

## 6. Land

Lands are the national treasure of Belarus and major natural resource for the development of the country. The Earth acts as a component of environment, the material basis of economic activities, means of production in agriculture and forestry, as well as the object of land and property relations.

For environmentally sound and sustainable use and protection of land resources it is necessary to form the optimal structure of land use, minimization of negative impact on the land of diverse business activities, improvement of normative and methodological support of the use and protection of land and soil.

To characterize the country's land resources and assess the influence of varied economic activities the data of land types and categories of land users are used which is represented in the annually published State Land Cadastre of the Republic of Belarus. These values allow to identify the proportion of land saved in natural and semi-natural state,



as well as land seized from productive turnover for construction, transport infrastructure, streets, squares and other public places and to characterize the level of socio-economic development of the country.

### Seizure of land from productive use

According to the State Land Cadastre as on January 1, 2010 the area of land in Belarus is 20759.8 hectares. The structure of land fund in 2009 is shown in *Figure 6.1*. Structure of land fund for the period 2005-

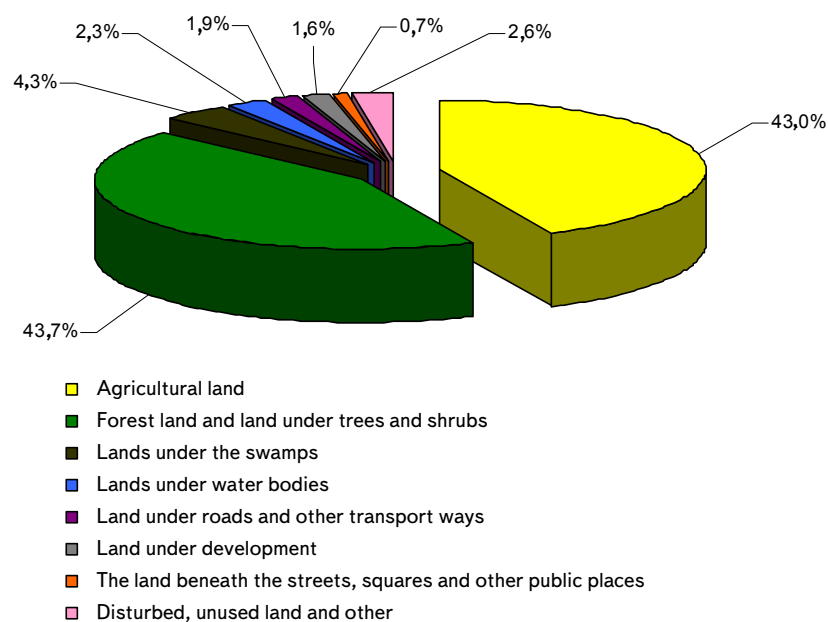


Figure 6.1 – Structure of land fund of Belarus by type of land (on 01.01.2010)

Table 6.1

**The structure of land fund of Belarus by type of land in 2005-2009**

| Type of land   | Area, ths ha |        |        |        |        |
|--|--------------|--------|--------|--------|--------|
|  | 2005         | 2006   | 2007   | 2008   | 2009   |
| Agricultural land  | 9011.5       | 8984.9 | 8968.0 | 8944.7 | 8926.9 |
| Forest land and land under trees and shrubs              | 8892.3       | 8979.9 | 9008.1 | 9035.0 | 9064.8 |
| Bog lands  | 900.1        | 901.5  | 894.6  | 894.1  | 889.6  |
| Lands under water bodies                                 | 476.7        | 469.6  | 469.9  | 469.8  | 470.2  |
| Lands under roads and other transport ways               | 364.4        | 371.9  | 386.1  | 391.7  | 391.0  |
| Lands under construction                                 | 323.9        | 327.6  | 331.5  | 330.7  | 337.2  |
| Lands under the streets, squares and other public places | 148.3        | 142.5  | 147.0  | 148.9  | 147.7  |
| Disturbed, unused and other lands                        | 642.6        | 581.9  | 554.6  | 544.9  | 532.4  |

