguments are at the core of the study initiated for highlighting and assessment of the priority risk factors for children's health, depending on the quality of water consumed.

During 2008 was registered a high level of drinking water quality unconformity if compared groundwater and water supply systems. The ratio of samples that didn't correspond to sanitary-chemical parameters of groundwater sources versus centralized water supply was about 58,3% against 61,4% in 2007. In the following districts: Anenii-Noi, Călărași, Glodeni, Fălești, Taraclia, Ciadâr-Lunga, Căușeni, Comrat, Ungheni, Telenești, Sîngerei this index is 80-100%. The ratio of water samples that don't correspond to microbiological parameters in urban water supply pipes is about 10%, against 6% in 2007, and rural water supply pipes is about 16,7% , against 12,8% in 2007. Serious problems with drinking water quality are persisting in children institutions supplying systems. Thus, in 2008 there were registered poorer indices if compared to other categories of aqueducts, 28% (in 2007 - 19%) of samples didn't correspond to chemical parameters and 17 % (in 2007-19%) to microbiological parameters.

From the total of 1534 drinking water supply systems that actually are registered by the State Service for Public Health Surveillance, 1523 aqueducts are supplied from underground water and 11 aqueducts from surface water sources. According to water quality studies, conducted in 2008, in order to identify the level of compliance with microbiological parameters: 11% of samples taken from municipal water systems, supplied form underground sources, 9% of samples taken from municipal water systems, supplied from surface water sources and 16,7% of samples taken from rural water supply systems failed to comply with microbiological parameters. These data indicate the poor maintenance of aqueducts in many rural areas.

Although in the past five years was registered the improvement of the sanitary-engineering conditions of water supply systems, which also lead to potable water quality improvement from microbiological parameters perspective, many related problems still exists. Particularly this refers to the rural areas, where no companies dealing with maintenance of the water supply and sewage systems exist. Only when the new water supply and sanitation systems are constructed the donor organizations ask for establishment of water consumer associations, which would further ensure their maintenance.

Only 11 water supply systems using surface sources have established laboratories to ensure the monitoring of drinking water. Therefore, this sector needs serious reforms having as result creation of maintenance companies of "Apa-Canal" type, that would provide services for several districts and settlements. Microbiological water quality parameters, for different types of water supply systems are reflected in Figure 6.

According to the Figure 6 and given the fact that the ratio of unsatisfactory drinking water samples haven't exceeded the 5% threshold during 1 year, the Chisinau water supply system is considered to have the best drinking water quality.

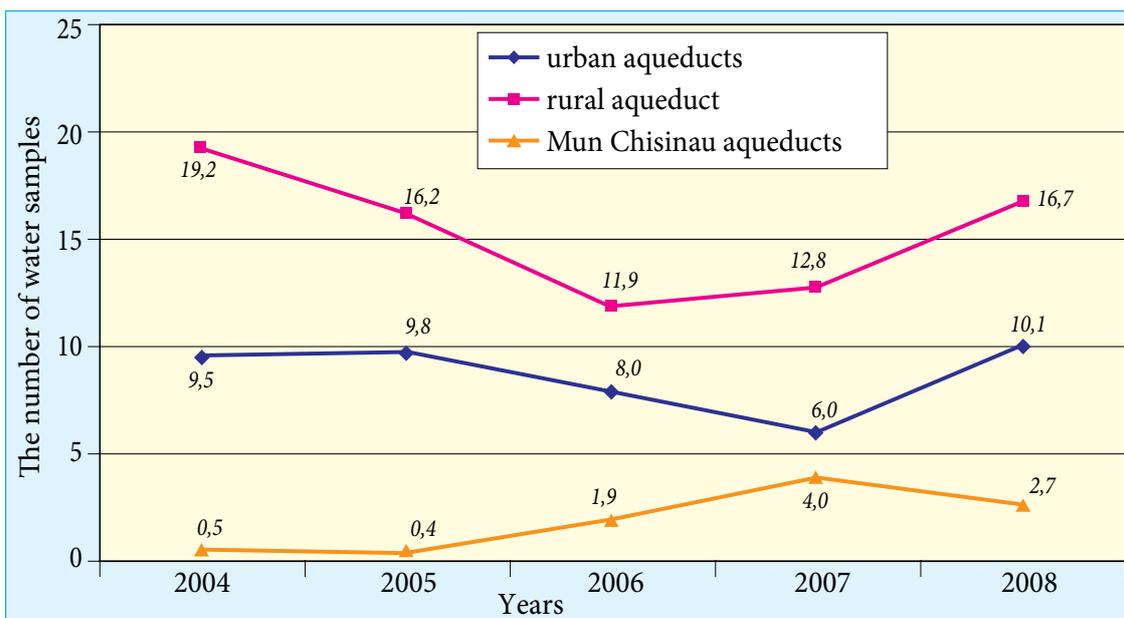


Figure 6. Weight of annual samples of drinking water that failed to comply with sanitary microbiological water quality parameters, taken from water supply systems

The quality of drinking water from wells.

Inadequate waste management, ignorance of sanitation rules in settlements and basic protection measures of water sources are the main causes of water quality worsening in wells. The wells are used as the unique source of drinking water for 85% of rural population. The share of unsatisfactory water quality from wells in terms of sanitary-chemical parameters in 2008 increased and was 84,8% (in 2007- 82,1%) and in terms of sanitary-microbiological parameters it was 38,3% (in 2007 – 31,1%). This can be explained by inadequate maintenance of the wells and their pollution as result of flooding.

Figure 7 presents the ratio of unsatisfactory water quality from wells, according to microbiological parameters, during 1999-2008.

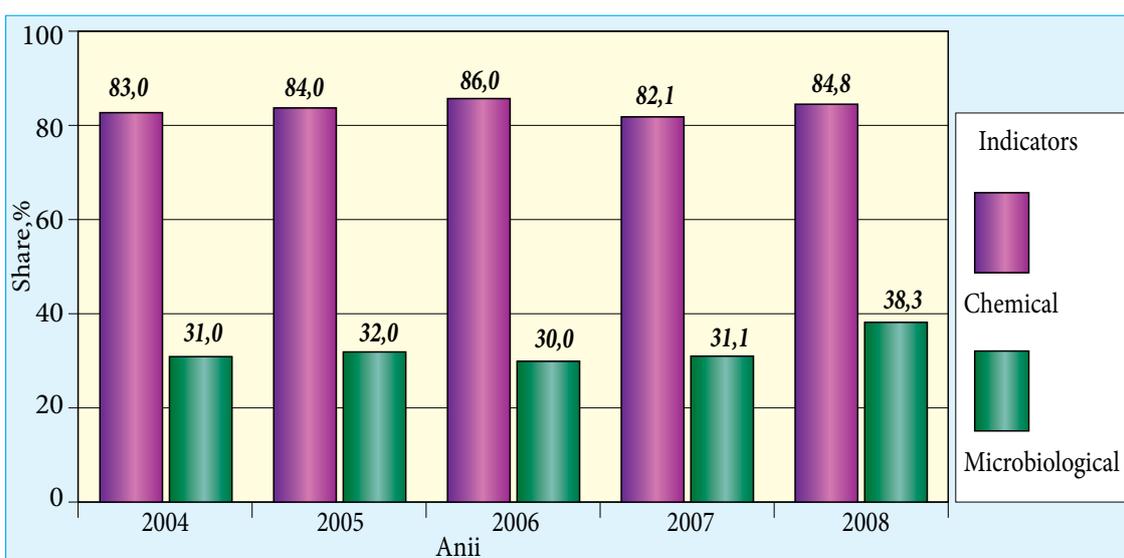


Figure 7. The ratio of unsatisfactory water quality from wells, 2004-2008

Water borne outbreaks of infectious disease.

Between 2004-2008 two outbreaks of infectious disease caused by drinking water, particularly with dysentery, were reported in Tomai village (Ciadir Lunga district) 138 cases (in 2007) and in Nisporeni town - 88 cases (in 2007). The investigation of both epidemiological outbreaks was conducted and detected microbial pollution at water distribution points to consumers.

Implementation of the Protocol on Water and Health.

Starting with August 2009, through the Ad Hoc Project Facilitation Mechanism of the Protocol, created by WHO/UNECE Joint Secretariat of the Protocol, Republic of Moldova received financial and methodical support for development, according to the Art. 6 and 7 of the Protocol, of the target-indicators and Action Plan for implementation of the Protocol in Moldova. Nowadays, with the support of the Government of Switzerland through the Moldavian Bureau of Swiss Development Cooperation Agency and international experts was initiated the elaboration of national target- indicators for implementation of the Protocol. After their establishment, these indicators will be discussed with all interested stakeholders and civil society, and then by the end of 2010 they will be approved by a Government Decision. The national target-indicators will be achieved gradually, depending on the terms established at national level. Simultaneously, for a better coordination of project activities a Steering Group consisting of various stakeholders has been established and approved by a Joint Order of Environment and Health Ministers.

The study on drinking water quality in schools.

In 2009, UNICEF Moldova conducted a study on the quality of drinking water in schools. The study included 1526 schools that were active during the scholar year 2008-2009.

The results of the study revealed problems with drinking water quality and water supply systems in schools. It was found that 69% of schools had centralized water supply systems, 31% - used wells, springs or water transported by tankers as water supply sources. For rayons (district) centers these indices are 66% and 34% respectively. The poorest water supply in schools was recorded in the following districts: Soldanesti - 3%, Leova - 23%, Donduseni - 27%, Edinet - 30%, Rezina - 30% . The situation is different in Chisinau and Balti cities, where schools are supplied with water from municipal water systems about 97,8% and 96,3% respectively. In districts Basarabasca -100% , Cahul 95%, Falesti - 96%, Causeni - 92%, Criuleni and Dubasari - 93%.

The data of water quality investigations conducted for 8 significant parameters revealed that the highest proportion of non-compliance is recorded for nitrate content – 31,6% samples, microbial pollution – 23,6% , fluorine – 13,3% and boron – 6,5% (Table 4). It must however be noted that the ratio of unsatisfactory samples, according to nitrite content, was only 1,9%.

Table 4

**Results of water quality in schools investigations, conducted for
8 significant parameters**

| Nr. d/o | Parameter | Investigated samples | Non- compliant | % of non- compliance |
|--------------------|------------------------------------------|---------------------------------|---------------------------|---------------------------------|
| 1. | Microbial pollution (E.coli, enterococi) | 1672 | 395 | 23,6 |
| 2. | Nitrates | 1597 | 505 | 31,6 |
| 3. | Nitrites | 1597 | 31 | 1,9 |
| 4. | Fluorine | 1577 | 210 | 13,3 |
| 5. | Boron | 504 | 33 | 6,5 |
| 6. | Arsenic | 653 | 0 | 0 |
| 7. | Pesticides | 653 | 0 | 0 |
| 8. | Cyanides | 504 | 0 | 0 |

If taking into consideration the fact that half of non-compliant samples (15) were recorded in 2 districts - Telenesti and Calarasi, and in most of cases the content of nitrites is due to ammonium presence in underground water sources, we might conclude that the nitrites are not at all the major problem for the quality of drinking water as referred to the whole country. It has a sporadic character, typical only for some special areas. As for the content of arsenic, cyanide and pesticides – there haven't been registered non-compliant samples. Therefore, we might conclude that these elements don't represent the risk for water used in schools, as well as for the population's health.

Along with the analysis of drinking water quality, there has been assessed the number and ration of students exposed to various risk factors associated with quality of consumed water. The Figures 8, 9, and 10 administrative reflect the ration of territories with inconsistent samples and pupils exposed to microbial pollution and excessive content of nitrates and fluoride.

As seen from the chart, the highest proportion of students exposed to microbial pollution is revealed in Edinet district - 65%, Soldanesti – 63,7%, Donduseni - 57%, Ungheni - 43%, Criuleni - 30%, Ialoveni and Soroca - 32%. On the other hand, the lowest recorded level is registered in Chisinau and Balti, respectively 0,8% and 0% of exposure, and Dubasari district – 0%, Basarabasca -0%, Causeni – 0,6%, Orhei - 3%.

The highest proportion of students exposed to pollution by nitrates is recorded in the following districts: Soldanesti - 67%, Donduseni - 65%, Criuleni - 58%, Soroca - 57% and Edinet - 54%. On the other hand, the lowest level was recorded in Chisinau -0,4% and Balti - 2% cities of students exposed, Basarabasca district - 0%, Cahul and Orhei districts - 4%.

Thus, the redundant content of fluorine in drinking water sources has an endemic character, being predominantly present in 9 administrative units, where the share of exposed students exceeds 40% - Gagauzia Yeri, Balti city, districts Glodeni, Calarasi, Rascani, Falesti, Causeni, Taraclia .

The most unfavorable areas, in terms of drinking water quality, where the students are exposed to all risk factors, are the following districts: Soldanesti, Edinet, Donduseni, Ungheni, Soroca, Criuleni Ialoveni, Falesti, Taraclia, Stefan Voda and Gagauzia Yeri.

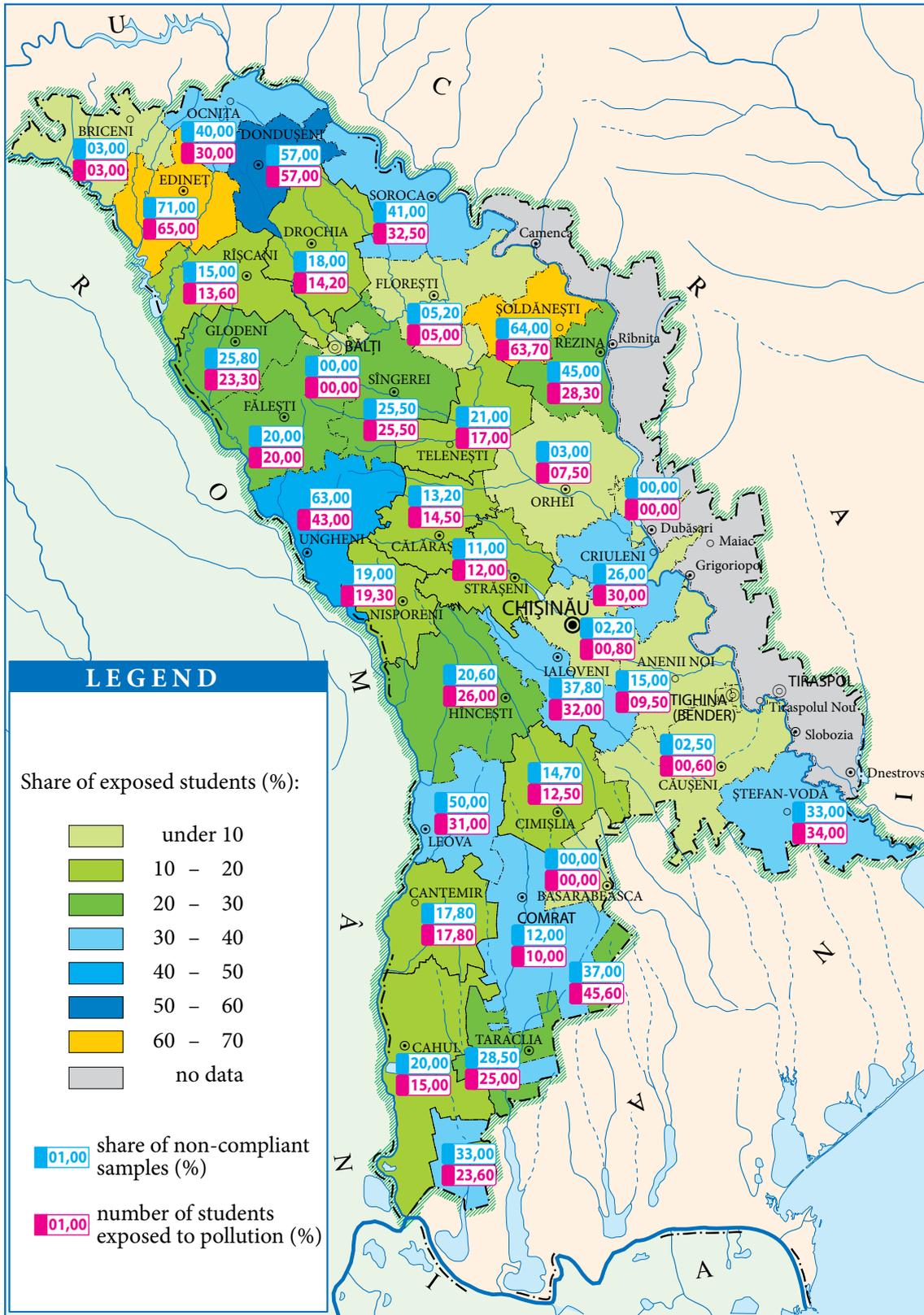


Figure 8. The ratio of students exposed to microbial pollution, as referred to non-compliant samples ratio, per administrative units

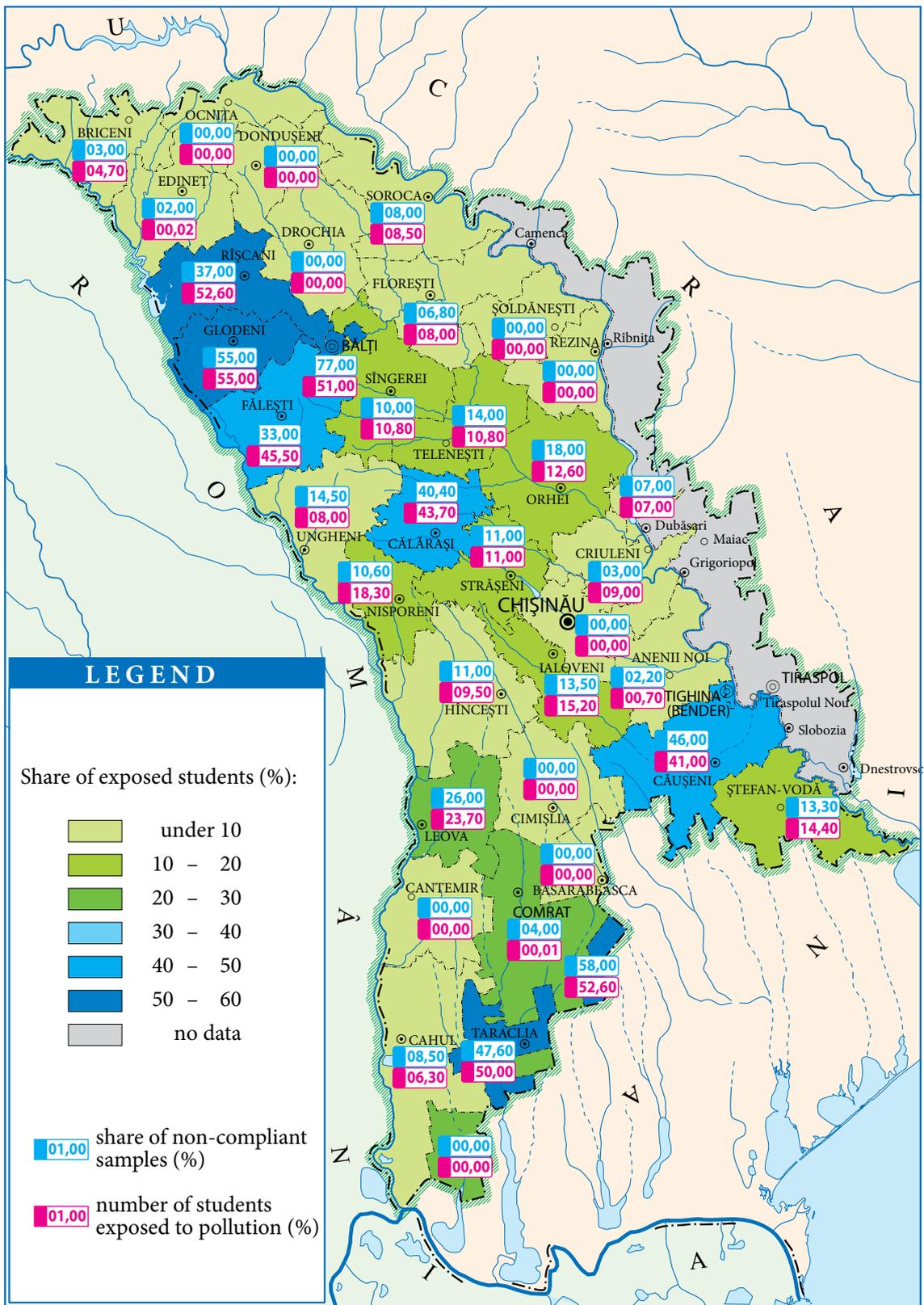


Figure 10. The weight of students exposed to fluorine, as referred to non-compliant samples ratio, per administrative units

Once the sanitary standards on drinking water quality were approved (2007) (the document is harmonized with EU Directives and WHO recommendations), the necessary regulatory framework was established. It regulates the quality and control of drinking water, as well as responsibilities in this field.

