DEVELOPMENT OF AGRO-CHEMISTRY AND AGROCHEMICAL SERVICES IN RUSSIAN AGRICULTURE

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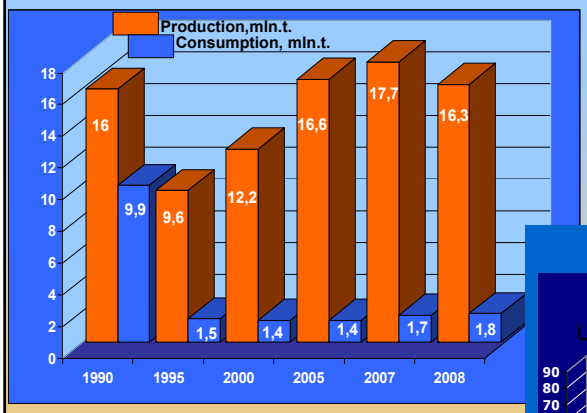
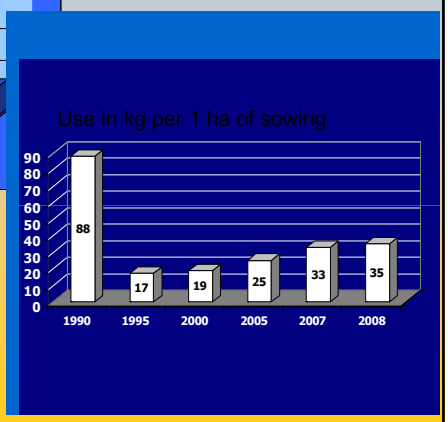
Production and Consumption of Mineral Fertilizers





The balance of nutrients in Russian agriculture,
kg / ha of arable land

Years	Application	Removal	Balance
1966-1970	44	74	-30
1971-1975	67	79	-12
1976-1980	95	85	10
1981-1985	116	78	38
1986-1990	136	93	43
1991-1995	60	80	-20
1996-2000	21	74	-53
2001-2005	22	79	-57
2008	23	106	-83

Dynamics of the acidity of arable soils of Russia,
% of arable land

Years	Highly Acid	Medium Acid	Mildly Acid
1971	11,7	19,4	25,8
1976	6,9	11,2	15,9
1981	5,6	11,1	16,7
1986	4,4	10,7	17,8
1991	3,7	9,9	17,9
1996	4,6	10,3	20,1
2001	2,7	9,0	20,1
2005	2,4	8,9	20,7

Dynamics of the content of mobile phosphorus in arable soils of Russia,% of arable land

Years	Very low and low	High and very high
1971	51,9	6,2
1976	44,4	8,4
1981	39,6	10,2
1986	33,7	14,1
1991	26,6	19,1
1996	21,9	23,6
2001	21,1	23,0
2005	21,5	21,5
2006	21,9	21,4

Dynamics of the content of mobile potassium in arable soils of Russia,% of arable land

Years	Very low and low	High and very high
1971	15,6	39,2
1976	11,9	41,2
1981	10,2	41,5
1986	9,0	41,1
1991	8,6	41,0
1996	9,2	40,3
2001	9,9	40,8
2005	10,1	40,1
2006	10,1	40,0

The return on investment of nitrogen fertilizers by increase in crop yield of winter rye (kg / kg) for sod-podzolic soils

The content in soil		Doses of nitrogen, кg/ha			
P_2O_5	K_2O	30	60	90	120
North-West Region					
< 50	< 80	7,7	4,5	3,0	2,1
	81-120	**9,3**	5,3	3,6	2,5
	> 120	**10,0**	5,7	3,9	2,7
51-100	< 80	**10,3**	6,0	4,1	3,0
	81-120	**12,0**	6,8	4,8	3,4
	> 120	**12,7**	7,2	5,0	3,6
> 100	< 80	**12,0**	7,0	5,0	3,8
	81-120	**14,0**	**8,0**	5,7	4,3
	> 120	**14,7**	**8,2**	5,9	4,5

Figures in bold are marking the options where the use of nitrogen fertilizers could have helped to recover the costs by increase of yield. Costs of the use of ammonium nitrate, prices of 2009 - 30,4 thousand rubles. The purchase price of winter rye - 3,9 thousand rubles.