Table 6.2

**The structure of land resources in Belarus by land types for the period 2005-2009**

| Type of land   | Area, ths ha                |                             |                             |                             |
|--|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|  | 2006 +/- compared with 2005 | 2007 +/- compared with 2006 | 2008 +/- compared with 2007 | 2009 +/- compared with 2008 |
| Agricultural land  | -26.6                       | -16.9                       | -23.3                       | -17.8                       |
| Forest land and land under trees and shrubs              | + 87.6                      | +28.2                       | +26.9                       | +29.8                       |
| Bog lands  | + 1.4                       | -6.9                        | -0.5                        | -4.5                        |
| Lands under water bodies                                 | -7.1                        | +0.3                        | -0.1                        | +0.4                        |
| Lands under roads and other transport ways               | +7.5                        | +14.2                       | +5.6                        | -0.7                        |
| Lands under construction                                 | + 3.7                       | +3.9                        | -0.8                        | +6.5                        |
| Lands under the streets, squares and other public places | -5.8                        | +4.5                        | +1.9                        | -1.2                        |
| Disturbed, unused and other lands                        | -60.7                       | -27.3                       | -9.7                        | -12.5                       |

2009 and the change is illustrated in the *Table 6.1* and *6.2*.

During the period of 2005-2009 in the structure of land resources by types of land substantially changes occurred. There was a steady downward trend in agricultural lands, the

area of which over a five year period decreased by 84.6 thousand ha, and the increase in the land under forest and shrub vegetation, the area of which increased to 172.5 thousand hectares. There was a reduction in the land occupied by marshes and water bodies – on

10,5 and 6,5 thousand hectares respectively. The main reasons for the redistribution of land are associated with the implementation of complex measures to optimize the structure of land use, the part of which was the withdrawal from circulation of low productivity, overgrown and bog farmlands and their transfer to other types of land.

The seizure of land from productive use for transport infrastructure and for construction for the period 2005-2009 was 39.9 thousand hectares. The area of land under the streets, squares and other public places did not change. The total types of land occupy 4.2% of Belarus territories. By 2009 significantly reduced the area of disturbed, unused and other lands – to 110.2 thousand hectares or 17,1% to the level of 2005.

The structure of land by categories of land users for five years changed. The structure of land fund for land users in 2009 is shown in *Figure 6.2*, its changes over the past five years – in *Tables 6.3* and *6.4*.

Through the reallocation of land among the categories of land users for the period of 2005-2009 the amount of lands belonging to agricultural organizations and peasant (farmer)



economies increased. In 2009 compared with 2005 through the transfer of unused lands and reserved lands the area of these lands increased by 169.9 thousand hectares or 1.9%.

The lands of state forestry organizations and environmental, recreational, historical and cultural organizations for a five-year period also increased by 100 thousand hectares (1,2%) and 48.9 thousand hectares (5,6% ) respectively. The significant increase of public forest lands organizations was in 2008. The same year the lands of the following organizations were reduced: enterprises, transport, connection, power industry, military and other. During 2005 – 2009 this category of land users decreased by 92.3 thousand hectares or 13,4%.