However, it's still necessary to further develop the regulatory framework for small and very small systems of drinking water supply, which actually is used by 50% of the total population.

Although, only during the last 2 years (2007-2008) were put into service 119 water supply systems, which allowed over 100 thousand people to have access to the improved water supply, the index is relatively small as compared to other developed countries. Thus, in 2008 the total share of population that benefited of improved access to drinking water supply was 53%, including 92% for urban and 26% for rural population. On order to achieve the target 10 of the Millennium Development Goals, by 2015 this indicator should be 68%.

Surface water quality

The characteristic of the surface water quality was made based on the monthly observations according to a series of physico-chemical, chemical, sanitary, sanitary-microbiological, virological indicators and viable eggs helminthes content, biogenic elements, petroleum, anion-active detergents, phenols, etc.

During 2004-2008 the trend of surface water quality change was assessed according to water pollution index value (WPI), which shows a slight improvement. It was determined that the water quality of Dniester and Prut rivers, varied within the limits of II quality class (clean) in Soroca (Dniester) and Braniste (Prut) sections, and III quality class (moderately polluted) in Vadul lui Voda (Dniester) and Leova (Prut) sections.

However, during 2004-2008 the share of samples that have not matched the hygienic requirements according to sanitary+chemical indicators, remained at a high level, constituting 15,25%-32,2% of the Dniester river body and 22,4%-36,9% of the Prut river. Recorded variables are characterized by a maximum peak incidence in 2006 for the Dniester river and the Prut river in 2005, data are represented in Figure 11.

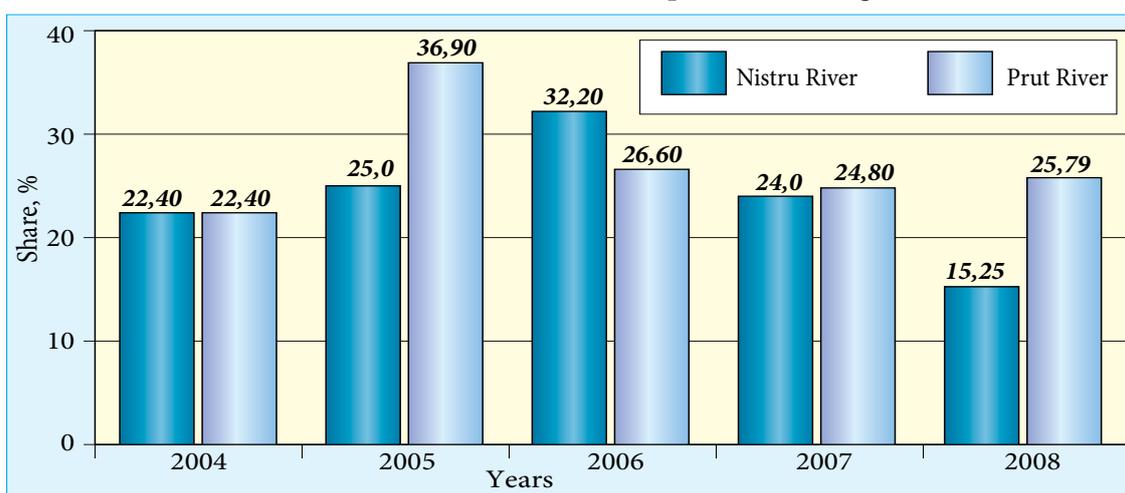


Figure 11. Share of water samples from Dniester and Prut rivers which do not correspond to standards according to sanitary-chemical indicators.

The Prut river water is characterized by a high level of pollution with copper compounds, as result of vineyards plantations and orchards treatment against diseases and parasites with chemicals containing copper. These chemicals are washed by precipitations and reach the river.

The water quality of the Danube river varied during the last 5 years within the limits of the II quality class (clean) and the III quality class (moderately polluted), (Figure 12).

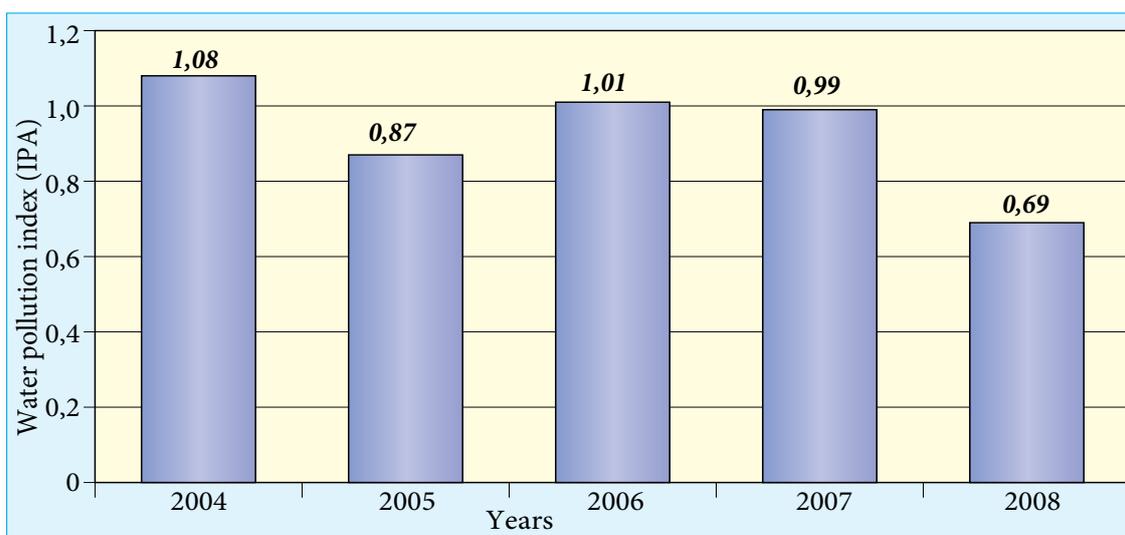


Figure 12. Danube river water quality, Giurgiulesti section

The water quality of the Ghidighici, Costesti, Taraclia, Comrat sections and Cahul, Beleu and Manta lakes fall into the III class (moderately polluted). The water basin Dubasari corresponds to the II class (clean).

Regarding the high pollution cases (HP) and extremely high pollution (EHP) of water during the years 2004-2008, was maintained a stable frequency of cases registered (Figure 13).

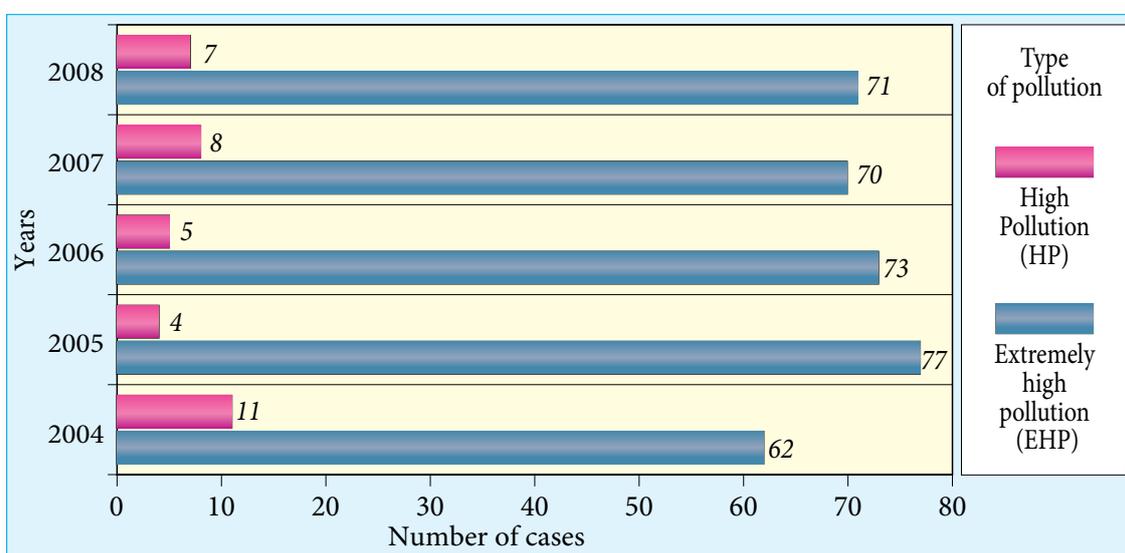


Figure 13. Detection of cases of HP and EHP by the surface water monitoring network, 2004-2008

The level of water pollution of these rivers continue to remain high according to sanitary-microbiological indicators, the share of which was for the Dniester 64,5% - 29,0% during the years 2004-2008, respectively for Prut 62,34% - 35,5%. The data are represented in Figure 14.

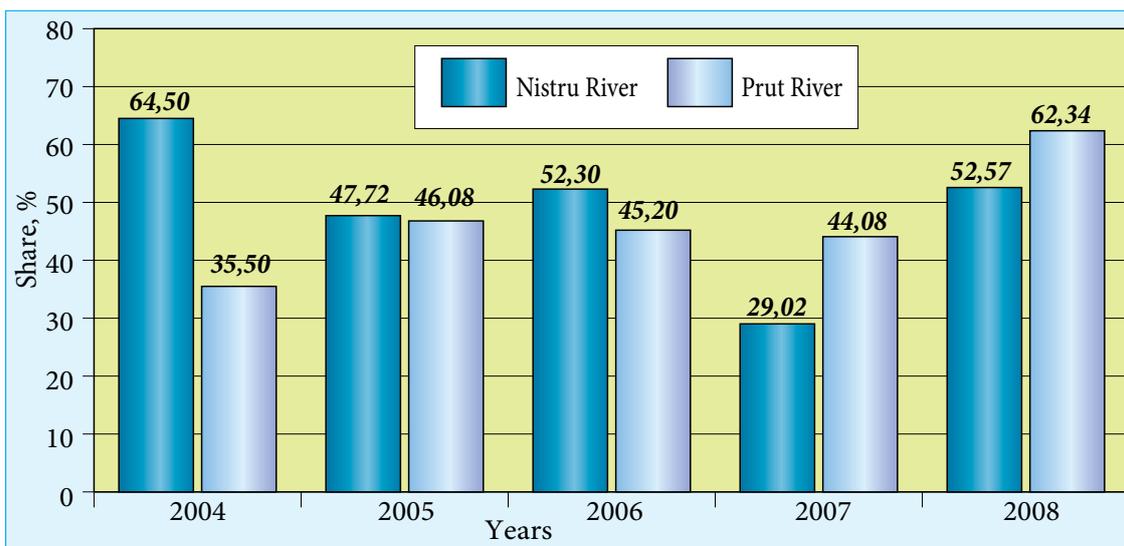


Figure 14. The share of water samples from Dniester and Prut rivers which do not correspond to standards according to the sanitary-microbiological parameters

Almost in all cases of Dniester and Prut rivers pollution the index of lacto-positive coliform bacteria was increased, but it should be also mentioned that during the last three years pathogenic microflora was not detected in the water.

The small rivers water, which is used for irrigation and public recreational purposes, remains polluted. Among small rivers the most polluted are: Lunga river - the water quality ranked to the V class (polluted), Bic river - the water quality varied within the IV class (degraded) and VII class (highly polluted) in downstream of Calfa village, and downstream of Chisinau municipality (site Singera), (Figure 15).

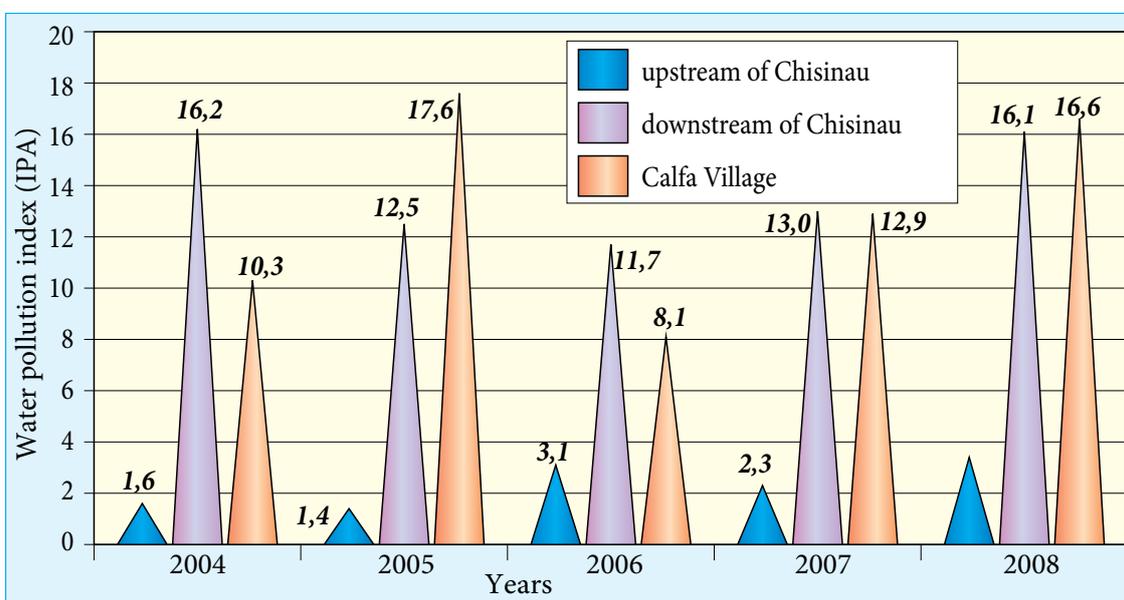


Figure 15. Bic river water quality, 2004-2008

The share of water samples that did not comply with hygiene requirements during 2004-2008 according to sanitary-chemical indicators are 42,63% - 59,6% and according to sanitary-microbiological indicators 39,01% / 47,1% (Figure 16)

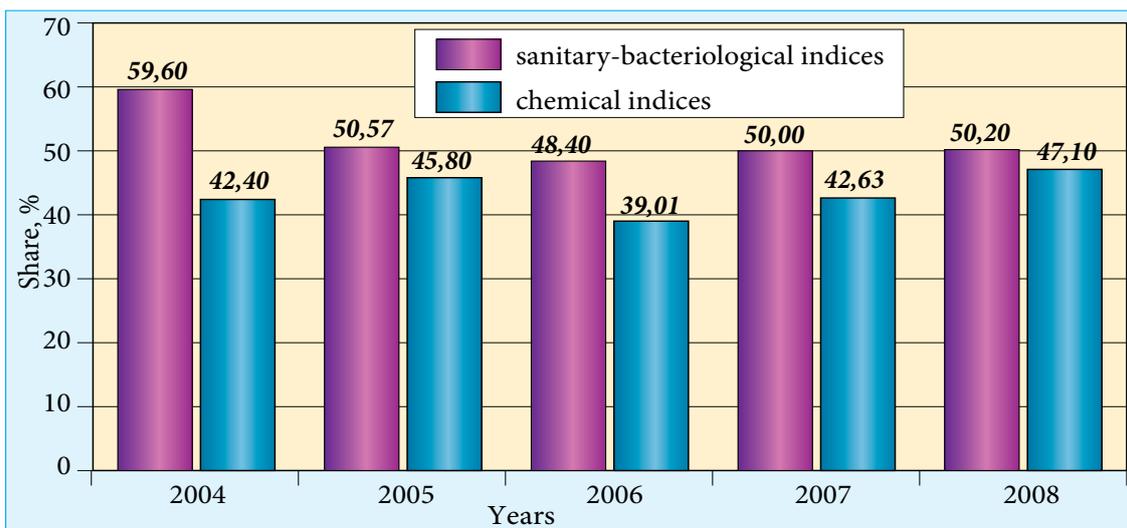


Figure 16. Share of water samples from small rivers that do not correspond to standards according to the sanitary-chemical and sanitary- microbiological indicators.

