FUTURE STRATEGIES IN THE RUSSIAN FEDERATION TO IMPROVE NITROGEN MANAGEMENT IN AGRICULTURE AND TO REDUCE LOSSES TO AIR AND WATER

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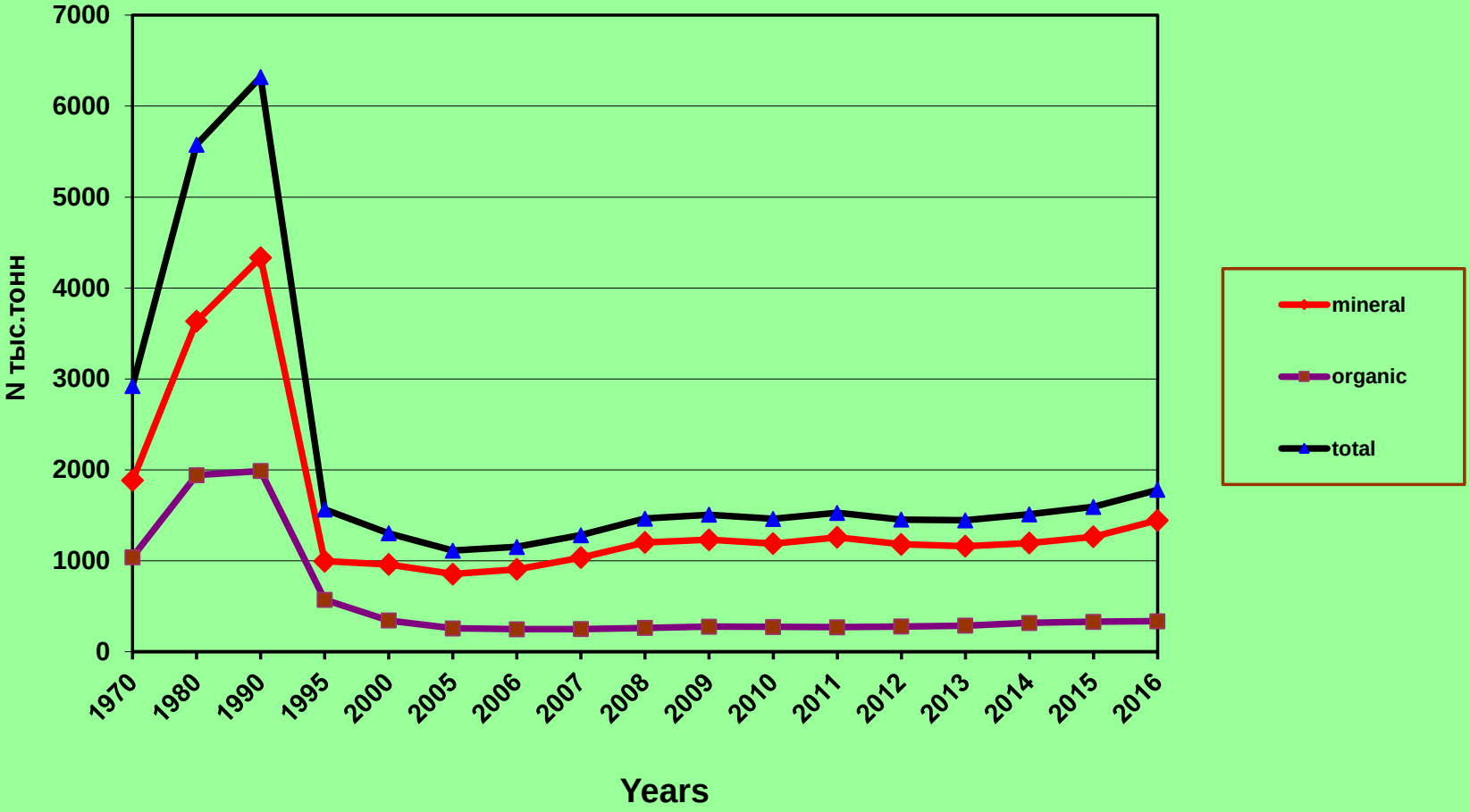