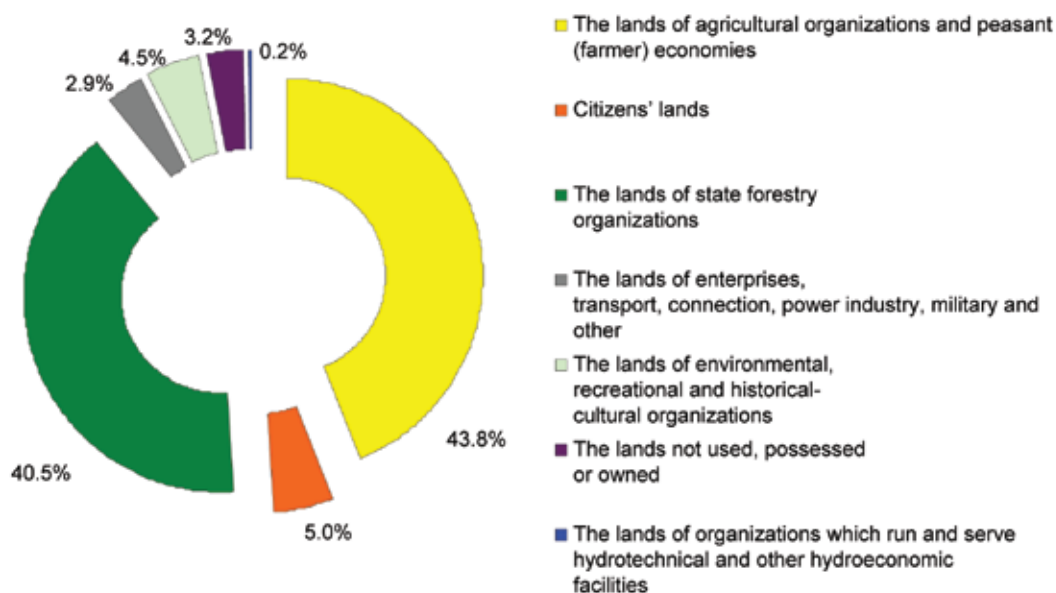


Figure 6.2 – The structure of land fund of Belarus by categories of land users (01.01.2010)

Table 6.3

**The structure of land by categories of land users in the Republic of Belarus  
in 2005-2009**

| The lands by land users categories   | The area, ths ha |        |        |        |        |
|--|------------------|--------|--------|--------|--------|
|  | 2005             | 2006   | 2007   | 2008   | 2009   |
| The lands of agricultural organizations and peasant (farmer) economies                           | 8920,1           | 8959,9 | 9007,7 | 9062,7 | 9090,0 |
| Citizens' lands  | 1284,1           | 1218,6 | 1145,0 | 1086,1 | 1035,8 |
| The lands of state forestry organizations  | 8299,5           | 8317,7 | 8286,5 | 8422,4 | 8399,5 |
| The lands of enterprises, transport, connection, power industry, military and other              | 690,1            | 683,1  | 723,1  | 598,0  | 597,8  |
| The lands of environmental, recreational and historical- cultural organizations                  | 879,2            | 887,1  | 887,1  | 886,8  | 928,1  |
| The lands of organizations which run and serve hydrotechnical and other hydroeconomic facilities | 39,9             | 40,1   | 39,5   | 39,3   | 39,7   |
| The lands not used, possessed or owned   | 646,9            | 653,3  | 670,9  | 664,5  | 668,9  |

Table 6.4

**Dynamics of land fund structure of Belarus by land users categories  
for the period 2005-2009**

| The lands by land users categories   | The area, ths ha                  |                                   |                                   |                                   |
|--|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
|  | 2006 +/-<br>compared with<br>2005 | 2007 +/-<br>compared with<br>2006 | 2008 +/-<br>compared with<br>2007 | 2009 +/-<br>compared with<br>2008 |
| The lands of agricultural organizations and peasant (farmer) economies                           | +39,8                             | +47,8                             | +55,0                             | +27,3                             |
| Citizens' lands  | -65,5                             | -73,6                             | -58,9                             | -50,3                             |
| The lands of state forestry organizations  | + 18,2                            | -31,2                             | +135,9                            | -22,9                             |
| The lands of enterprises, transport, connection, power industry, military and other              | -7,0                              | + 40,0                            | -125,1                            | -0,2                              |
| The lands of environmental, recreational and historical- cultural organizations                  | +7,9                              | —                                 | -0,3                              | +41,3                             |
| The lands of organizations which run and serve hydrotechnical and other hydroeconomic facilities | +0,2                              | -0,6                              | -0,2                              | +0,4                              |
| The lands not used, possessed or owned   | +6,4                              | +17,6                             | -6,4                              | +4,4                              |

From the land of citizens to other categories of land 248.3 hectares of land (19,3%) moved during 5 years. The decrease was primarily due to transfer of these lands to agricultural organizations.

The area of land not used, possessed or owned increased to 22 thousand ha or 3.4%. The greatest increase occurred in 2007 and amounted to 17.6 thousand hectares.

The lands of organizations which run and serve hydrotechnical and other hydroeconomic facilities were modified slightly.

Significant impact on the structure of land resources in Belarus still has the consequences of the Chernobyl disaster. On 01.01.2010 from economic turnover derived 248.7 thousand hectares of contaminated land or 1.2% from the total area of Belarus lands. 41.6% of the derived area refers to the lands of forestry organizations, 37,2% – lands of environmental, recreational and historical-cultural organizations, 16,3% – the land of agricultural organizations and farms, 4,9% – lands lands not used, possessed or owned.

The data on the structure of land by types and categories, the results of analysis of existing and prospective situation are the basis for the formation of public policy on environmentally sound use and protection of land and soil and improvement of the mechanism of state management of land resources and regulation of land relations.