On the other hand, there is observed an increased number of the non-compliant samples with coliform bacteria content in large rivers, data are presented in Figure 17.

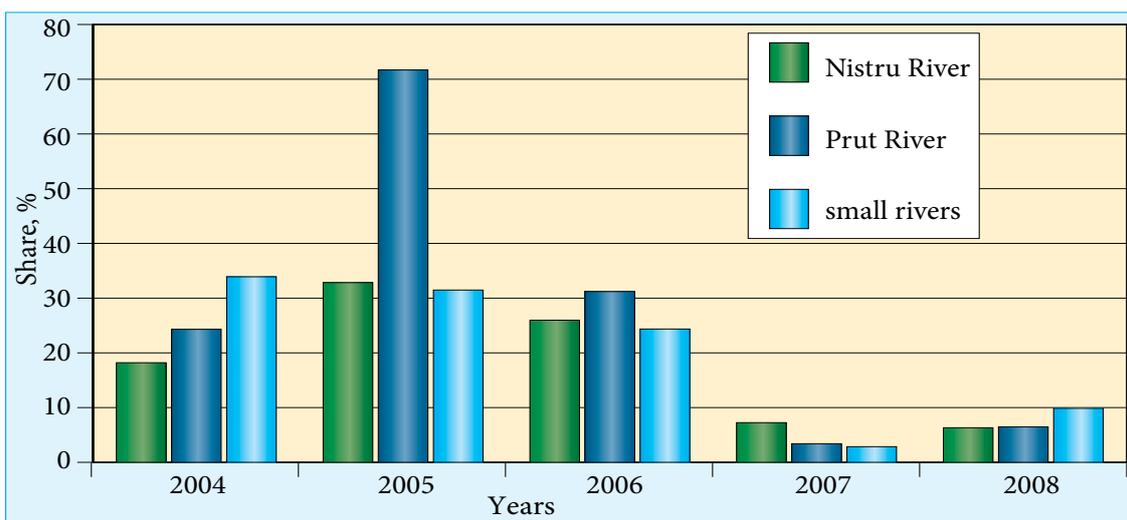


Figure 17. The weight of water samples from Dniester, Prut and small rivers that do not correspond to standards according to the coliphages content.

Data from the chart shows that during 2004 – 2008 there was a decrease of water samples weight containing coliform bacteria from 32,83% in 2005 to 2,86% in 2008 (for Dniester river) and from 71,69% in 2005 to 3,4% in 2008 (for Prut river).

Helminthes viable eggs continue to be detected in water. The weight of inconsistency with existing sanitary norms is 24,51% -7,77% in Dniester river and 6,49% - 11,84 % in Prut river.

The above mentioned situation is not changing, because the construction of the water supply and sewage disposal systems is delayed from year to year.

Only 11 sewage pipe systems were put into service in 2008 out of which 5 have wastewater treatment plants. Other 11 sewerage systems with 6 wastewater treatment plants were made operational in 2007. During 2007-2008 119 water supply systems were put into service.

3.2. AMBIENT AND INDOOR AIR QUALITY AND THEIR IMPACT ON HUMAN HEALTH

Ambient air quality

The quality of atmospheric air in the Republic of Moldova is monitored by a network consisting from 17 stationary stations located in 5 main industrial centres: Chisinau, Balti, Tiraspol, Ribnita, and Bender. The air samples are collected 3 times per day and analyzed by main pollutants: total dust, SO₂, CO, NO₂ and specific pollutants: sulphates, HCOH, C₆H₅OH (Figure 18).

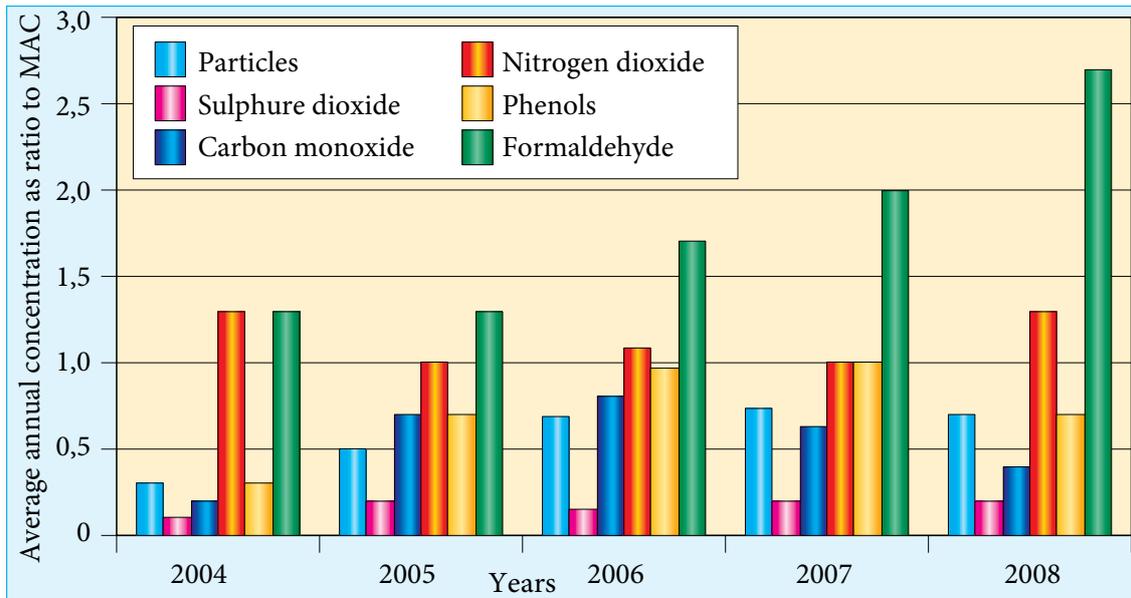


Figure 18. The air pollution dynamics during 2004-2008 in Chisinau

In the transboundary context, atmospheric air quality is monitored by Leova station, using the EMEP program Level I and partially Level II. Starting with April, 2007, in Mateuti village, Rezina district, the first automatic air quality monitoring station started its operation and measuring continuously 17 parameters, including 12 air pollutants (Nitrogen Oxides, Sulphur Dioxide, Hydrogen Sulphide, Ammonia, Carbon Monoxide, the amount of aromatic hydrocarbons, Ozone O₃, Particulate matter (PM₁₀), total dust and doze-rate of gamma radiation) and 5 meteorological parameters (air temperature, wind direction and speed, relative humidity and atmospheric pressure).

On the basis of observations on the atmospheric air pollution level in Chişinău, Tiraspol, Bălţi, Bender and Rîbniţa, for the period 2004-2008, it was determined that the air pollutants such as total dust, Sulphur Dioxide, Carbon Monoxide and formaldehyde have shown a downward trend and the pollutants as phenol and Nitrogen Dioxide an upward trend (Figure 19).

On the basis of data on atmospheric air quality, the background air pollution forecasts are issued for the localities where the air quality monitoring is carried out-Chişinău, Bălţi, Tiraspol, Bender, Rîbniţa and Rezina. A major contribution on the quality of air pollution in industrialized cities have the recommendations issued by the State Hydrometeorological Service employees for companies which have a negative environmental impact in these localities and are included in the List of enterprises that need to regulate the emissions from their activity.

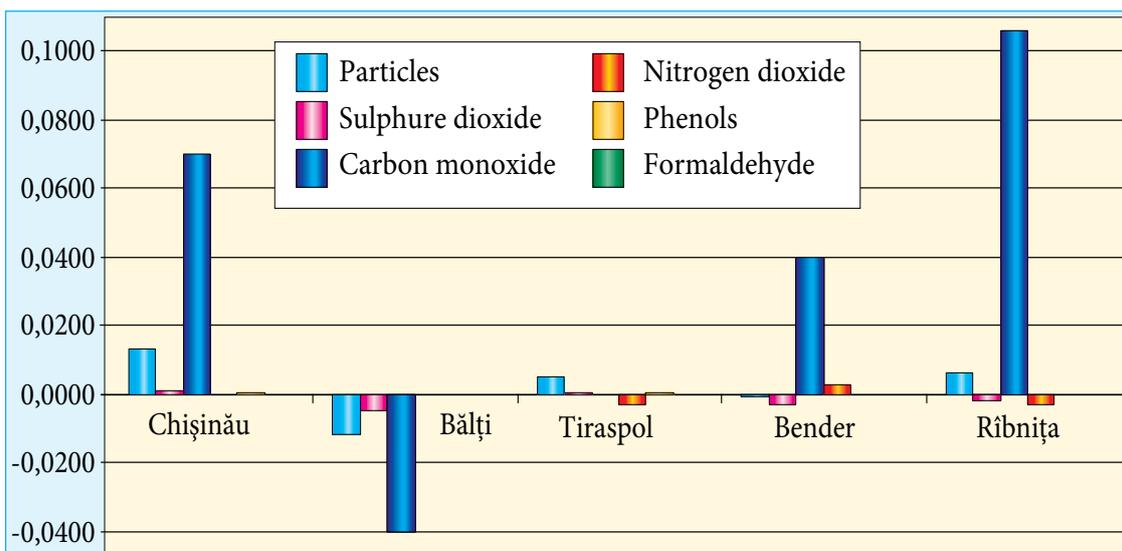


Figure 19. The atmospheric air pollution trends in the monitored urban areas (2004-2008)

In order to reduce the maximal pollution levels, in 2008 only, there were issued 152 warnings with recommendations regarding the regulation of emissions by 20% for the enterprises from Chişinău, Bălţi and Rezina.

It was estimated that the atmospheric air quality in the republic is determined by 3 sources of pollution: mobile, stationary and transboundary. The main local pollution sources are the motor vehicles, especially the end of life ones which were imported in the country. Their share is 88,6% of total emissions, followed by the stationary sources emissions - 11,4%, including 5,36 % from thermal power plants.

To implement the provisions of the national and European legislation, as well as to raise public awareness with regard to mitigation the atmospheric air pollution from vehicles in order to reduce the human health risks, the European Mobility Week “Clean air for all” is yearly taking place. During this week, the vehicles belonging to enterprises, organizations, agriculture enterprises, joint stock companies are checked out. For aligning to international standards, the Project financed by the Economic Commission for Europe through the Convention on Long-range Transboundary Air Pollution having tangency points with the Gothenburg Protocol is being implemented.

An inventarization of the pollution sources was carried out in order to prevent the air pollution. Thus, out of 2818 registered air cleaning systems, 229 of them are damaged or are not functioning properly. In 2006 the air cleaning systems base was updated by installing 60 new cleaning stations.

A special attention was paid to the thermal power plants JSC „CET-I”, JSC „CET-2”, JSC „Termocom” – Chişinău and JSC „CET-Nord” – Bălţi. Their total emissions in 2006 constituted 1551, 2 tonnes/year or as compared to 2005 with 418 tonnes/year (21,2 %) less. This is due switching from fuel oil to natural gas, as well due to carrying out several technical, economical and organizational measures with regard to optimization the combustion system of boilers, air dose in the combustion process, the dosing and testing working system of the boilers.

The atmosphere pollution background in the country includes the emissions from the local sources as well as from the transboundary one.

Environment radioactivity

According to the radiological monitoring data during 2004-2008, equivalent dose rate of gamma radiation on the territory of the republic ranged between 11 – 23 $\mu\text{R/h}$ and didn't exceed the warning limit of 25 $\mu\text{R/h}$. Thus, this parameter doesn't represent a threat for the environment and human health.

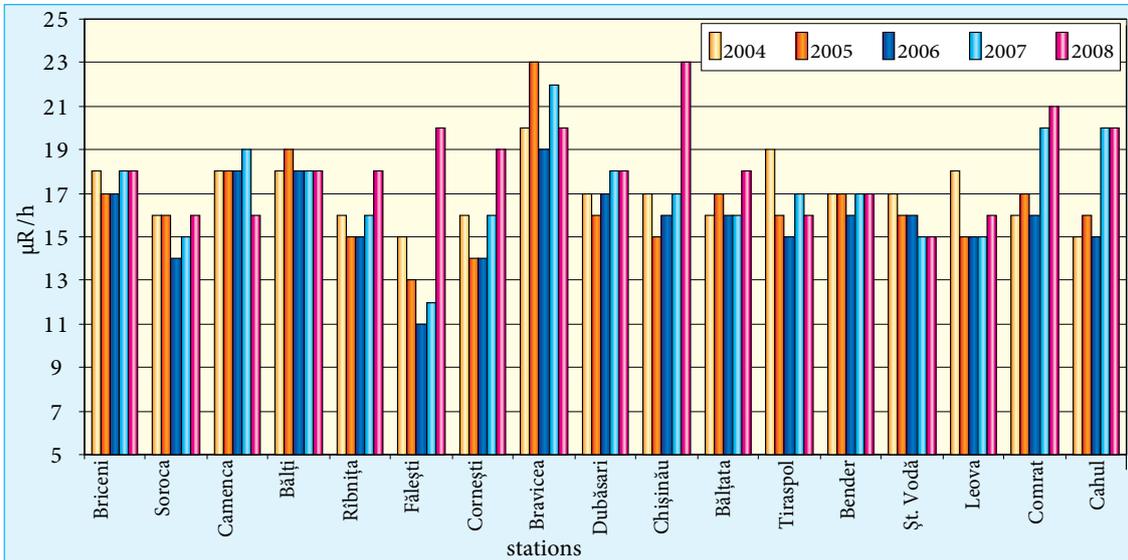


Figure 20. The variation of the maximum monthly gamma rays exposure dose during 2004-2008

Since 2003, the meteorological stations and the environmental quality monitoring sections have been carried out radiological observations on the following parameters: anthropogenic radionuclide ^{137}Cs , ^{90}Sr , telluric radionuclide ^{226}Ra , ^{232}Th , ^{40}K , total volume of α , γ , β activity in atmospheric fallout, soil and surface water. The registered data allow to conclude that, during the reference period, there hasn't occurred any spatial or temporal radioactive pollution, that could increase the exposure dose or that could represent a threat to the human health or ecosystems. The instability of radiological parameters is determined by the dynamic atmospheric processes and by the regional particularities of the Republic of Moldova territory.

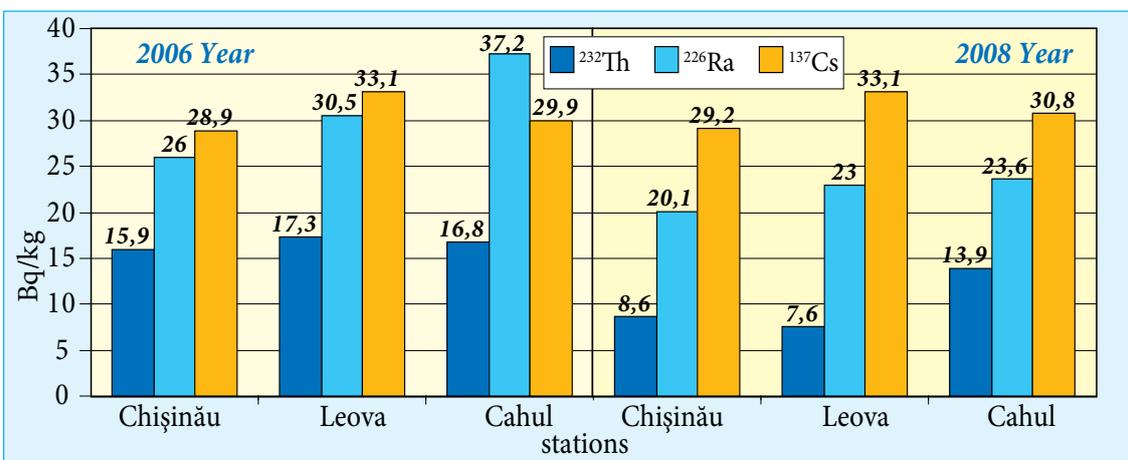


Figure 21. The radionuclide concentration in soil samples collected from the meteorological stations in 2006 and 2008

The monitoring of radionuclide concentration in the environmental components, food products and raw materials, drinking water, building materials, biological samples etc., is carried out according to the National Action Plan „Health and the environment”.

The content of different radionuclide in the environmental compounds, crops and food products are stable (Table 5).

Table 5.

The content of artificial radionuclide in the environmental elements and alimentary products

| No | Investigated sample | Total volume of β activity, Bq/kg | Strontium-90, Bq/kg | Cesium-137, Bq/kg |
|----|--------------------------|-----------------------------------------|----------------------------------------|----------------------------------------|
| 1 | Atmospheric air | $3,2 \cdot 10^{-5}$ Bq/m ³ | $1,38 \cdot 10^{-9}$ Bq/m ³ | $1,28 \cdot 10^{-9}$ Bq/m ³ |
| 2 | Soil | 25,3 | 5,1 | 13,6 |
| 3 | Drinking water | 2,55 | 0,51 | <1,0 |
| 4 | Mineral water | 10,0 | 0,2 | <1,0 |
| 5 | Milk | 5,4 | 1,08 | <1,0 |
| 6 | Beef meat | 17,6 | 3,5 | <1,0 |
| 7 | Pork meat | 11,87 | 2,37 | 1,78 |
| 8 | Fish | 12,35 | 0,4 | <1,0 |
| 9 | Bird eggs | 5,3 | 1,6 | <1,0 |
| 10 | Vegetables | 21,0 | 0,5 | <1,0 |
| 11 | Fruits | 3,5 | 0,7 | <1,0 |
| 12 | Leafy vegetables, greens | 14,0 | 2,8 | 2,1 |

The artificial radioactivity occurs when a previously stable material has been made radioactive by exposure to specific radiation, as in case of Chernobyl accident in 1986 or other nuclear experiments. According to a complex study on assessment of the risks associated to the ionizing radiation after the nuclear power plant accident in Chernobyl for certain groups of population, including the descendants of the Participants in the Liquidation of the Chernobyl Accident (PLCA), it was determined that:

- a) the boys and girls, born between 1989-1992, whose parents where exposed to Chernobyl radiation, have supported a deterioration in the chromosome morphology, expressed by solitary fragments, twin fragments, disentrances appearance (Figure 22).
- b) chromosomal aberration frequency in the investigated samples exceeded 2,8-3 times the frequency of these events before the unexposed control group.

