

7. Agriculture

Formation and implementation of effective policies on the use and protection of agricultural land, acceptance of valid management decisions to preserve their productivity and improvement of its quality, assess of the negative impact exerted by agricultural activities on soils in the application of fertilizers and plant protection are impossible without adequate and reliable data on soil fertility, quantitative and qualitative composition used in plant-growing branch of mineral and organic fertilizers.

However, application of fertilizers is one of the indicators, which makes it possible to assess the pressure exerted on the environment by crop industry.

By cadastre assessing the land, arable soil in Belarus as a whole is estimated at 31.2 points. Arable areas with fertility estimated as 25-35 points occupy 46.4% of arable land, 20,1-25,0 points occupy 16.3%, and 20 points and lower – 7.6% of arable land.

Productive capacity of arable land in Belarus for the five-year period increased by 1,4 times and now stands at 4.54 t/ha of fodder units, varying on administrative areas from 3.20 t/ha in the Vitebsk region to 5.27 t/ha of fodder units in Grodno (*Table 7.1*).



By area of the productive capacity of agricultural soils for the period from 2005 to 2009 increased: in the Brest region – at 0.96 t/ha of fodder units, Vitebsk – 0.43, Gomel region – 1.55, Grodno – 0.64, Minsk – 1.01, Mogilev region – 1.55 t/ha of fodder units, which indicates the improvement of the ecological state of intensively used for agricultural production land.

Increasing the productivity of arable land and obtaining high and stable yields can only be a subject to sufficient doses of mineral and organic fertilizers, which ensure a positive balance of major nutrients.

The use of mineral fertilizers for the production of competitive products in foreign

Table 7.1
**Production capacity of arable land in the Republic of Belarus 2005-2009,
t/ha of fodder units**

Areas	2005	2006	2007	2008	2009
Brest	35.7	37.0	41.7	49.0	45.3
Vitebsk	27.7	30.8	36.3	38.9	32.0
Gomel	27.8	31.3	33.2	41.6	43.3
Grodno	46.3	48.4	53.2	67.0	52.7
Minsk	33.8	40.3	43.6	52.0	43.9
Mogilev	29.5	35.4	39.8	45.7	45.0
Total in Belarus	33.4	37.4	41.5	49.2	45.4

markets should be at a level of 200-250 kg/ha of agricultural land on the background of integrated plant protection.

During the period from 2005 to 2009 the national average amount of fertilizer application (NPK) has increased by 132 kg/ha and reached 288 kg/ha in 2009, which corresponds to the required level (*Table 7.2*).

Within the bounds of administrative areas the extension of using fertilizers over five year period was in Brest region at 138 kg/ha, Vitebsk – 134, Gomel – 140, Grodno – 113, Minsk – 138, Mogilev 133 kg/ ha.

It is very important to the use the fertilizers in balance. In recent years, chemical fertilizers are often used in violation of the ratio of

nutrients. In some cases, there are attempts to replace the lack of one of element, mostly phosphorus, by nitrogen or potassium, which lead to loss of crops of agricultural crops and reduction of soil fertility. Thus, in 2006 the average percentage of potash in the country was 46% of all mineral fertilizers. For nitrogen and phosphorus fertilizers, the figure is 36, and 18% respectively. In 2008 the share of phosphate fertilizers has decreased by 15% due to the increase of nitrogen fertilizers, which accounted for 39% of all mineral fertilizers (*Table 7.3, Fig. 7.1*).

Within the bounds of administrative regions the least amount of phosphate fertilizers in 2008 applied on farmland to the Vitebsk

Table 7.2

The application of mineral fertilizers on arable land in administrative regions of Belarus in 2005-2009, NPK kg/ha per year

Region	2005	2006	2007	2008	2009
Brest	165	262	259	253	303
Vitebsk	117	207	189	202	251
Gomel	162	249	234	259	302
Grodno	197	267	239	277	310
Minsk	156	254	266	258	294
Mogilev	140	239	216	253	273
Total in Belarus	156	247	236	250	288

Table 7.3

Application of potash, nitrogen and phosphorus fertilizers on arable land in the administrative regions of Belarus in 2006-2008, kg/ha

Region	Nitrogen			Phosphorus			Potassium		
	2006	2007	2008	2006	2007	2008	2006	2007	2008
Brest	99	93	93	43	45	33	120	121	127
Vitebsk	76	70	82	35	27	25	96	92	95
Gomel	78	75	94	51	44	45	120	115	120
Grodno	103	94	115	47	35	41	117	110	121
Minsk	95	96	103	42	53	41	117	117	114
Mogilev	83	78	95	48	37	45	108	101	113
Total in Belarus	89	85	97	44	41	39	114	110	114