### Degradation of soil cover

One of the major factors to constrain land use and deteriorate ecological condition of soil is the process of land degradation. To degradation process associated with economic activities refer water and wind erosion, mineralization of drained peat soils, the transformation of land caused by mining and construction, the loss of productivity of agricultural land, radioactive and chemical pollution, discoloration of drained peats and forest lands. Land degradation process causes significant economic, environmental and social harm, making adjustments in land and environmental policies of the country.

### Water and wind erosion






Of all the types of land degradation in Belarus erosion is the most evident. According to the National Action Plan on Rational Use of Natural Resources and Environment of the Republic of Belarus for 2006-2010 the total area of eroded and erosive dangerous lands in the country is more than 4 000.0 thousand hectares, including arable – about 2,600 thousand hectares. For eroded soil there are 556.5 hectares of land, including 479.5 thousand hectares of arable land. In this case, the share of water erosion is 84%, wind – 16%.



The erosion process is regional in nature. In Belarusian Poozerie and the central part of Belarus the most actively flow water and erosion processes. In Belarusian Polesie the process of wind erosion developed (*Fig. 6.3*). Erosive processes are mostly evident on agricultural lands, because of constant transformation the upper soil horizon as a result of plowing.

According to the RUE «Institute of Soil Science and Agricultural Chemistry» the largest areas of agricultural land affected by erosion processes are typical for Minsk and Vitebsk region, the lowest – for Gomel and Brest. The distribution of eroded agricultural land by administrative areas of Belarus is shown in *Figure 6.4* and *Table 6.5*.

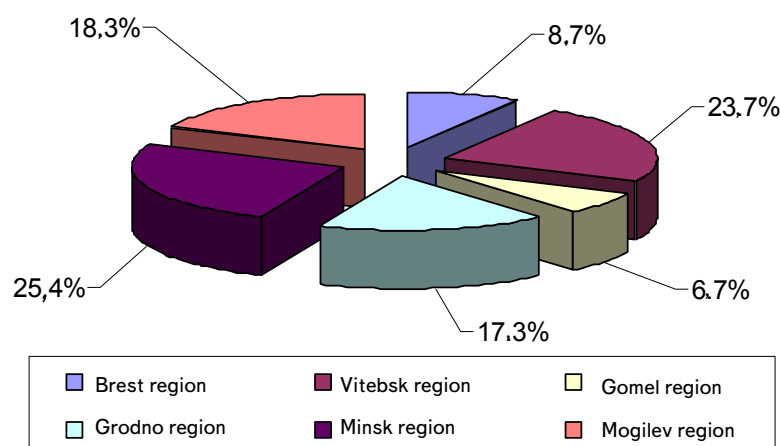


**Erosion types and its intensity on the agricultural lands**

| The rate of erosion and deflation of soil cover | The share of erosion and deflation soil covers, % from the area of agricultural lands | Water erosion  | Wind erosion (deflation)  |
|---|---|--|---|
| weak  | 1,0–5,0   |  |  |
| middle  | 5,1–10,0  |  |   |
| strong  | 10,1–20,0   |  |   |
| very strong                                     | >20,0   |  |   |

-  The territories with almost non-erosive or non-deflated soil cover (soil erosion missed or <1,0 %).
-  Forestry and other wood covered lands.

**Figure 6.3 – Soil erosion map of the Republic of Belarus**



**Figure 6.4. Distribution of eroded lands by administrative regions of the Republic of Belarus (from total area of eroded lands)**

By weight eroded lands in total area of farmland administrative regions are as follows: Vitebsk – 7,3%, Minsk – 6,6, Grodno and Mogilev – 6,4, Brest – 2,9, Gomel – 2,4%.

The largest land area affected by water erosion is located in Vitebsk region and constitutes 7.0% of total agricultural land area. In Mogilev, Minsk and Grodno regions water-erosion processes are characteristic respectively for 6,2%, 5,5 and 5,0% of farmlands. The minimum area of agricultural

lands subject to water erosion are located in Brest and Gomel regions – 2,2 and 0,8% respectively.

Area of land affected by deflation are small and geographically confined mainly to Grodno, Gomel and Minsk regions, where occupy respectively 1,7%, 1,6 and 1,1% of total agricultural land. In other areas the share of such lands does not exceed 1% of farmland.