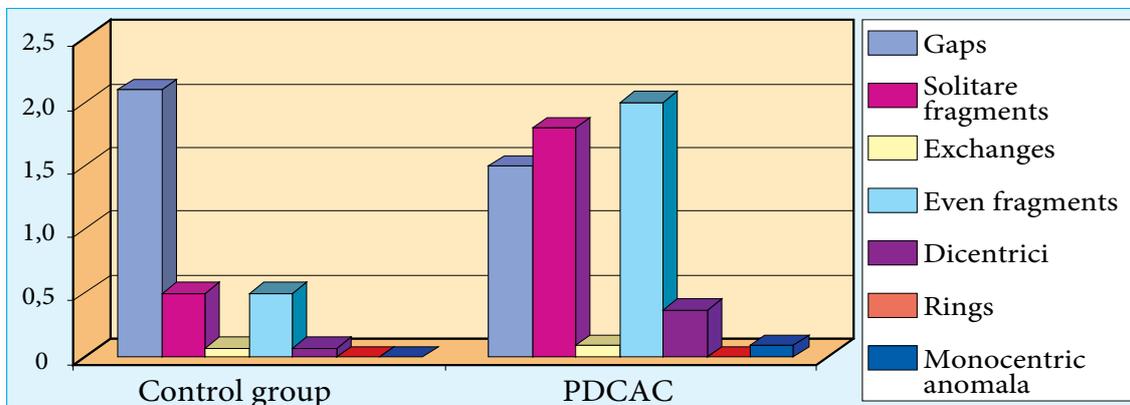


Figura 22. Chromosomal aberration frequency, discovered at PLCA

Transboundary effects of pollution

The most widespread problems related to the transboundary pollution are acid rains, caused by the release of sulphur dioxide (SO₂) and nitrogen dioxide (NO₂), from the thermal power plants, large industrial enterprises, coal and other fossil fuel-burning in the household sector, as well as from the transport sector. The countries of the Central and Western Europe are essentially contributing to the pollutants flows towards the less developed countries. According to the data on the average value of imported/exported transboundary pollutants, offered by the European Monitoring and Evaluation Programme (EMEP), the Republic of Moldova proved to be a net importer of sulphur, nitrogen oxides and ammonium. The share of the transboundary import is 84% for the sulphur deposits, 96% for the nitrogen oxidant deposits and 45% for the nitrogen reduced. The biggest share of sulphur deposits comes from Romania (32%) and Ukraine (18%), and nitrogen oxidant deposits – especially from Ukraine (15%) and Poland (12%).

In order to achieve the provisions of the Long Range Transboundary Air Pollution Convention (LRTAP), with target to the Heavy Metals Protocol, during 2004-2008, precipitation samples at the transboundary station Leova were collected in order to determine the concentration of the main heavy metals (Pb, Cd) and of other heavy metals (Cu, Ni, Zn, Cr), stipulated in the Protocol.

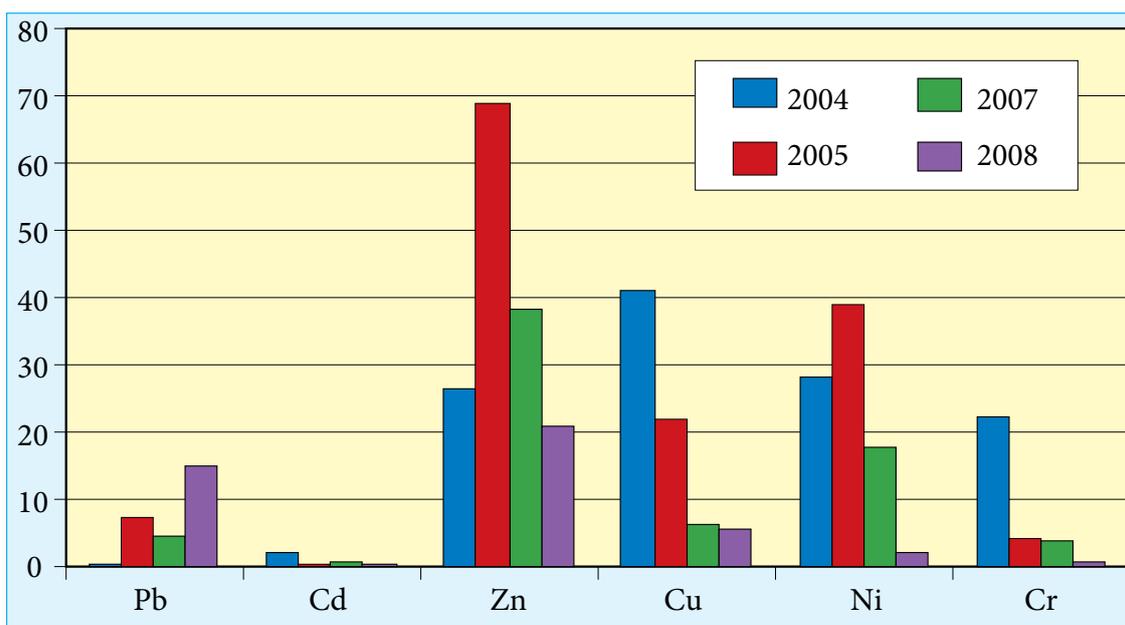


Fig. 23. The maximum concentration of heavy metals registered in the wet samples at the Leova station

Comparing to the previous years, in 2008, a decrease of the zinc, cuprum, nickel and chrome concentrations were registered.

The increase of the lead concentration can be explained by the intensification of traffic and industrial processes. The persistent concentration of the cuprum and nickel in the winter season is caused by the fuel burning from the household sector. High concentrations of heavy metals may be a consequence of the transboundary pollution; emissions from the technological processes (cement, glass, building materials production and thermoenergy); eolian dispersion of the metals in soil.

Ambient air influence on human health

The conducted observations have shown the existence of a correlation between the ambient air pollution and human health, especially on the respiratory system. The environmental factors are acting both as etiologic agents and as determinant or favouring factors of evolutionary flares appearance.

The infants represent the most vulnerable category of population due to the biological particularities (growing organism, insufficient immune system developed). The data from the Table 6 show a high level of respiratory diseases among urban children and the growing trend of chronic bronchitis and bronchial asthma. The high frequency of bronchitis and bronchial asthma shows the prevalence of chronic diseases.

Table 6

The dynamics of children morbidity from the diseases of respiratory system in Chişinău (per 10 000 inhabitants)

| <i>Nosologies</i> | <i>Incidence</i> | | | | <i>Prevalence</i> | | | |
|-----------------------------------------|-------------------------|--------------------|--------------------|--------------------|--------------------------|--------------------|--------------------|--------------------|
| | <i>Years</i> | | | | | | | |
| | <i>2003</i> | <i>2004</i> | <i>2005</i> | <i>2006</i> | <i>2003</i> | <i>2004</i> | <i>2005</i> | <i>2006</i> |
| Respiratory system diseases, including: | 3678,2 | 3737,5 | 4095,9 | 4052,6 | 4570,4 | 4133,2 | 4384,9 | 4314,7 |
| Chronic bronchitis | 6,0 | 7,8 | 6,6 | 5 | 22,2 | 25,2 | 31,1 | 33,6 |
| Bronchial asthma | 3,6 | 3,9 | 4,4 | 5,4 | 23,8 | 29,1 | 31,2 | 33,8 |

The nitrogen dioxide is correlating directly and significantly with such pathological states as tumours ($r=0,77$), blood diseases ($r=0,85$), circulating system diseases ($r=0,88$), endocrine diseases ($r=0,96$). The content of dust in the air correlates with chronic bronchitis ($r=0,90$), bronchial asthma ($r=0,87$). These two diseases correlate also with the concentration of formaldehyde in the air (correspondingly $r=0,41$ și $r=0,71$).

It must be mentioned that the atmospheric air quality severity holds the II position among the determinant risk factors of the non-transmissible pathologic states.

The share of the urban area factors with regard to the risk on human health is as follows:

- I – water quality – 47,06%;
- II – atmospheric air quality – 25,47%;
- III – other factors (mainly behavioristic) – 17,60%;
- IV – soil quality – 9,89%.

These results are very important for the development of measures for prevention of atmospheric air pollution, maintenance and strengthening of urban area population health.

In this context, the technological measures are very important, especially implementation of clean or less polluting technologies in industry, transport and heating systems, using of fuel that contains less sulphur, improving of the engines, etc. It is necessary to improve the national legislation according to the European one. The activities of hygienic and ecologic supervision of the public health services and ecologists, the activities of the local public authorities, economic agents, population have also a very important role in prevention of the atmospheric air pollution. In this regard it is very important to raise awareness among the stakeholders and population trough training initiation and education for health.

3.4. SURVEILLANCE OF PHYSICAL FACTORS – IONIZING RADIATION AND NOISE

In the Republic of Moldova the surveillance of ambient noise sources is performed. The main sources of noise impacting the environment are the following: highways, airports, railways, industrial enterprises, objects located in or adjacent to residential buildings (restaurants, disco clubs, bars, cafes, sports facilities, etc.).

During 2005-2008 within the residential areas in localities, including residential buildings/dwellings, schools, kindergartens, were conducted 7499 researches on noise level, 1407 of them failed to comply with existing standards, representing 18,8%.

In Chisinau municipality 4961 researches were conducted, out of which 930 haven't met the standards, representing 18,7%, in Balti municipality were conducted 83 researches out of which 25 haven't met the standards, representing 30,1%, in selected districts were conducted 1002 researches, out of which 106 haven't met the standards, representing 10,5%.

According to the sources of noise: motor transport represents – 42,3% of total noise, industrial enterprises – 28,8%, the objects located in residential buildings – 11,2%, other items – 14,8%.

The data from the Tables 7 and 8 indicate the increase of non-standard noise ratio, produced by motor vehicles from 40,1% in 2005 to 55,5% in 2008, due to increase of motor vehicle units in country.

Table 7
Weight of noise investigations generated by the motor vehicles, non-compliant with Maximum Admissible Limits

| Investigated objects | 2005 Year | | | 2006 Year | | | 2007 Year | | | 2008 Year | | |
|---------------------------------------------------------|--------------------------|---------------------------|------|--------------------------|---------------------------|------|--------------------------|---------------------------|------|--------------------------|---------------------------|------|
| | Number of investigations | Failed to comply with MAL | % | Number of investigations | Failed to comply with MAL | % | Number of investigations | Failed to comply with MAL | % | Number of investigations | Failed to comply with MAL | % |
| Transport | 304 | 122 | 40,1 | 379 | 136 | 35,8 | 243 | 108 | 44,4 | 272 | 151 | 55,5 |
| Industrial Enterprises | 220 | 131 | 59,5 | 295 | 61 | 20,6 | 189 | 32 | 16,9 | 121 | 14 | 11,5 |
| Objects located in or adjacent to residential buildings | 1689 | 25 | 1,5 | 680 | 9 | 1,3 | 819 | 144 | 17,6 | 1227 | 317 | 25,8 |
| Others | 42 | 13 | 30,9 | 707 | 111 | 15,7 | 289 | 31 | 10,7 | 23 | 2 | 8,7 |
| Total | 2255 | 291 | 12,9 | 2061 | 317 | 15,4 | 1540 | 315 | 20,5 | 1643 | 484 | 29,5 |

On the country's territory are located about 2500 of broadcasting engineering objects with non-ionizing sources (television, communications, radio broadcasting, high voltage power lines, etc.).

In order to prevent the negative actions of electromagnetic radiation on human health, including children's health, investigations on intensity and density of electromagnetic energy flux in the environment are being conducted.

During 2005-2009 17732 studies on non-ionizing electromagnetic radiation were conducted, 74 of them were non-standard.

The number of investigation conducted during 2005-2009 is shown in table 9

Table 8
Weight of noise investigations generated by the motor vehicles, non-compliant with Maximum Admissible Limits, in selected local administrative territories

| Locality | 2005 Year | | | 2006 Year | | | 2007 Year | | | 2008 Year | | |
|-----------------------|--------------------------|---------------------------|------|--------------------------|---------------------------|------|--------------------------|---------------------------|------|--------------------------|---------------------------|------|
| | Number of investigations | Failed to comply with MAL | % | Number of investigations | Failed to comply with MAL | % | Number of investigations | Failed to comply with MAL | % | Number of investigations | Failed to comply with MAL | % |
| Chisinau municipality | 1796 | 106 | 5,9 | 1007 | 185 | 18,4 | 889 | 209 | 23,5 | 1269 | 430 | 33,8 |
| Balti municipality | 20 | 5 | 25,0 | 26 | 7 | 26,9 | 19 | 7 | 36,8 | 18 | 6 | 33,3 |
| Districts | 206 | 19 | 9,2 | 303 | 46 | 15,2 | 258 | 19 | 7,4 | 235 | 22 | 9,4 |

Table 9

Weight of investigations of electromagnetic irradiation non-compliant with sanitary standards, 2005-2009

| Number of investigations | Year | Non compliant with existing standards | Weight of investigations non compliant with existing standards |
|--------------------------|---------------------------|---------------------------------------|----------------------------------------------------------------|
| 954 | 2005 | 17 | 18 |
| 1260 | 2006 | 17 | 1,35 |
| 3015 | 2007 | 0 | 0 |
| 7474 | 2008 | 5 | 0,07 |
| 5029 | I half 2009 | 35 | 0,7 |
| 17732 | Total in 2008-2009 I half | 74 | 0,43 |

3.4. PESTICIDES USE AND IMPACT ASSESSMENT

In recent years, the use of pesticides in the national economy essentially decreased. However, despite this fact, the import, storage and use of phytosanitary products remains an actual problem.

According to statistics, in the 2008 growing season, in order to combat plant pests, diseases and weeds in agriculture, on the whole country's territory there have been used 431 types of phytosanitary products, the total volume representing 2890,9 tons.

Table 10 presents the level of phytosanitary products use during last 5 years.

The above mentioned period of time is characterized by a moderate increase of the import and widening the variety of phytosanitary products. Thus, if during 2004 in the country were used 2269,1 tons, in 2008 the total amount of phytosanitary products used was 2890,9 tons. The variety of products increased from 102 in 2004 to 431 in 2008. The table data indicate the changes that occurred in major groups of pesticides used in agriculture. Thus, during the referred period the volume of products use, containing copper and sulphur, decreased to 1657,2 and 399,5 tons in 2004, to 696,3 and 285,5 tons respectively in 2008. It must be also noted the significant increase of chlorophenols compound group use: from 10,7 tons in 2004, to 479,6 tons, carbamate products from 33,4 to 339,5 tons and organophosphorus products from 56,7 to 505,5 tons in 2008.

Table 10

The level of phytosanitary products use, 2004-2008

| Years | Quantity of used pesticides (tons) according preparation form | Number of used products | Level of pesticides use according to preparaion form (tons), including: | | | | | |
|-------|---------------------------------------------------------------|-------------------------|-------------------------------------------------------------------------|-------------------|-------------------------|-----------------------|-------------------|--------|
| | | | Copper compound | Sulphur compounds | Chlorophenols compounds | Di-, thio-, carbamate | Organo-phosphorus | Others |
| 2004 | 2269,1 | 102 | 1657,2 | 399,5 | 10,7 | 33,4 | 56,7 | 109,6 |
| 2005 | 2321,4 | 181 | 927,2 | 249,6 | 304,2 | 268,8 | 131,0 | 585,3 |
| 2006 | 2413,5 | 307 | 844,8 | 220,0 | 318,5 | 288,3 | 156,6 | 440,6 |
| 2007 | 2563,8 | 360 | 654,8 | 173,1 | 499,5 | 285,7 | 241,3 | 709,4 |
| 2008 | 2890,9 | 431,0 | 696,3 | 285,5 | 479,6 | 339,5 | 505,5 | 582,0 |

Despite the decrease of copper compounds use, registered in the past 5 years, the first place in the range of imported and used phytosanitary products, belongs to copper-containing products, followed by the products of chlorophenols group and products from the di-, thio-, carbamate group.

Intensity of plant protection products use in the Republic of Moldova, during 2004-2008 (kg/ha active ingredient) is shown in Figure 24.

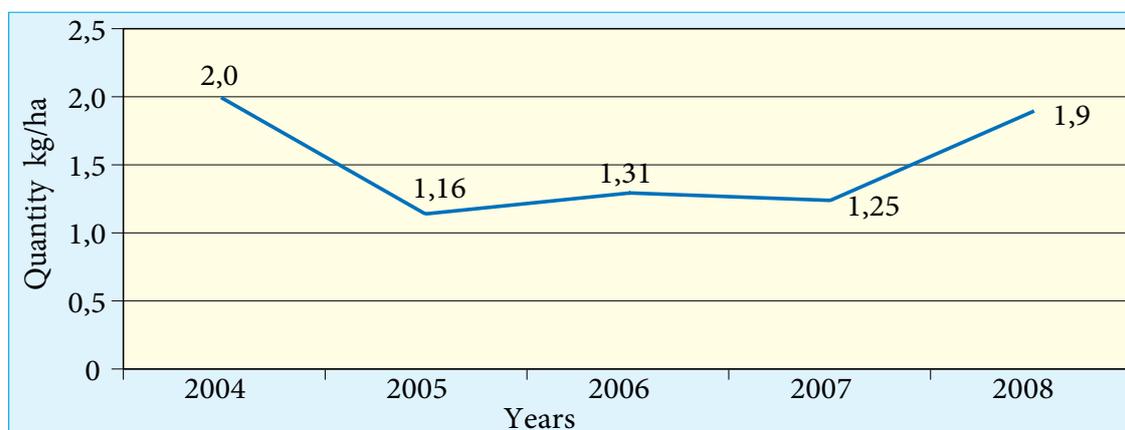


Figure 24. The level of phytosanitary products use during 2004-2008

The analysis of plant protection products use has confirmed that during 2004 – 2008, the intensity of phytosanitary products use maintained at 1,16 to 2,0 kg/ha. The frequency of environmental and food products contamination with residues of phytosanitary products, exceeding the maximum admissible limits, was about 0,2% during the referred period. In the last 5 years the nitrate pollution of agricultural products increased form 6,5% in 2004 to 9,1% in 2008.