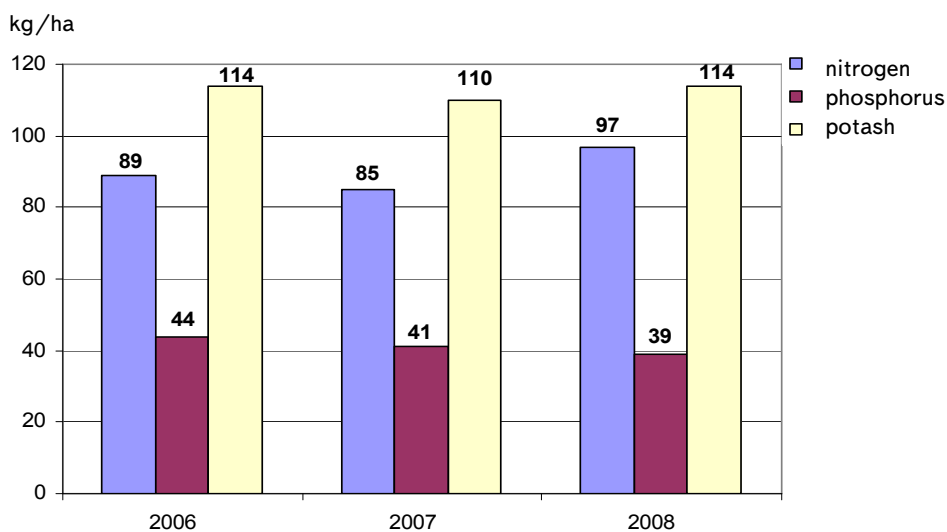


Figure 7.1 – The application of mineral fertilizers on arable land in Belarus in 2006-2008

region – 12% of all fertilizers in the region, the largest – in the Mogilev, where their share reached 18%. Nitrogen fertilizer applied on the fields varies from 36 to 42%. The maximum amount of applied potassium fertilizers were in Brest region (50%), minimum – in Grodno (43%).

To improve the quality of agricultural land and increase their productive capacity, along with mineral fertilizers organic ones are applied (Tabl. 7.4).

In 2005-2009 the tendency to increase the use of organic fertilizers was outlined. The national average application of organic fertilizers for the five-year increased by 2.6 tons/ha (40%) and reached in

2009, 8.9 tons/ha. The increase of organic fertilizers within the bounds of administrative areas made in: Brest – 4,1 tons/ha, Vitebsk – 2,7, Gomel – 2.6, Grodno – 0.1, Minsk – 3,4, Mogilev – 2, 3 tons/ha.

Regulations are developed to determine the need for organic fertilizer according to the ratio of areas. These regulations provide an undeficit humus balance in arable soils of organic fertilizers in Belarus as 12.0 tons/ha, or 58.8 million tons (Table 7.5).

The average doses of organic fertilizers for ensuring undeficit humus balance per hectare of crop rotation area of administrative areas of the country considerably vary. They depend on the granular structure of soils and correlation

Table 7.4

Application of organic fertilizers on arable land in the administrative regions of Belarus in 2005-2009, tons/ha

Region	2005	2006	2007	2008	2009
Brest	7,9	8,8	8,9	10,4	12,0
Vitebsk	3,3	3,5	3,8	4,1	6,0
Gomel	6,0	5,8	6,4	7,9	8,6
Grodno	11,0	11,0	6,4	11,1	11,1
Minsk	6,3	5,8	9,1	9,3	9,7
Mogilev	3,7	3,7	5,1	5,5	6,0
Total in Belarus	6,3	6,3	7,5	8,1	8,9

Table 7.5

Needs and possible production of organic fertilizers in the Republic of Belarus

Region	Need for undeficit humus balance		Possible accumulation of organic fertilizers, million tons of hypothetical manure	
	million tons	t/ha	million tons	t/ha
Brest	10,7	14,0	10,3	13,4
Vitebsk	7,3	9,5	7,6	9,9
Gomel	11,0	14,8	8,9	11,9
Grodno	9,5	13,2	9,6	13,4
Minsk	12,4	10,7	14,2	12,2
Mogilev	7,9	11,0	8	11,1
Total in Belarus	58,8	12,0	58,6	12,0

between row crops and perennial grasses – from 9.5 tons/ha in Vitebsk to 14.8 tons/ha in Gomel. At present the applying of organic fertilizers in all administrative areas are lower than the standards, and this threatens the maintenance of undeficit humus balance in arable soils.

The most important agrochemical intake efficiency and potential fertility of soil is liming of acid soils. In the period 2005-2009 the amounts of liming were on a level 417,7-433,0 ths ha.

Liming of soils helped to reduce areas with acidic soils, which allowed to pass on to the concept of supporting liming, the main purpose of which is to maintain a certain level of soil acidity of agricultural land. Now in most parts of the country the soil acidity is optimum for plant level and averages 5.9.

Currently, 27, 9 % of agricultural land needs the chemical melioration. The need in lime fertilizers is 2199.5 thousand tons, including for arable lands – 1401.9 thousand

tons, for ameliorated hayfields and pastures – 593.1 thousand tons, for contaminated land – 205.3 tons. The indicated amounts of lime are optimal for supporting the systematic liming.

In general, due to measures for increasing the volume of mineral and organic fertilizers, there has been some positive trends soils in Belarus to improve the agrochemical properties of arable. At the same time, the negative influence that might impact on the environment by using of mineral and organic fertilizers, which can deteriorate soil quality, surface and ground waters, crop production, yet has no significant ecological consequences, as introduced the present volumes of fertilizers correspond or even below the needs of the agricultural industry. However, analysis of data on fertilizer application allows to monitor their impact on environmental components and in proper time to develop a strategy to combat the negative processes that may occur as a result of fertilizer application.