The return on investment of nitrogen fertilizers by increase in crop yield of winter rye (kg / kg) for sod-podzolic soils

The content in soil		Doses of nitrogen, кg/ha			
P_2O_5	K_2O	30	60	90	120
Central district					
< 50	< 80	5,0	3,0	2,1	1,3
	81-120	6,0	3,5	2,4	1,7
	> 120	7,0	4,0	2,8	1,8
51-100	< 80	7,3	4,3	3,1	2,2
	81-120	**8,3**	4,8	3,4	2,4
	> 120	**9,3**	5,3	3,8	2,7
> 100	< 80	**8,3**	5,0	3,7	2,8
	81-120	**9,3**	5,5	4,0	3,1
	> 120	**10,3**	6,0	4,3	3,3
Privolzskij (Pri-Volga) district					
Low	< 80	7,7	4,5	3,0	2,1
	81-120	**9,3**	5,3	3,6	2,5
	> 120	**10,0**	5,7	3,9	2,7
Medium	< 80	**10,3**	6,0	4,1	3,0
	81-120	**12,0**	6,8	4,8	3,4
	> 120	**12,7**	7,2	5,0	3,6
High	< 80	**12,0**	7,0	5,0	3,8
	81-120	**14,0**	**8,0**	5,7	4,3
	> 120	**14,7**	**8,2**	5,9	4,5

The investment return on phosphorus fertilizers by increase in crop yield of winter wheat in the Central district

The content in soil, mg / kg	Doses of Nitrogen kg/ha			
P_2O_5	30	60	90	120
Sod podzol soils				
< 50	**18,7**	**10,8**	**7,9**	**6,3**
51-100	5,0	2,8	2,1	1,7
101-150	11,3	6,0	4,7	3,6
>150	1,0	0,5	0,4	0,3
Gray forest soils				
< 50	**15,0**	**9,0**	**6,6**	5,1
51-100	5,0	2,8	2,1	1,6
101-150	2,1	1,3	0,9	0,7
>150	1,0	0,5	0,4	0,3
Chernozems leached and podzolized				
< 50	**12,0**	**7,0**	5,0	3,8
51-100	4,0	2,3	1,7	1,3
101-150	1,7	1,0	0,7	0,6
>150	0,7	0,5	0,3	0,3
Chernozems typical and ordinary				
< 50	**8,3**	**5,5**	4,2	3,3
51-100	2,7	1,8	1,3	1,1
101-150	1,0	0,8	0,6	0,4
>150	0,5	0,3	0,2	0,2

Costs of ammophos use, price in 2009 - 34,5 thousand rubles. Purchase price for wheat of Class 5 - 5,5 thousand rubles.

Needs of Russian agriculture for nutrients to reach the objectives of crop production

Crops	Gross harvest, mln tons		Needs, in mt			
	average for 1999-2002.	planned	N	P_2O_5	K_2O	Total
Grain	**72,9**	**120**	**2,0**	**2,1**	**0,9**	**5,0**
Sugar beet	**14,9**	**35**	**0,09**	**0,10**	**0,09**	**0,28**
Sunflower	**3,6**	**6**	**0,1**	**0,2**	**0,2**	**0,5**
Potato	**33,3**	**50**	**0,15**	**0,15**	**0,15**	**0,45**
Feeding crops	**24,8**	**50**	**1,6**	**1,2**	**1,0**	**3,8**
Vegetables	**12,8**	**24**	**0,04**	**0,04**	**0,04**	**0,12**
TOTAL:			**3,98**	**3,79**	**2,38**	**10,15**