Analysis of data, attested that over the last 5 years in the country were registered 19 cases of occupational poisoning. All were employees involved in plant protection work: machine-operators, vineyardists, plant protection specialists with 6-14 years of work experience. The poisonings have had a chronic character, being variously diagnosed - toxic hepatitis, asthma and encephalopathy.

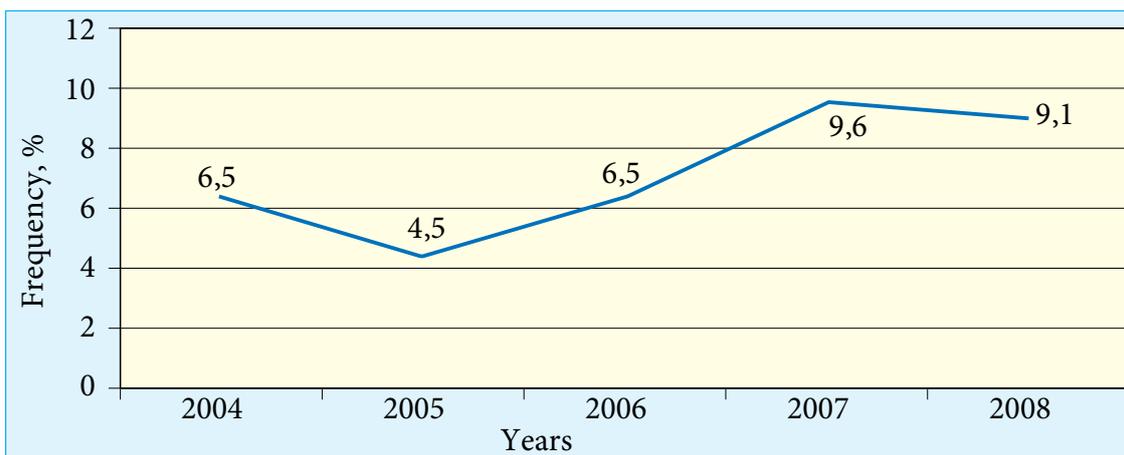


Figure 25. The frequency of nitrates detection in agricultural products, exceeding the maximum admissible limits

In recent years, the relevant authorities have undertaken a number of organizational and decision making measures, aimed at reducing the risk of phytosanitary products for the public health.

The issue of phytosanitary products' import, production, storage and use is regulated by the Law on Plant Protection Products and Fertilizers and the Governmental Decision "On approval of the Regulation on Import, Storage, Sale and Use of Plant Protection Products and Fertilizers". Based on these documents, the adequate system of official approval and registration of phytosanitary products was created. It doesn't allow the import, and manufacture of products if no toxicological and hygiene expertise was carried out.

3.5. THE SOIL QUALITY IN LOCALITIES

The monitoring of the soil quality started in the 1970s of last century and is now conducted according to the approved Action Program and Working Plan.

In 2008 new investigation spots have been set on the country's territory. In this context, in 2008, in order to determine the Organochlorine Pesticide (OCP) content, total and mobile forms of heavy metals and agrochemical indexes were investigated 6371,1 hectares of agricultural land, 6 fields nearby the obsolete pesticides storages, 3 substations of electrical power stations, 3 parks in Chisinau municipality and 12 meteorological stations. According to the results, on 100 fields belonging to 10 farms were determined the following: Organochlorine Pesticide (OCP) (dichlorodiphenyltrichloroethane/ DDT); Dichloro-diphenyl-trichloro-ethylene; isomers – hexachlorocyclohexane (HCH) and hexachlorobenzene (HCB), polychlorinated biphenyls (PCBs) and total and mobile forms of heavy metals (copper, zinc, nickel, lead and manganese), total nitrogen and ammonia, nitrate nitrogen, total and mobile phosphorus, humus, potassium, calcium, magnesium, pH_{H_2O} , pH_{KCl} .

The investigation results suggested that the soil pollution with Σ DDT is insignificant and records 2,1 MAC /the maximum admissible concentration (Figure 26). For heavy metals were recorded MAC exceedances of mobile copper in Leova, Cahul and Ungheni, reaching the maximum level of 6,1 MAC.

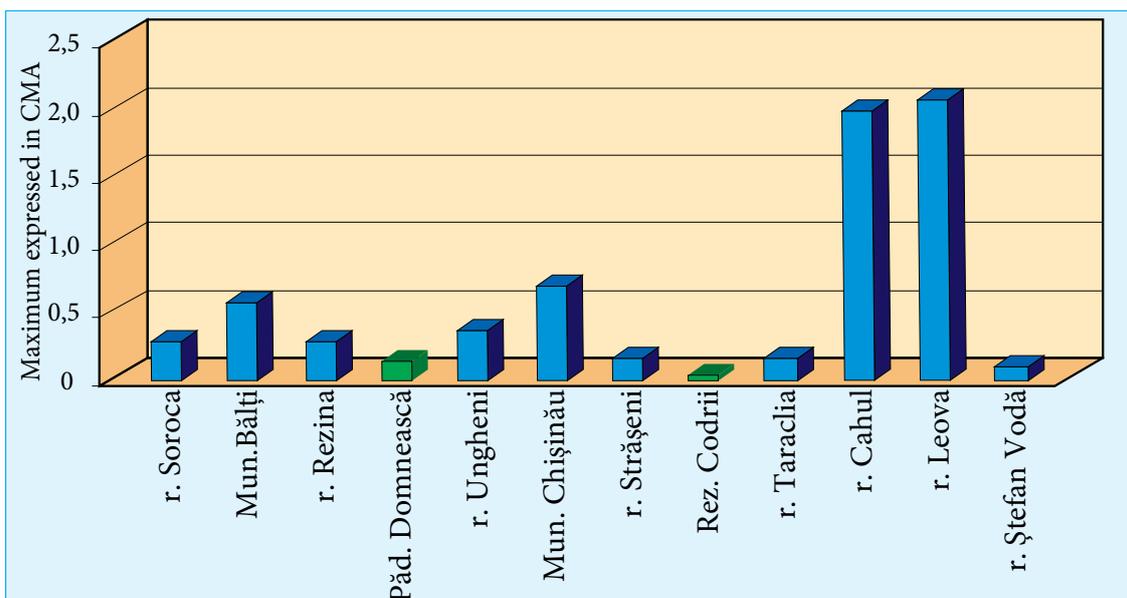


Figure 26. The maximum content of the Σ DDT in soil (2008)

In order to determine the content of OCP, PCBs, etc. in Chisinau municipality was conducted an investigation of soil in the parks: “Botanical Garden”, “Charming Valley” and “La izvor”. The results showed that the content in the soil of the monitored ingredients is insignificant and doesn’t exceed the MAC values. A higher level of Σ DDT is recorded in soil samples collected in the Park “Botanical Garden”, with a maximum of 0,176 MAC, and for BPC₇ – 0,03 MAC in the Park “La Izvor”.

Under the Action Plan for implementation of Stockholm Convention on Persistent Organic Pollutants, were conducted studies in Recea village (Riscani district), Ciobaccia village (Cantemir), Cosauti village (Soroca), Sadaclia village (Basarabasca), Hansca village (Ialoveni), Straseni town (“Fertility” JS), in order to determine the content of OCP in soil adjacent to 6 deposits with obsolete pesticides (Figure 27). According to investigation results, the OCP soil pollution was detected in: Cantemir district (Ciobaccia), district Soroca (Cosauti) and district Ialoveni (Hansca).



Figure 27. Pesticides storage

Also, investigations were performed on soil pollution with PCBs, adjacent to power system equipment, notably substations Riscani, Hincesti and Leova. The data obtained revealed that the area of electrical power substations does not exceed the PCBs MAC values. A higher level was detected in power substation of the Riscani district – 0,04 MAC.

National monitoring system has the tendency to extend, in order to cover more extensively the country areas with studies on the quality and state of environmental factors. Thus, it will contribute in solving the most pressing issues related to environmental quality and human health, the integration of environmental concerns in national economy sectors and promotion of sustainable development.

In order to improve the sanitation system in localities, the Government declared 2007 “Year of settlements sanitation” and approved the Concept on Sanitation of Settlements in Moldova. Both measures have had a beneficial impact sanitation improvement and greening the environment. It is worth to mention that each locality succeeded to involve various stakeholders: local public authorities and its services, education institutions, NGOs, initiative groups, volunteers, various institutions, organizations and private sector.

According to the Governmental Decree on Republican contest “The most modern, cleaned up and arranged locality” annually, are carried out sanitation works in all districts localities. The winners are awarded with considerable funds from the National Ecological Fund (NEF), that should be mandatory used by the local authorities for environmental protection purposes.

Also, in accordance with Presidential Decree on National Day “A Tree for Our Lasting”, twice a year (in spring and autumn) are carried out sanitation and settlements planning works. These activities, as well as projects for construction of solid waste landfills, are financially covered from NEF and local environmental funds. Thus, NEF allocated for this purposes 8209208 MDL (2006); 5365145 MDL (2007; 11676801 MDL (2008); 5827082 MDL (2009).

During 2005-2007, with the scope of National Program “Moldovan Village” implementation (2005-2015), concerning the activities of environmental factors improvement, was notices a significant increase of foreign investment for water and soil related projects. In order to mainstream and establish specific targets of the state policy in the field of localities’ sanitation, as well as its approximation to European Union requirements, the new draft Law on Waste was elaborated, which will be submitted to the Government for consideration and approval.

According to studies on soil quality in residential and industrial areas, agricultural land and places of waste storage, an increased level of organic pollution of soil was detected. During 2004-2008 the soil suffered from organic pollution. The weight of soil samples that do not meet sanitary standards for microbiological indicators, increased from 8,8% to 10,3% (Figure 28). The most contaminated areas are residential areas, where the deviation from existing standards is up to 9,77% of cases and adjacent areas of educational institutions- 11,25% of cases.

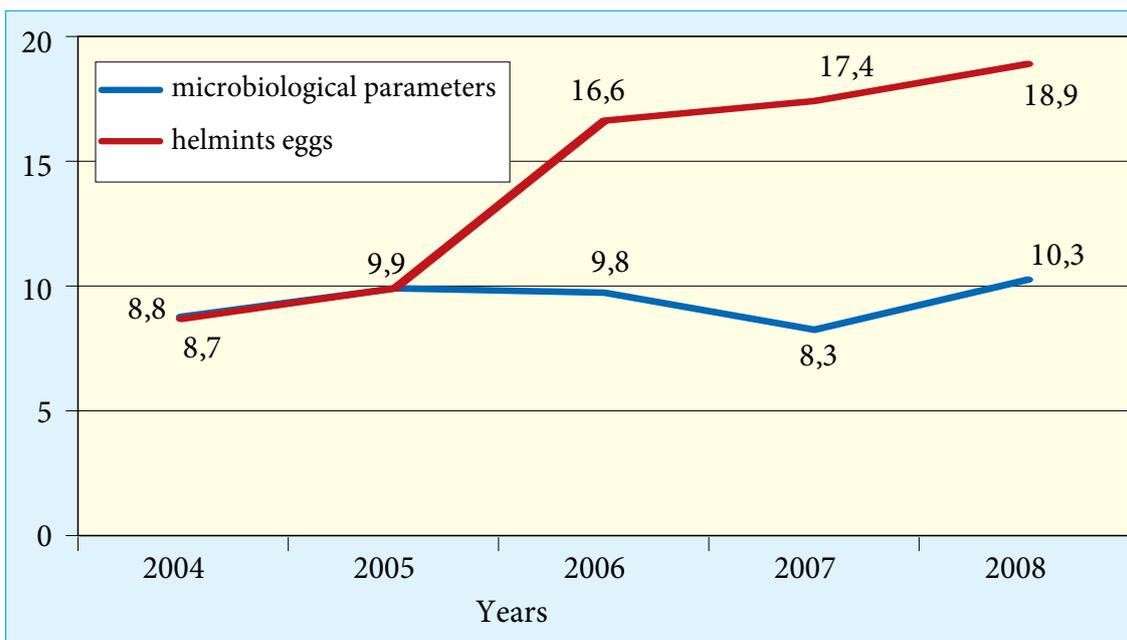


Figure 28. Data on soil pollution with microbial and helminth eggs infections (2004-2008).

Based on the diagram data, the weight of samples indicating soil contamination with helminth diseases increased from 8,7% (2004) to 18,9% (2008).

Soil pollution is reflected in Figure 29.

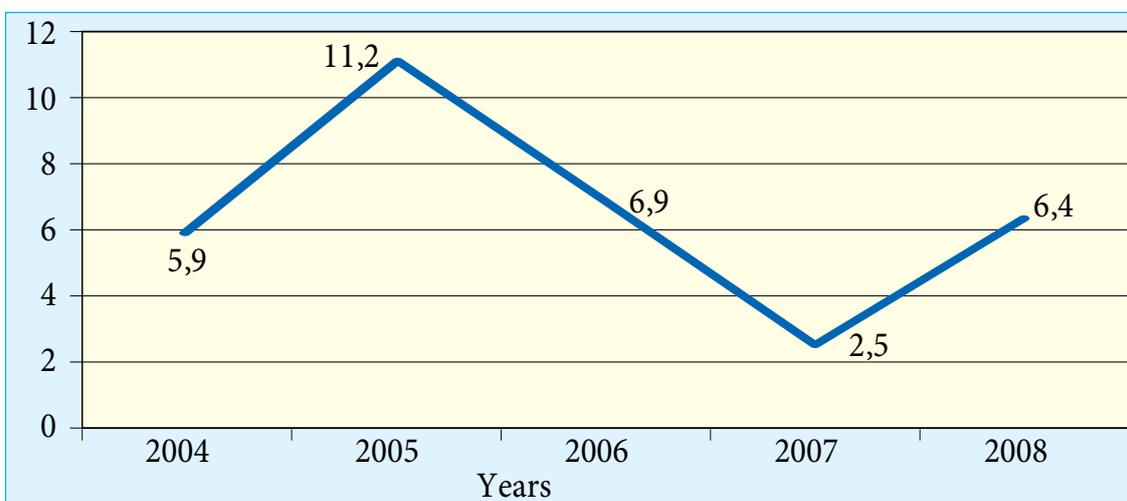


Figure 29. The weight of soil samples non-compliant with sanitary-chemical parameters.

The most affected areas were detected in Chisinau municipality, Telenesti, Riscani, Anenii Noi, Criuleni, Cahul, and other districts.

The main cause of soil pollution is still considered unsatisfactory organization and implementation of sanitation activities in localities, as well as incomplete coverage of sanitation activities, preference is being made for central residential areas. The number of motor vehicles, used for sanitation activities slightly increased from 606 units in 2004 to 649 units in 2007. However, due to the fact that the volume of waste disposed in authorized

landfills increased from 1101,9 to 1790,6 thousand m³/year, the number of units is not sufficient for timely evacuation of waste and sanitation services.

During 2004-2008 a high level of population's morbidity to infectious diseases transmitted by direct contact or by contact with contaminated soil was registered. Thus, in 2008 there were 28,82 cases of dysentery (in 2004 -38,51 cases) and 229,97 cases (2004 -193,75 cases) of acute intestinal infections caused by unspecified agents, as referred to 100 thousand population. Also, in 2008 were detected 18,36 salmonella cases (in 2004 -23,65), 177,54 (2004 - 161, 36) of ascariasis cases and 3,22 (2004-9,24) trichuriasis case per 100 thousand population, which are widespread in certain localities, particularly in rural areas.

It must be noted that in rural areas sanitation activities are performed unsatisfactory, the local authorities do not provide waste containers and specialized transport, or these services are absent. It was established a direct dependence between the soil degree of pollution and nitrate content of organic origin, which often exceed the maximum allowable concentration in water wells and springs in most localities.

Implementation of National Action Plan for implementation of the Concept on Sanitation of localities in Moldova, as well as Local Action Plans on sanitation, has created a positive precedent by involving all decision makers at central and local level, in solving environmental problems, which directly affect human health. The results obtained in 2007-2008 after implementation of the actions planned by central government and local authorities, give us hope that the issue of sanitation, unauthorized dumps, sanitation, etc., will improve significantly.

3.6. TEACHING CONDITIONS IN SCHOOLS FROM HYGIENIC PERSPECTIVE

School-age children spend a part of the day in school precincts, and majority of their time at home, being constantly influenced by indoor environmental factors.

Air temperature in classrooms, especially before the classes start, is low and its average is equivalent to 15,9°C (these data refer to so called "transition period", namely before and after the heating seasons). During lessons the temperature increases and reaches the highest level of 16,8° C, which is not in line with hygienic requirements.

The average limits of relative air humidity in classrooms are high, exceeding the hygienic norm limits with 17,8% in transition period. During the cold period of the year, the air humidity exceeds the hygienic norms with 10,5%.

The most evident changes in classrooms air quality are attested by the carbon dioxide content, that during lessons increases by 2 times, and exceeds the hygienic standard (0,1%) by 1,3-3,2 times during school activities.

Not less important for children's health are the *living conditions*, which usually are determined by the socio-economic welfare of the family. According to the study all children from rural areas live in individual houses. The percentage of the families that in the winter time live in one room is: 53,8% in the North, 22,3%; in the South and 24,3% in the Centre (Table 11). In the North approximately 40,5% of surveyed children don't have an individual bed, in central and southern part of the country this index is 31,6% and 29,7%.

Table 11

Living conditions of the school- age children

| | <i>During the winter time live in one room</i> | | <i>Child doesn't have individual bed</i> | | <i>Unfavourable socio-economic situation of the family</i> | | <i>Unfavourable psychological family climate</i> | |
|--------|------------------------------------------------|------|------------------------------------------|------|------------------------------------------------------------|------|--------------------------------------------------|-----|
| | No | % | No | % | No | % | No | % |
| South | 88 | 21,8 | 120 | 29,7 | 92 | 22,8 | 35 | 8,7 |
| Centre | 82 | 20.8 | 125 | 31.6 | 24 | 6.1 | 14 | 3.5 |
| North | 190 | 53.8 | 143 | 40.5 | 33 | 9.3 | 17 | 4.8 |

The residences of children with respiratory system pathology are often poorly ventilated, affected by damp and expansion of micelles. The average winter temperature is $17,8\text{ }^{\circ}\text{C} \pm 0,3^{\circ}\text{C}$ to $20,7^{\circ} \pm 0,4^{\circ}\text{C}$, during the transition period it constitutes $15,4^{\circ}\text{C} \pm 0,6^{\circ}\text{C}$. The concentration of CO_2 , in the houses that were subject of the study, vary during the transition to heating season and no heated season from 0,07% to 0,34%, the hygiene standard of 0,1% was exceeded in 70,5% cases. Infests of damp and mould were detected in 34,7% of houses. The most frequently indoor air is polluted with tobacco smoke, other family members becoming passive smokers. The scientific studies have confirmed the deleterious effect of tobacco smoke on development of respiratory symptoms, circulatory pathologies and heart diseases.