It was determined that the way of use of erosive dangerous and erosion lands

Table 6.5

**Distribution of agricultural land in Belarus on types of erosion**

| Region           | Lands subject to water erosion |       | Lands subject to wind erosion |       |
|------------------|--------------------------------|-------|-------------------------------|-------|
|                  | ths ha                         | %*    | ths ha                        | %**   |
| Brest            | 31.3                           | 7.7   | 11.3                          | 13.7  |
| Vitebsk          | 112.0                          | 27.4  | 4.2                           | 5.1   |
| Gomel            | 10.9                           | 2.7   | 21.8                          | 26.4  |
| Grodno           | 63.6                           | 15.6  | 21.3                          | 25.8  |
| Minsk            | 103.6                          | 25.4  | 21.4                          | 25.9  |
| Mogilev          | 87.1                           | 21.3  | 2.7                           | 3.3   |
| Total in Belarus | 408.5                          | 100.0 | 82.7                          | 100.0 |

\* % of total agricultural land affected by water erosion.

\*\* % of total agricultural land affected by wind erosion.



with washed off and blown soil each year in average 10-15 tons of solid phase is wafted from one ha, 150-180 kg humic substances, 10 kg of nitrogen, 4-5 kg of phosphorus and potassium, 5-6 kg of calcium and magnesium which negatively affect the soil. There is a significant reduction of crop yields on eroded soils from 5 to 60%.

In order to control erosion there must be the system of organizational economic, technological, agricultural, forest and hydromeliorative anti-erosive activities which fulfillment will help to preserve and rehabilitate erosive dangerous and eroded lands.

### Soil pollution

According to the National Report of the Republic of Belarus on the implementation of the UN Convention to Combat Desertification/ Land Degradation (2006), one of the factors of degradation is chemical contamination of lands. Available data monitoring of land and local monitoring of NEMS, as well as the results of ecological and geochemical studies of soils indicate that chemical contamination is characteristic mainly for cities and its areas, roadsides, the zones of influence of waste

disposal, agricultural lands and industrial areas.

According to the National Plan of Action for the sustainable use of natural resources and environmental protection of the Republic of Belarus for 2006-2010 the area with dangerous levels of soil pollution in urban areas is 78 thousand ha, in roads zones – to 119 thousand, within the agricultural land – 10 thousand, in the zones of landfill influence – 2,5 thousand ha.

According to observations of the chemical pollution of land, conducted as part of NEMS, for five year period 44 cities of Belarus there is accumulation in soils of petroleum products and heavy metals, to a lesser extent – of sulfates and nitrates.

Soil pollution with oil products is characteristic for all surveyed cities. In 50% of settlements maximum oil content in soil exceeds the maximum permissible concentration for 5-15 times.

Heavy metals main pollutants are cadmium, zinc and lead. Soil pollution by cadmium is typical for 72% of the surveyed cities, zinc – 77%, lead – for 61% of the cities. Exceeding the permissible level of cadmium in 2 times or more was noted in 8 cities, zinc – in 14, lead – in 9 cities.

Copper in high concentrations was in 4 cities. Soil pollution with nickel and manganese in the surveyed cities was not mentioned.

Isolated cases of soil pollution with sulfates in 1,0-1,5 times higher the permissible level





reported in 39% of the cities. Exceedance of the standards of the nitrates is characteristic for the soil of only 3 cities.

According to the results of local monitoring of land held in the framework of NEMS from 2007 it was revealed that contaminants in the soil at the industrial areas of machine building and metal work are zinc and cadmium, in a lesser degree copper, nickel, lead and chromium. On selected areas metal concentrations exceed the standards of admissible standards in several dozen times.

Priority pollutants in the enterprises of fuel and energy, chemical and petrochemical industries are the polycyclic aromatic hydrocarbons (PAHs), petroleum products, polychlorinated biphenyls (PCBs).

At the enterprises specializing in the manufacture of varnishes and paints, most pollutant substances are PCBs which concentrations in some cases are 100 times higher than the permissible level.



On the industrial areas of enterprises specializing in production of building materials, soils are contaminated with arsenic. The average content of elements in soils on some industrial areas is several times higher than the norm.

In general, chemical contamination of land is local and has no significant effect on the ecological state of the environment on the regional level.