The main sources of health risk factors are residence/dwelling location, construction materials, furniture, carpets, tap water, natural gas, expired food, chemicals used or stored inside residential constructions, ventilation, excessive moisture, plants, animals, etc. The most toxic substances detected in living rooms are benzene, formaldehyde, acetic aldehyde, hexane, naphthalene. Chemicals found out inside dwellings constitute 8-20% of the indoor health risk.

The monitoring of Radon concentrations in indoor air samples, carried out during 2004-2009 throughout the country, proved that in most of cases it haven't exceeded the maximum permissible value and registered 92,0 – 179,1 Bq/m³. The following residential buildings exceeded the maximum permissible values of Radon concentration: that used building materials with enhanced level of natural radionuclide content, located directly on soil, having basement in subsoil, located on terrestrial rocks fissures.

To maintain and improve health of children affected by chronic respiratory diseases and their prevention the “*Methodical recommendations on prevention of children's chronic respiratory diseases*” were elaborated in 2009. The recommendations suggest the implementation of a complex of preventive actions focusing on removal of respiratory disease releasing factors and prevention of new cases.

At the level of Family Doctors Offices and Centres, special attention is given to identification of pre-morbid physical state, early diagnosis and treatment of acute and chronic respiratory diseases, including medical surveillance of children with asthma and chronic bronchitis.

3.7. CHILDREN'S AND ADOLESCENTS' PHYSICAL DEVELOPMENT

Children's physical development is an objective indicator of the society's state and represents a complex of body morpho-functional features that characterize biological age and ability of its activity. The level of children's physical development is determined primarily by socio-hygienic factors, in particular, the balanced nutrition, which is one of the faithful index of children's health and nutritional status. Harmonious development of children can be achieved through favourable conditions of life.

To obtain objective information on physical development in Moldova, for several decades is conducted physical development monitoring, using three somatic indicators: height, body weight and chest area. Studies have shown that different age children's growing parameters are similar to those of the same age children leaving in developed countries. However, a significant number of children under school age have deficiencies in physical development, depending much on living conditions.

In recent years, the proportion of children with physical retardation in secondary educational level is maintained at significant level – 17,1% in 2008 and 17,9% in 2006. As regards the share of children with medium physical development (small height), in recent years was noticed a decreasing trend: from 12,5% in 2006 to 9,6% in 2008. Simultaneously, it was registered the augmentation of the share of children with body mass deficit (in 2007 was 11%). The body mass is significantly influenced by exogenous factors.

Approval of physical development standards, both for boys and girls, has contributed to more objective monitoring of children's and teenagers' health. The latest investigations of teenagers between 15-18 years, showed harmonious development for 81,1%, inconsonant development with deficient body mass – 13,9%, inconsonant development with surplus body mass -4,2%, and physical development delays - 0,8% individuals.

The results of medical investigations of adolescents aged 16-18, suggested that 81,1% adolescents benefit of harmonious physical development. Inconsonant physical development with deficient body mass was registered at 14,5% adolescents, excepting 15 years teenagers -their share was 12,1%. The share of adolescents with inconsonant physical development with surplus body mass varies from 1,7% at 16 years to 5,9% at 17 years (average – 4,2%). The biggest share of adolescents with physical development delays was detected at 16 years old teenagers, representing 3,1%.

The physical retardation is a moderately spread phenomenon and varies between 11,1% and 14,8%, depending on the year. This phenomenon is affecting primary the students in rural areas. The average incidence of physical retardation of children in cities is 5,6%, in rural areas – 15,3%, in both cases was registered a downward trend (Table 12.).

Table 12.

The incidence of children with physical development delays (0-17 years)

| No | Residential area | 2004 | 2005 | 2006 | 2007 | 2008 | Average |
|----|------------------------|------|------|------|------|------|---------|
| 1. | Urban area | 7,7 | 6,0 | 4,9 | 5,7 | 3,6 | 5,6 |
| 2. | Rural area | 16,8 | 16,8 | 15,2 | 14,5 | 13,3 | 15,3 |
| 3. | Average in the country | 14,8 | 14,4 | 13,0 | 12,5 | 11,1 | 13,2 |

Children's physical development in localities with different environmental risks

Numerous scientific researches conducted over several years have proven that the child and adolescent physical development is influenced by living conditions and reflect their impact. In particular, the physical development indicators are lower in Southern part of the country as compared to Centre and especially the Northern area. As about the height of secondary level students (Table 13), we can see an insignificant difference between girls and boys, aged 8-10 and 15-17 years in different areas.

Table 13.

Height of students by sex, in cm

| <i>Part of the country</i> | <i>Girls (age)</i> | | | <i>Boys (age)</i> | | |
|----------------------------|--------------------|--------------|--------------|-------------------|--------------|--------------|
| | <i>8-10</i> | <i>12-13</i> | <i>15-17</i> | <i>8-10</i> | <i>12-13</i> | <i>15-17</i> |
| North | 133,1 | 157,3 | 163,3 | 134,0 | 152,8 | 172,3 |
| Centre | 131,4 | 156,7 | 162,1 | 133,6 | 155,0 | 174,1 |
| South | 133,4 | 150,8 | 159,8 | 131,5 | 147,7 | 172,2 |

The difference is quite remarkable for 12-13 years. Thus, the girls of this age in Northern part of the country have a larger height as compared to the Southern area. Such tendencies may be noticed in other age groups.

There are minor differences in body weight throughout the country. For the 12-13 years old girls the body weight is average of 48,9 kilograms in the North, 46,4 kilograms in the Centre, and 43,4 kilograms in the South. For boys the features of body mass are less prominent, although there have been noticed some trends in the South for the 12-13 years group. The same tendencies are revealed for the chest areas.

In this way, somatic indices show typical physical characteristics of the school-aged children from Moldova. These features may reflect the living conditions, including the nutrition level, depending on the socio-economic situation of the family.

Also, there were detected some peculiarities in physio-metric/functional indexes (vital capacity of lungs, blood pressure, muscle strength, body reaction to the effort), which all indicating a downward trend in the South.

It must be noted that environmental risks are higher in the South if compared to other areas. But practically, in all investigated localities the water from wells is highly mineralized: in the North - 1,7-2,0 g/l, in the Centre - 1,8-2,1 g/l, South - 2,6-2,7 g/l. The average level of the fix residue in the South is 2483,1 mg/dm³, which is comparatively lower than in the Centre and North of the republic, where these values are correspondingly equal to 1883,6 mg/dm³ and 1837,0 mg/dm³.

In localities with high level of soil pollution, areas adjacent to livestock, village households and sites contaminated with infiltrated animal manure, the groundwater contain an increased amount of ammonia, nitrites and nitrates. The most significant concentrations of nitrates were recorded in Northern and Southern parts of the republic, respectively 217,4 mg/dm³ and 243,2 mg/dm³. Nitrates concentration in the Centre is low and constitutes 118 mg/dm³, however it exceeds twice the admissible limits.

The nutrition of school-aged children is characterized by insufficient consumption of meat, meat products, dairies, fruits and vegetables. This leads to a considerable proportion of children with protein and vitamins malnutrition.

A particular problem for rural areas is children involvement in household responsibilities and physical work. Thus in the North of 48,2% of children recognized that during the free time they practice physical work, the South 46,5%, 36,7% Centre.

In the last decade the discrepancies between in rural and urban living standards have considerably increased. From human development perspective, children from villages have fewer opportunities in terms of access to decent living conditions, health services, education, qualitative nutrition. They are more frequently subject to environmental risks.

As result of children examination in schools and preschool institutions from the left bank of Dniestr River (Transnistria) was established a downward trend in preservation of children's health (Table 14).

Table 14

The results of prophylactic examination of children and adolescents from the left bank of Dniestr River during 2008-2009 (per 1000 children)

| <i>Contingent</i> | <i>Detected</i> | | | | | | | | | | | |
|--------------------------|-------------------------|-------------|-------------------|-------------|-----------------------|-------------|------------------|-------------|-------------------------------|-------------|---------------------------------------|-------------|
| | <i>Decreased acuity</i> | | | | <i>Speech defects</i> | | <i>Scoliosis</i> | | <i>Disturbance of posture</i> | | <i>Delays in physical development</i> | |
| | <i>Hearing</i> | | <i>Eye/visual</i> | | | | | | | | | |
| | <i>2007</i> | <i>2008</i> | <i>2007</i> | <i>2008</i> | <i>2007</i> | <i>2008</i> | <i>2007</i> | <i>2008</i> | <i>2007</i> | <i>2008</i> | <i>2007</i> | <i>2008</i> |
| Total children | 1,6 | 2,0 | 42,1 | 42,6 | 22,5 | 25,7 | 11,8 | 13,2 | 17,5 | 23,1 | 9,0 | 7,6 |
| including: preschool age | 1,8 | 0,7 | 16,5 | 17,2 | 64,4 | 57,4 | 4,3 | 2,5 | 1,4 | 5,6 | 4,7 | 2,0 |
| Students, first class | 2,4 | 3,9 | 26,2 | 27,8 | 20,7 | 18,7 | 3,9 | 6,9 | 4,25 | 6,8 | 8,8 | 4,7 |
| Students, classes 2-4 | 1,6 | 2,6 | 43,5 | 36,8 | 9,2 | 13,4 | 10,6 | 16,0 | 10,4 | 29,7 | 9,9 | 5,5 |
| Students, classes 5-9 | 0,8 | 1,7 | 43,9 | 47,7 | 3,3 | 3,8 | 15,1 | 18,2 | 25,8 | 31,5 | 7,4 | 4,4 |
| Students, classes 10-11 | 0,9 | 2,2 | 32,6 | 48,4 | 1,2 | 1,6 | 10,5 | 16,5 | 9,3 | 15,8 | 2,5 | 3,8 |

According to the above presented data, stability in decreasing of hearing and visual acuity is observed. Also, the number of cases related to speech defects, scoliosis, disturbance of posture and general physical retardation has increased.

Such increase of the examination indexes for prophylaxis purpose is due to the increase of the number of children that have to be examined, and to liven up the activity of the sectoral network.

There has been determined that the increase of the above mentioned disturbances is conditioned by the school furniture, which is incompatible with children's growth characteristics, by the insufficient level of lighting in schools and preschool institutions. The delay of physical development is related to irrational nutrition, the ratio of overloading with school activities as per insufficient level of physical activity, neglecting daily regime, etc. This situation may be viewed partially as the consequence of inefficient economic activities of school administration, health institutions and authorities, oriented towards liquidation or reducing the impact of environmental factors which negatively affect the health and physical development of children.

3.8. INFECTIOUS (COMMUNICABLE) DISEASES

Estimation of transmission pathways of infectious and persistent parasitic diseases suggests that environmental factors play a key role in transmission of infections and intestinal parasitoses. In Moldova, these groups of diseases are endemic, characterized with seasonal peaks. The most frequent are intestinal infections included according to the classification approved by the Ministry of Health within the class of *intestinal infections of undetermined etiology and incorrectly determined origins*: food poisoning (36,2% of the average infectious diseases), followed by ascariasis (28,6%), enteritis, colitis, gastroenteritis, food poisoning caused by determined etiologic agents(19,0%), dysentery (5,8%), salmonella (3,7%), enteroviruses (2,3%), etc. Transmission pathways and the conditions that favor transmission of infections are priority areas that require multisectoral approach.

3.9. ACCIDENTS AND INTOXICATIONS

Accidents are one of the major causes of death among children between 0-17 years (9,6 to 10,3 to 10 thousand inhabitants) and the main cause of death among children aged 5 to 19 years (28,3% of the total deaths). The main causes are road- traffic accidents, drowning or submersions, poisonings, burnings and falls. The most affected are obviously the most disadvantaged children. Death rates vary by age, the highest rates being recorded among children aged up to 1 year and adolescent boys. Although accidents are a major cause of disease burden and wastage of health and social resources, they were not yet declared a priority area for national policy.

According to the European database on mortality, in 2006 Moldova ranked the 4th position among the countries of European region, according to standardized age mortality rate due to external causes of death for the general population of 109.03 to 100 000 general population. In fact, in 2006 Moldova ranked 3rd according to the average standardized rate for all unintentional injuries among children between 0-19 years in 2003-2005. In specific cases, Moldova was ranked 4th according mortality rate by drowning and 5th according mortality rate due to poisonings and thermal injuries.

In the past five years the incidence of trauma and intoxication among children of 0-18 years was about 5000 (as against 100 thousand people), with the total of 41077 cases in 2008. Because the morbidity and mortality statistics are not disaggregated by specific age categories, all data referring to young people fall under 0-18 years age category.

The majority of traumas occur at home, approximately 37 thousand cases annually. Therefore, parental supervision is a key point for intervention. It is also alarming that 1600 cases of trauma occur in school, indicating the need for better supervision in school. The average of 130 cases of injuries occur at work, at the beginning of youth career, especially in agriculture, indicating lack of employment protection measures and training in labor security.

It is worth to mention that in the past five years 226 children have died by drowning or submersion. This could be easily prevented, without major costs, if there were created safe facilities near lakes. Although injuries pose the heaviest burden on the health system and are the leading cause of children and adolescents death, there are no specific national programs on accident prevention elaborated. Little work is done to ensure a safe environment for children and adolescents and to improve parental supervision.

3.10. CHILD ABUSE AND DOMESTIC VIOLENCE

A series of studies, revealed insufficient parental skills. In some families are still used abusive methods of children's education. 1/3 of children reported emotional abuse, 10% were neglected by the family, 1/4 of children said they were beaten when not rendering obedience to parents, and 30% of mothers mentioned that they beat their children because this the right way for them to become more disciplined and obedient. Also, 1/3 of children said they were verbally abused by teachers at school and 24% of children felt discriminated by teachers.

3.11. MORBIDITY AND MORTALITY OF CHILDREN AS RESULT OF MORBID CHRONIC CONDITIONS AND INJURIES

In general, morbidity and trauma, being caused by incidence or prevalence, in some serious cases lead to abnormal conditions incompatible with life. This is referring also to the population aged 0-17 years. Based upon official statistics data, for the past 5 years was registered the maintenance of the incidence and prevalence level of children at significantly higher rates (Figure 30), ranging from 5452,9% (7350,0% prevalence) in 2004 and 5298,3% (7075,4% prevalence) in 2008.

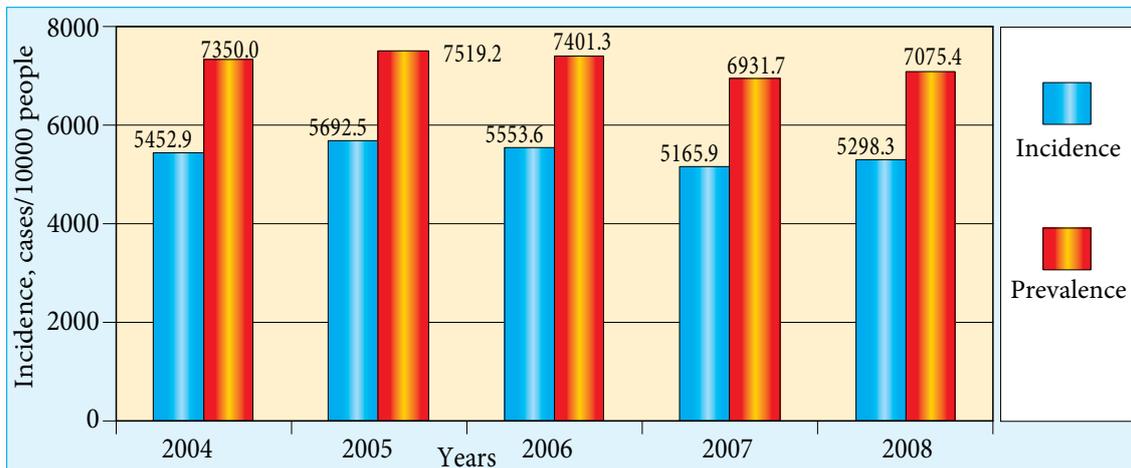


Figure 30. Dynamics of the incidence and prevalence for 0-17 years old children, at 10 thousand inhabitants (2004-2008)

The analysis of structure for dominant disease cases, which doesn't exclude the impact of environmental factors in their genesis, indicates the weight values of ca. 75,6% of cases, representing an average incidence rate of 4235,8/10.000 at 0-17 years aged children (excluding infectious pathology). The respiratory diseases prevail in the structure of dominant cases - with 44,17% (without pathologies of infectious origin), followed by traumatic injuries, poisonings and other externally caused consequences - with 9,41%, skin and subcutaneous cellular tissue diseases - with 8,13%, digestive system diseases - with 4,78% and others (Table 15).

In the Table below is presented the incidence of diseases at children from left bank of Dniestr River Thus the basis of chronic morbidity (less frequently the acute morbidity background) and traumatic injuries, including poisoning are the leading causes of children death, aged 0-17 years. The overview of the structural components for children traumatic injuries, according to their area of expression, suggested that about 80% of these phenomena are caused by habitual conditions (Figure 31). Occurrences of these phenomena in habitual conditions, and the extent of their impact on children's health, are determined by the sanitary education and responsibility of supervisors.

Table 15.
**The weight of dominant disease cases in the structure of morbidity
at 0-17 years old children (2004-2008)**

| <i>Disease classes and nosological entities</i> | <i>Weight of disease cases (%)</i> | |
|---------------------------------------------------------------------------------|------------------------------------|----------------------|
| | <i>By incidence</i> | <i>By prevalence</i> |
| Infectious and parasitic diseases | 13,3 | 10,5 |
| Blood and hematopoietic organs disease, and some disorders of the immune system | 3,8 | 5,4 |
| Respiratory system diseases | 44,2 | 36,1 |
| Digestive system diseases | 4,8 | 8,2 |
| Skin and subcutaneous cellular tissue diseases | 8,1 | 6,6 |
| Traumas, poisoning and other externally caused consequences | 9,4 | 7,1 |
| Other diseases | 16,4 | 26,1 |

Table 16
Structure of chronic illnesses of children from left bank of Dniestr River in 2006.

| <i>Diseases</i> | <i>Preschool institutions</i> | | <i>Growth rhythm %</i> | <i>Schools</i> | | <i>Growth rhythm %</i> |
|------------------------------------------------|-------------------------------|-------------|------------------------|----------------|-------------|------------------------|
| | <i>2005</i> | <i>2006</i> | | <i>2005</i> | <i>2006</i> | |
| Respiratory system diseases | 9 | 10,4 | 37,3% | 20,8 | 21,2 | 2 |
| Digestive system diseases | 47,4 | 65,1 | 15,5% | 84,6 | 70,0 | -17,3 |
| Nervous system diseases | 13,9 | 45,3 | 225,9% | - | - | - |
| Psychiatric disorders | 76,9 | 16,3 | -78,8 | 20,6 | 21,4 | 3,8 |
| Skin and subcutaneous cellular tissue diseases | 0,9 | 0,4 | -55,5% | 2,3 | 2,6 | 13 |
| Urinary system diseases | 90,2 | 61,7 | -31,5% | 115,7 | 113,8 | -1,6 |
| Circulatory system diseases | 18,9 | 17,2 | -8,9% | 0,96 | 1,6 | 66,6 |
| Auditory and vestibular system diseases | 0,2 | 0,2 | 0 | 1,4 | 0,9 | -35,7 |
| Blood and haematopoietic organs diseases | 22,8 | 9,8 | -5,7% | 2,6 | 2,5 | -3,8 |
| Endocrine system diseases | 0,9 | 0,4 | -55,5 | 12,1 | 10,6 | -12 |

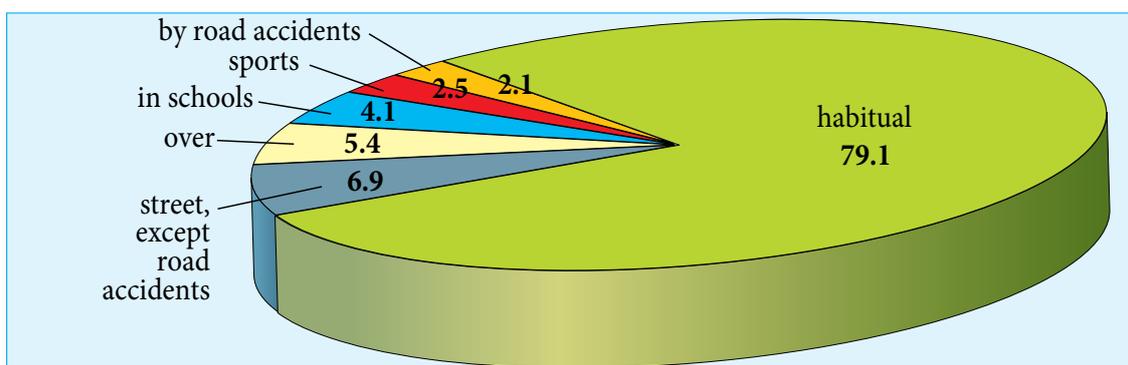


Figure 31. Distribution of trauma cases at 0-17 years old children, that are not related to production (absolute average for 2004-2008, %)

The dynamics of the children death causes indicates that, over the years the same cases persist (Figure 32).

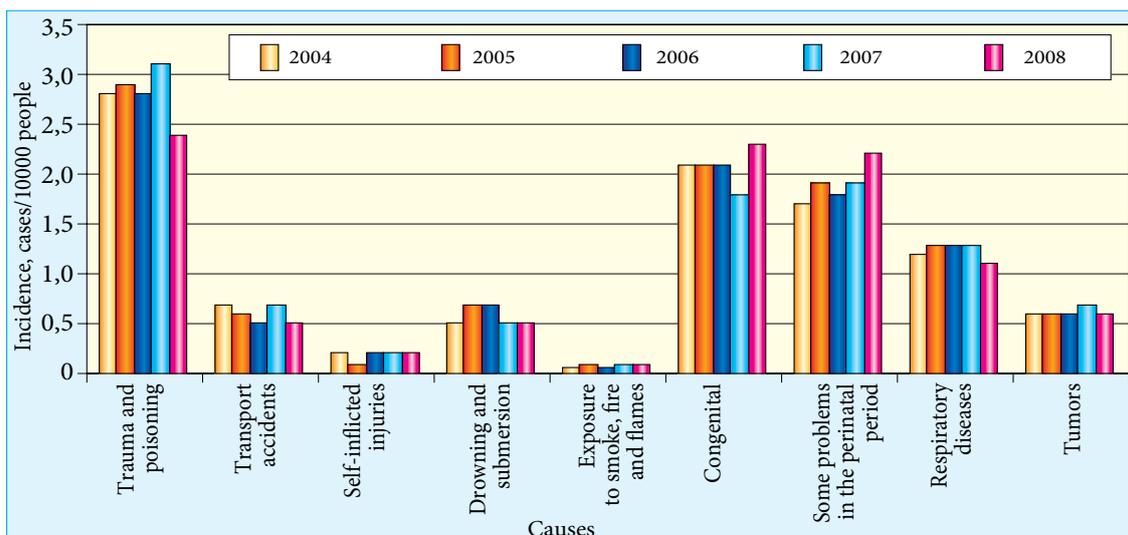


Figure 32. Weight of children deaths, 0-17 years (per 10000 inhabitants)

It should be pointed out that if the environmental factors, as the main cause of children's death born with birth defects and other problems in the perinatal period, is a causal result of *indirect* influence on their health, then for deaths caused by trauma, poisoning, including road traffic accidents, self-inflicted injuries, drowning, burns, intoxication by inhalation of combustion gases (CO, CO₂) and drugs – the influence of the environmental factors is *direct*. The weight of the latter in the general structure of children mortality is 40,8%. For example, the children mortality ratio from drowning in 2008 was ca.5,7 per 100 000 children aged 1-19 years, including 6,7 per 100 000 children aged 1-4 years, 4,9 per 100000 children aged 5-14 years. The majority of these cases indicate lack or decreased level of conditions and arrangements for leisure and recreation of children, according existing requirements and standards. Another example may serve children death by burns or inhalation of combustion gases (CO and CO₂) during the fire. In 2008 were registered 5,3 deaths per 100 thousand children aged 0-1 years and about 4,0 deaths per 100 thousand children aged 1-4 years. Children death rates, as to the main causes, remain at relatively high levels with insignificant deviations in the referred period (Table 17).

Table 17

Children mortality aged 0-17 years, as to the main causes of death (per 10 thousand inhabitants)

| Years | 2004 | 2005 | 2006 | 2007 | 2008 |
|--------------------------------------|------------|-------------|------------|------------|------------|
| Total | 9.8 | 10.3 | 9.9 | 9.9 | 9.6 |
| Trauma and poisoning, including: | 2.8 | 2.9 | 2.8 | 3.1 | 2.4 |
| - road-traffic accident | 0.7 | 0.6 | 0.5 | 0.7 | 0.5 |
| - self-inflicted injuries | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 |
| - drowining and submersion | 0.5 | 0.7 | 0.7 | 0.5 | 0.5 |
| - exposure to smoke, fire and flames | 0.06 | 0.1 | 0.07 | 0.08 | 0.1 |
| Congenital malformation | 2.1 | 2.1 | 2.1 | 1.8 | 2.3 |
| Affections in perinatal period | 1.7 | 1.9 | 1.8 | 1.9 | 2.2 |
| Respiratory system diseases | 1.2 | 1.3 | 1.3 | 1.3 | 1.1 |
| Cancers | 0.6 | 0.6 | 0.6 | 0.7 | 0.6 |

The mortality of children aged up to 5 years is one of the countries public health assessment index. It also used to estimate the degree of country's economic and social development (used by WHO). It is considered that at this age children need to be permanently and adequately supervised and all external causes of danger for children's health need to be consciously eliminated or maximally minimized. Unfortunately, according to this index, the Republic of Moldova is ranked among the lowest positions in Europe. The under-five mortality rate registered on 01 January 2009 was about 7,3 per 100 000 inhabitants, or 14,4 per 1 000 live births. There was conducted an assessment of "under-five mortality" index through the perspective of country's economic regions. The results of the assessment suggested its different manifestation throughout the country, indicating the existence of factors which cause a higher death rate in the Gagauzia Yeri, Southern and Northern regions of the country, as compared with the Center (Figure 33).

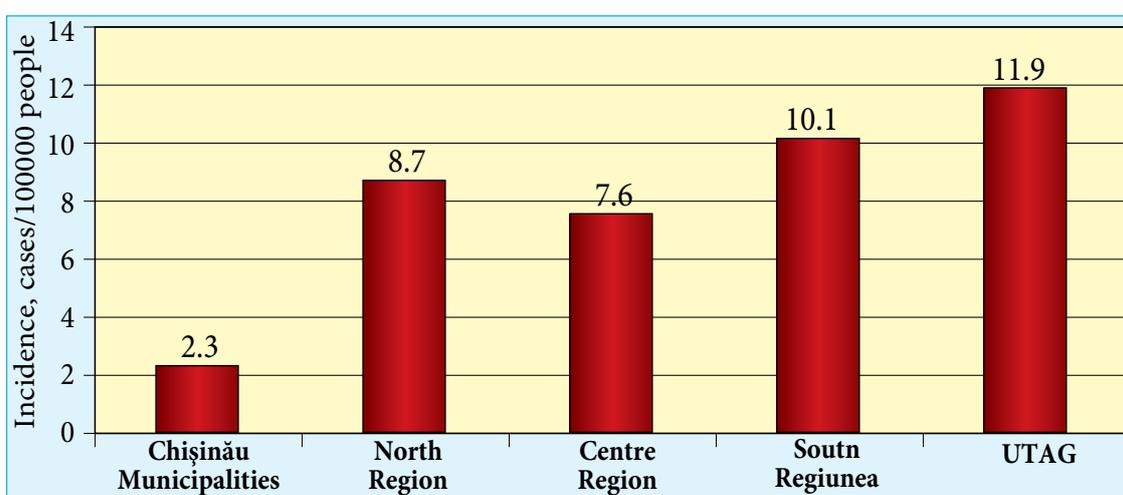


Figure 33. Under-five mortality rate, through country's economic regions perspective, 100 thousand inhabitants.

The above mentioned facts demonstrates that the measures taken by the society, including health and environmental authorities, both at central and local levels, for the prevention or prophylaxis of above mentioned issues, are insufficient and inefficient.

Table 18. Infant mortality rate as to the most frequent causes during 2004-2008 (per 1000 live births)

| Years | Total per 1000 live births | Inclusiv: | | | | | | |
|-------|----------------------------|-----------------------------------|-------------------------|-----------------------------|------------------------------------|--------------------------|----------------------|--------------|
| | | Infectious and parasitic diseases | Nervous system diseases | Respiratory system diseases | Affections in the perinatal period | Congenital malformations | Trauma and poisoning | Other causes |
| 2008 | 14.4 | 0.5 | 0.2 | 2.0 | 4.6 | 4.4 | 1.7 | 1.1 |
| 2007 | 14.0 | 0.5 | 0.2 | 2.2 | 3.9 | 3.3 | 2.8 | 1.0 |
| 2006 | 14.0 | 0.5 | 0.4 | 2.4 | 3.9 | 4.0 | 1.8 | 1.1 |
| 2005 | 15.6 | 0.9 | 0.5 | 2.4 | 4.2 | 4.2 | 2.4 | 1.0 |
| 2004 | 15.3 | 0.9 | 0.4 | 2.4 | 3.8 | 4.4 | 2.2 | 1.3 |

IV. BEHAVIORAL FACTORS. HEALTH EDUCATION

4.1. HEALTH EFFECTS OF TOBACCO

Smoking is one of the behavioral factors that negatively impacting human health. Nowadays, worldwide, every tenth adult death is caused by the use of tobacco. WHO suggests that about 4 million deaths refer to tobacco. This figure is forecasted to increase up to 5,4 million per year until 2020. The European Region of the WHO, with a population of only 15% of the total world population, is facing almost the third part of the global burden of diseases associated with smoking.

The scientific researchers showed that tobacco use is the leading cause of some fatal diseases. Smoking is one of the main factors of major risk and causes at least six devastating chronic diseases: heart disease, cancer, cerebral vascular disease, diabetes, chronic destructive lung disease and atherosclerosis.

Tobacco use is the cause of over 50% of malignancies, 90% of which is lung cancer; 80% of chronic emphysema-bronchitis; more than half of cardiovascular and cerebral vascular diseases.

Smoking has a negative impact on reproduction. A decrease in sperm content and disorders of sexual potency are detected at the young men. A more frequent failure of ovum fertilization (spontaneous abortion) is detected at smoking women. This shows that cigarettes consumption causes infertility (sterility). In the pregnant smoker case, the fetus evolution is affected by the weak blood circulation in the uterus and placenta and low levels of oxygen in blood. As a result, the risk of premature birth and / or invalidity of the new baby is increased. Tobacco use during pregnancy may cause premature births, and the development of abnormalities such as absence of extremities.

Harmful effect of tobacco smoke (passive smoking) is also well known. But early harmful effects of tobacco use are less known. Some researches suggest that the acquisition of leuro tobacco products causes a 0,3 euro costs for treatment of tobacco related diseases.

Tobacco use in the Republic of Moldova

In the Republic of Moldova, one of the most accepted social behaviors, harmful to health, is the use of tobacco items. In the past 10 years this is one of the fundamental problems in permanent growth.

Currently, about 46% of adult population and about 15-18% of school aged children (13-18 years) smoke. Almost every sixth adult women (circa 13,5%) is smoking. The number of girls and women starting smoking is also increasing.

Compared to Europe these figures are extremely high. Extensive use of tobacco has serious consequences for human health. Smoking also has an important role in the population number decrease in Moldova, which is considered to be a national problem.

A major problem is that smoking is widely spread among the young people who start to smoke at an early age, which is also a widely spread phenomenon in the world. Some national studies showed that in recent years, 3/4 of young people aged between 15-17 years said they had already tried smoking and almost 1/3 of them consume cigarettes at least once a week. Although the frequency of cigarette consumption is higher for male individuals, the difference of cigarette consumption by sex is small (less than 5%).

Tobacco control in Moldova

On May 11, 2007 the Moldovan Parliament has passed the Law on ratification of the Framework Convention of the World Health Organization on Tobacco Control, assuming the commitment to join the treaty obligations. To achieve these commitments the Parliament approved the Law on Tobacco and Tobacco items. It refers to the following things:

- tobacco advertising is prohibited;
- the marketing and distribution of tobacco products is regulated by this Law;
- prohibition of smoking in public places;
- prohibition in the country of any tobacco goods which are not smokable (tobacco for chewing, sniffing or sucking);
- prohibits the direct or indirect advertising of tobacco products on TV, radio, in press or via internet, at the cinema, using their trade mark or to promote other goods or services, and external advertising of tobacco products;
- prohibit the sale of tobacco products to minors (under 18 years).

Policy and Intervention

In order to monitor the efforts in implementation of the WHO Framework Convention on Tobacco Control provisions, Atlanta CDC (USA) and Canadian Public Health Association launched the Global Survey on Youth Smoking (GYTS) to help countries to monitor tobacco use by youth, attitudes and exposure to passive smoking, etc.

This report presents the results of the GYTS survey conducted in Moldova in 2004 and 2008 by the National Center of Preventive Medicine, which suggest that smoking, consumption of tobacco and passive smoking is currently declining among youth.

It was found that factors influencing the consumption of cigarettes are decreasing. It was also observed an intensified orientation towards smoking prohibition in public places and promotion in the mass-media of the anti cigarette consume.

Moldova has implemented anti-tobacco legislation in accordance with the assumed commitments. GYTS study results suggest that these efforts had a positive impact on reducing tobacco use among adolescents.

In Moldova, in 2008 four students out of ten (39,2%) 57,7% of boys and 24,3% of girls have smoked in the past, in 2004 – 41,7% of students, 64,4% boys and 22,7% girls smoked cigarettes, 13,2% are currently using tobacco products (boys - 23, 8%, girls 8,2%). However, there is a decrease in the level of smoking from 15% in 2004 to 13,0% in 2008.

Table 19

Tobacco products users by category

| Category | 2004 | | | 2008 | | |
|--------------------------------------------------------------------|-------|------|-------|-------|------|-------|
| | Total | Boys | Girls | Total | Boys | Girls |
| Have smoked cigarettes in the past | 41.7 | 64.4 | 22.7 | 39.2 | 57.7 | 24.3 |
| Smokers who have started smoking cigarettes at the age of 10 years | 46,1 | 51.1 | 33.5 | 49.2 | 54.1 | 40.5 |
| Current smokers | 13.7 | 23.0 | 6.0 | 11.3 | 18.5 | 5.6 |
| Currently using other tobacco products | 8.3 | 12.8 | 4.2 | 8.2 | 11.6 | 5.1 |
| Waterpipe tobacco users /shisha | 3.3 | 4.6 | 2.0 | 3.5 | 4.7 | 2,4 |

Since 2004 (46,1%) until 2008 (49,2%) was noticed a slight increase among smokers who started smoking cigarettes at the age of 10 years. Approximately one of ten students felt the need to smoke a cigarette in the morning 9,0% (10,9% boys and 4,9% girls) in 2004 and – 9,1% (8,7% boys and 7,6% girls) in 2008, indicating a serious addiction to tobacco. Exposure to passive smoking was high among all Moldovan students, both at school and in public places.

4.2 ALCOHOL CONSUMPTION

Excessive alcohol consumption (abuse) is a major concern for many European countries. The highest consumption of alcohol in the world is registered in this region and it is considered the third, by frequency, risk factor for death and disability.

The total costs related to alcohol consumption bore by society are equivalent to 1-3% of Gross Domestic Product (WHO, 2001).

Moldova is an agricultural country, viticulture and winemaking has been over the years the main income in country's economy. Large quantities of wine are traditionally consumed in the country. An estimated average of over 12 liters of pure alcohol is consumed annually by an inhabitant aged over 15 years, exceeding twice the average of the EU countries and of the Commonwealth of Independent States (CIS).

In 2008, 81,8% of young people aged between 15 and 24 years consumed alcohol, boys consume more alcohol than girls. Occasional alcohol abuse was reported by more than half of respondents, 58,7% of them drunk six or more glasses of wine or its equivalent in stronger alcoholic beverages on occasion.

Another study showed that young people do not perceive alcohol as a problem. Only 54,4% of girls and 47,1% of boys (42,7% of respondents from the Transnistrian region) consider alcohol abuse as a problem. Consultations held with young people showed that adolescents perceive smoking and drugs as bigger problems if compared to alcohol, indicating a low awareness of the youth about the negative consequences of alcohol and the acceptance by young people of excessive alcohol consumption culture.

Legislation on the control of alcohol and drugs consumption

State policy on the control prevention of excessive alcohol consumption, illicit drugs and psychotropic substances consumption, reduction and eradication of these habits, education on population's abstinence and healthz lifestzle, as well as removal of the consequences of phzysical and/or mental dependence on alcohol and drugs, was established by the Law on Control and Prevention of Abusive Alcohol Consumption, Illicit Drugs and Psychotropic Substances Use. The Law on Advertising set restrictions on alcoholic beverages advertising.

4.3. DRUGS USE AND DRUG RELATED PROBLEMS

Drug use is one of the challenges which humanity is facing. Its direct and indirect effects reveal it as a worrying phenomenon, worthy to be considered in international co-operation programs.

The number of drug addicted persons in Moldova is constantly increasing, becoming a serious factor that negatively affects the society development and presents a danger to public health. Since 1986, the spread of drug addiction got an epidemic character.

The transition from adolescence to early adulthood period is a crucial period in which young people often start experimenting with drugs. Drugs can be very tempting for young people starting their own struggle for independence, as they are in search of their identity. Marginalized and neglected young people are particularly likely to be tempted by drugs.

Moldova is a country where drugs such as cannabis and opium are grown, produced and consumed. Analysis shows that while the use of lighter drugs like cannabis and methamphetamine in Moldova is lower than in EU countries, the prevalence of injecting drugs is high in comparison with other European countries (Figure 34).

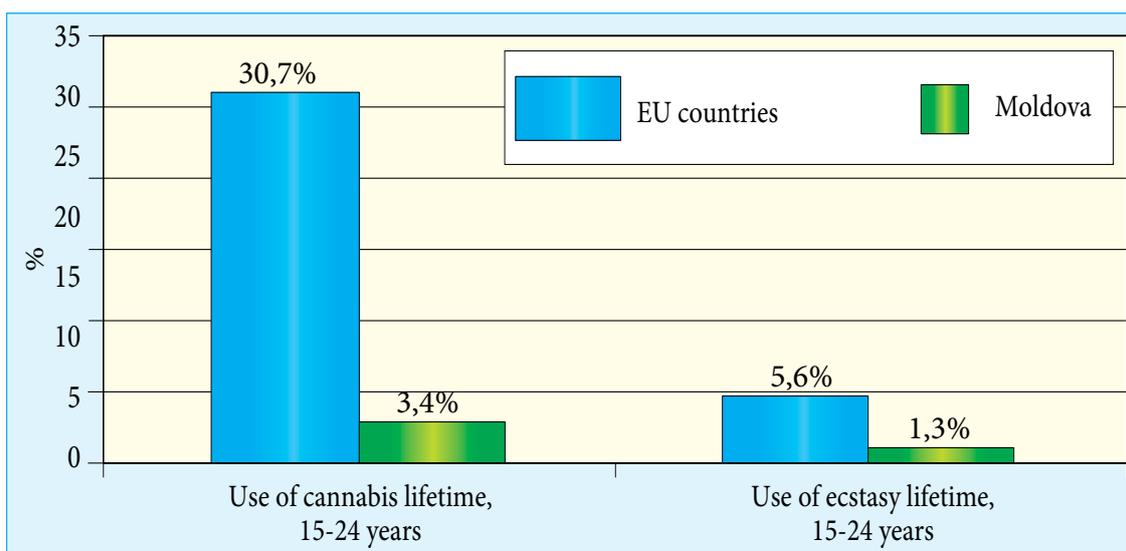


Figure 34. The use of cannabis and ecstasy in Moldova as compared to EU countries, 2008

Average prevalence of cannabis use among young people aged 15-24 years in Europe is 30,7%, while in Moldova is 3,4% for the same age. The same applies to the use of synthetic drugs such as amphetamines. If the prevalence of ecstasy use in Europe is 5,5% among people aged 15-34 years, then in Moldova it is 1,3% for the same age.

Injecting drug users are subject to the highest risk of facing health problems due to drug use, such as blood-borne infections (e.g. HIV/AIDS, hepatitis) or deaths caused by drugs. Injecting drug prevalence is higher among young people Moldova than young people from EU countries. While some EU countries reported a prevalence of opioid drug (usually equivalent to injectable drugs) between 0,1% and 0,6% of the population (15-64 years), a study in Moldova indicates a prevalence of opioid drugs use of 0,5% of the population (15-64 years) and 1,0% for 15-24 years old population. There is no comparison available for the prevalence of opioid use among young people aged 15-25 years in European countries (Figure 35).

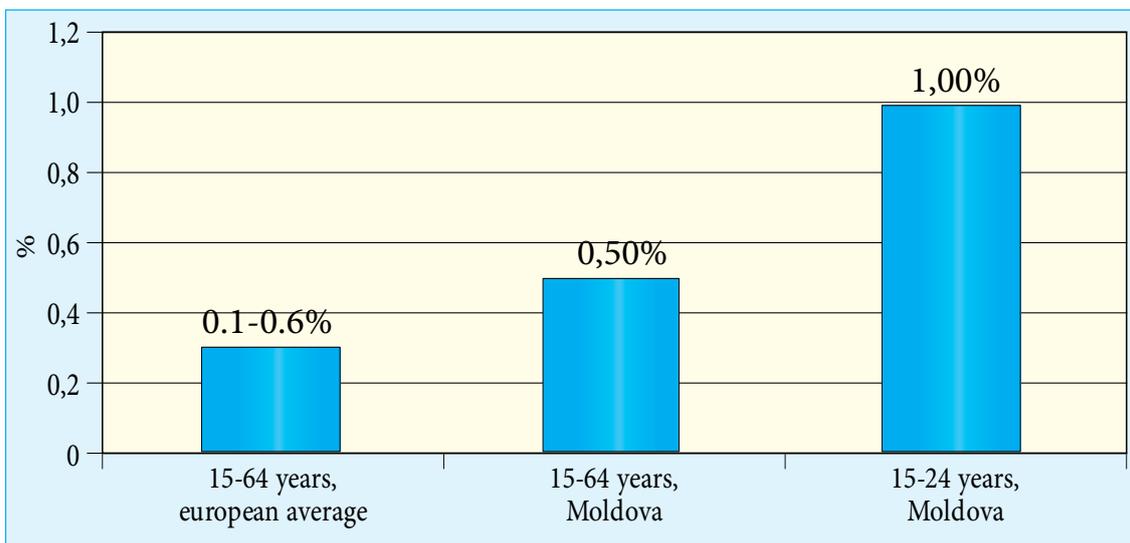


Figure 35. Prevalence of opioid drugs in Moldova as compared to EU countries, 2007

According to statistics, the number of drug users in Moldova increases annually by 42,3%, affecting younger and younger people, 120-140 drug addicted persons die each year. Reasons for drug use in most cases are: curiosity – 46,3%, imitation - 12%, peer influence – 39,2%.

Incidence of drug addicts is officially in the database of the Republican Narcological Dispensary and constituted 1256 cases in 2009 (34,9 cases per 100 thousand population), as compared to 1138 cases in 2008 (31,9 cases per 100 thousand population), prevalence reaching 8802 cases (238,0 to 100 thousand population).

Most cases (about 87%) are recorded among young people aged between 18 and 35 years. According to national statistics, in 2009, 10 adolescents with clinically documented addiction to any type of drugs and 114 adolescent drug users in the age group 0-18 years were registered. However, a study among adolescents consuming injection drugs conducted in three cities suggested a total of 193 injecting drug users aged 12-18 years in

only four months of the study. At the same time, according to another study, 4,9% of boys and 2,3% of girls with the age between 12-18 years confirmed the current use of drugs.

The estimation of absolute numbers of cannabis and opiate drugs users in the above mentioned youth survey (2008), revealed that about 8 000 young people have used opiates during their life, and about 23 000 young people in the age group of 15-24 years have used cannabis at certain period of their life. This indicates an insufficient degree of reporting in the official records of the Narcological Dispensary. The insufficient level of reporting has procedural reasons. Officially registered cases are entered into the Narcological Dispensary database only if the person was directed by police or was examined by doctor. Anonymous treatment cases are not introduced in the database.

However, despite unfavorable statistics, only 30,0% of girls and 26,5% of boys consider drug use as a major social problem, all they perceive drug use as less important problem if compared to smoking and alcohol abuse. In Transnistria 93,5% of youth know someone who use drugs, and 76,3% consider drug use as a problem for their community. There is a difference between young people from urban and rural areas, less than 50% of young people in rural areas know someone who uses drugs, if compared with 86% of urban youth.

Modern methods of drug treatment, rehabilitation and psycho-social recovery are applied in the Republican Narcological Dispensary. The anonymity of patients is also guaranteed there. Annually about 70% of registered drug addicted persons are involved in educational programs, prevention and treatment actions. At the end of 2009 a number of 12632 injecting drug users benefited of risk reduction projects in Republic of Moldova.

V. THE CLIMATE CHANGE EFFECTS AND NATURAL HAZARDS

Disasters are emergency circumstances which can cause excessive morbidity and mortality among the population and can significantly affect the environment. The risk of natural disasters occurrence is everywhere, both in big cities or rural areas. They may be caused by earthquakes, landslides, abundant heavy rains (flood, outpouring, hail), drought, fires, accidents, etc. In recent decades, this list is supplemented with natural disasters caused by climate change phenomena.

Poor sanitary and hygienic conditions in the areas affected by disasters worsen the sanitary-epidemiological state. The systems ensuring the vitality of settlements, including water supply, solid waste disposal, sewage, pluvial water flows, etc. are destroyed or heavily damaged. The character and degree of sanitary-epidemiological complications depend on factors that have caused the catastrophe and on local particularities.

Nowadays, there was reached a global scientific consensus linked to climate change process. For example, in the summer of 2003 twelve European countries have reported over 70 thousand additional cases of deaths as compared to the average of deaths for the same period of the previous five years. Similar accident, although of smaller scale, was also observed in Chisinau, during the summer of 2007, when there were registered 189 of additional death cases as compared with the warm period average of six previous years. If global warming trends will remain, the occurrence of the extreme weather phenomena - heat waves, storms, droughts, floods, etc., will become more frequent and expressive. Consequently, the food and drinking water sources will be jeopardized, people's living environment will be affected and many plants and animals species will be threatened.

The International Panel for Climate Change (IPCC) has concluded that at the global level, millions of people will be affected by malnutrition and hunger, frequent diseases, injuries and deaths, caused by public health emergencies.

Natural disasters, particularly those caused by extreme weather phenomena, may serve or, when appropriate action are not taken, act as a catalyst in triggering the various aggravations, more frequent epidemiological ones. There are different pathways of epidemic processes activation. The Republic of Moldova is one of the Central European countries, which is more frequently affected by natural disasters.

Infants and children represent the most vulnerable layer of population, because they are sensible to disasters, both of natural and anthropogenic origins. Since the infant thermoregulatory mechanisms are still imperfect, it's necessary to ensure a microclimate for them, which would satisfy certain values of temperature, humidity, air movement, etc. Their immune system also is still imperfect, leading to a higher risk of intestinal infections, respiratory or any other origins. Another important fact is that children at this age are totally depending on the parental care. This factor may become decisive during extreme weather phenomena and disasters.

The results of multiannual studies in Moldova may serve as an example of disasters' impact on children's health. Excepting dysentery and viral hepatitis A, it was detected a direct and close correlation of children intestinal infections incidence with monthly average temperature and a modest correlation with the average monthly rainfall. Regarding the viral hepatitis A, its negative correlation is explained by the fact that its incubation period is extended and often exceeding one month. Cross-correlation shows a genuine correlation coefficient with the average temperature in previous month ($r = -0.724$).

VI. INTERVENTION INDICATORS

(POLICY DOCUMENTS FOR AMBIENTAL HAZARDS REDUCTION)

The main goal of the National Health Policy in the Republic of Moldova (approved in 2007) is to create optimal conditions for each individual to achieve maximum health potential throughout the life and achieve adequate standards of population's quality of life.

The National Development Strategy for 2008 - 2011 (approved in 2007) defines "strengthening of healthy society" as a medium-term development priority. The following measures are foreseen in this regard: analysis of factors which can explain the differences in life expectancy between men and women, strengthening and further expansion of Youth Friendly Health Services Network and ensure youth access to information, education and communication on health issues, strengthening maternal and child health, strengthening control on communicable diseases, reducing the burden of non-transmissible diseases, in particular by disease prevention through micronutrients deficiencies (iron and iodine) and launching national anti-smoking and anti alcohol campaigns, prevention of children injuries and accidents.

The Strategy on Health System Development for 2008-2017 (approved in 2007), transposes the main goals and priorities set out in the National Health Policy, establishes as the overall objective "organization and provision of adequate health services tailored to the population's needs, strengthening of public health services as part of the development of health system priority areas which impact public health and have a strategic scope.

In recent years were noticed some weaknesses in public health policy coordination and monitoring. Legislative and regulatory framework on public health was not aligned with national development priorities and EU legislation. In order to improve the efficiency of health services, adapting them to new needs, optimizing health costs, ensuring equity and enhancing the quality and affordability of public health, the State Sanitary- Epidemiological Service was reorganized into the Public Health Surveillance State Service.

The Public Health Surveillance Service State was an adequate and coordinated response to the new challenges influencing the state of public health, encompassing problems identification regardless their origin – communicative or non-transmissible, their prioritization and developing of appropriate preventive and control measures. In order to ensure the state control over the implementation of health policies and programs, the above mentioned service was empowered with coordination of public health activities at the territorial level, training the regional health institutions, local government authorities and other central government structures.

The State Sanitary - Epidemiological Service reformation into the Public Health Surveillance Service State was based on the following principles: developing of public health regulatory and legislative framework in line with national development priorities and EU legislation; complex study and evaluation of health problems regardless of their origin with elaboration of appropriate preventive and control measures; functional delimitation of the monitoring, evaluation and expertise activities in order to avoid conflicts of interest and overlapping of services provided; establish processes to ensure the management of service quality by standardizing techniques and work procedures; designation of laboratories; efficient use of human and material resources in order to ensure full rapid identification of health problems, of determinant factors and implement the prevention and disease control measures; documentation, monitoring and evaluation of health determinants (drinking water quality, population's diet and nutrition, ambient factors in the workplace, education, training and promotion of healthy lifestyle, etc.).

CONCLUSION

The quality of environmental factors in Moldova plays an important role in determining the public health and particularly childrens' health. Tackling the risks to which the growing generation is exposed requires joint efforts of the key ministries: Health and Environment, as well as other government institutions, local authorities, NGOs, economic agents, population, etc.

Approximation of national legislation with EU Directives requirements, compliance with EU standards - is one of potential pathway to reduce the impact of environmental factors pollution on health.

The implementation of cross-sectoral policy documents, ensuring sustainable development through mainstreaming the environmental protection concerns into the processes of economic reforms in sectoral policies, will considerably improve the quality of water and soil resources, atmospheric air, etc. that in its turn will lead to more favorable conditions for life and health.

In this context, the Republic of Moldova will act in order to achieve its political aspirations of European integration.

OBJECTIVES AND FOLLOW UP MEASURES

In order to improve the existing situation, promote environmental and health policies, the following measures need to be taken:

Further approximation of national environment and public health legislation to EU Directives

- Elaboration of the legal and regulatory framework for a healthy environment
- Decision-making on noise pollution prevention in localities
- Compliance with EU Directives and international standards on pesticide use (residues in food and protection of employees at workplace)
- Improvement of existing legislation in order to reduce the incidence of smoking and regulating the smoking in public places
- Elaboration of policies on atmospheric and indoor air pollution control

Efficient control and monitoring of environmental factors quality

- Development of a Program on Environmental Components Quality Monitoring
- Strengthening the air quality and water resources research and investigation potential, including supply with laboratory control and monitoring equipment

Ensure the rural population with access to improved water supply and sanitation services

- Regulate the activities related to surface water and groundwater (impacting health)
- Ensure the compliance with hygiene and sanitation requirements towards water supply and sanitation systems
- Update the Program on Water Supply and Sanitation (2005) with specific measures for water infrastructure development in schools, focused on disadvantaged territories, in order to ensure all students with access to improved drinking water systems.
- Ensure additional drinking water purification systems to schools connected to the centralized water supply systems with non-compliant drinking water quality
- Creation under rural municipalities of specialized services that will serve water supply and sanitation systems in schools
- Strengthening the drinking water quality monitoring capacities of the Public Health Surveillance Service State
- Conducting awareness campaigns for students and teachers and including launching of extra-scholar curricula on water, sanitation and hygienic practices
- Sanitation of localities, including construction of functional sewerage systems

State supervision of public health

- Implementation of programs, training plans to ensure a necessary degree of preparedness, response and reduction of the impact from emergency situations
- Monitoring of public health in relation to the quality of environmental factors
- Development of cross-sectoral policy for prevention and control of children injuries
- Creation of healthy leaving and teaching conditions, physical security and hygienic conditions for children and adolescents
- Development of health impact thresholds, approval and implementation of an early warning system
- Providing timely public access to complete and true information on health and environment
- Training the population on necessity of creation a family microclimate acceptable for children and other vulnerable groups of people, etc.

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