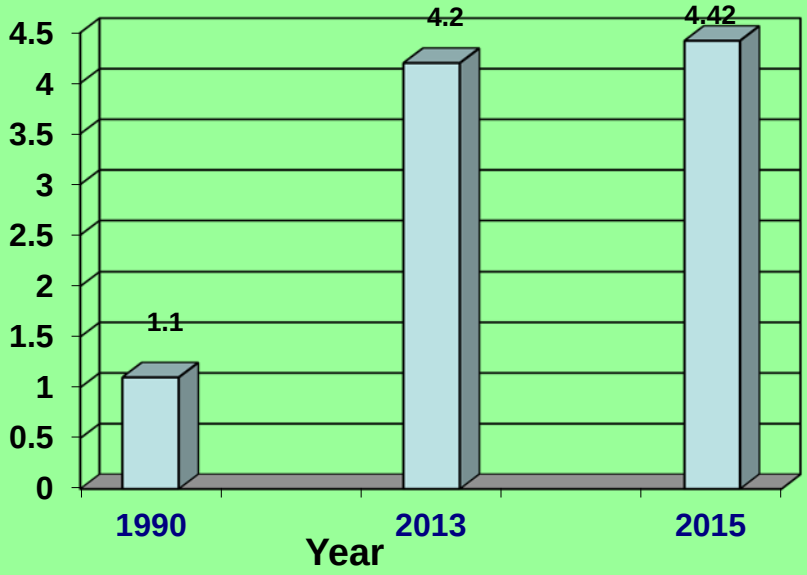
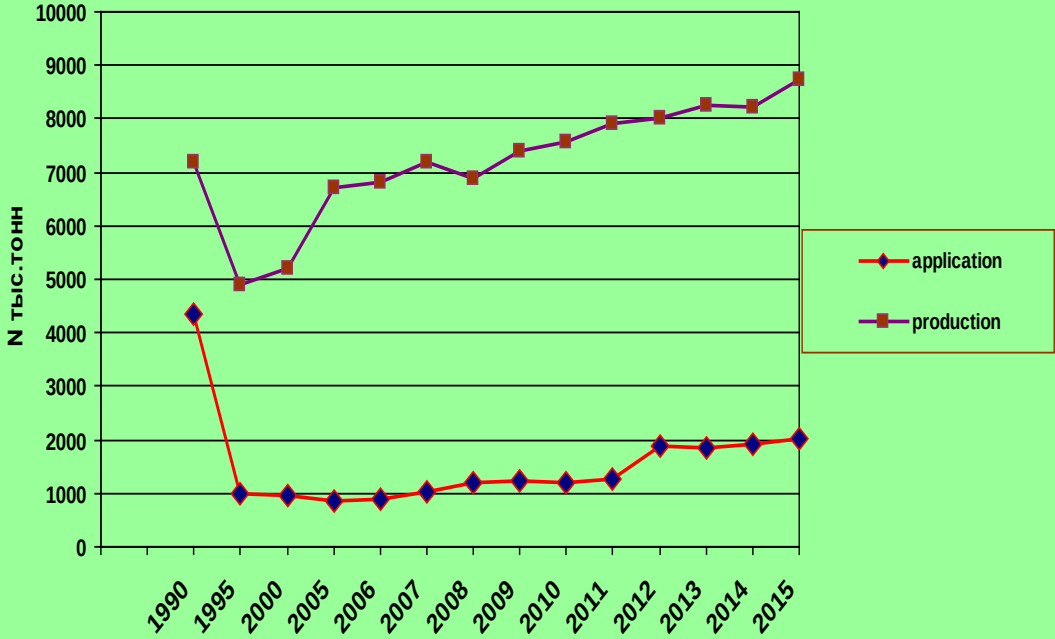
Nitrogen input with mineral and organic fertilisers to the agricultural enterprises in Russia, thousand tons



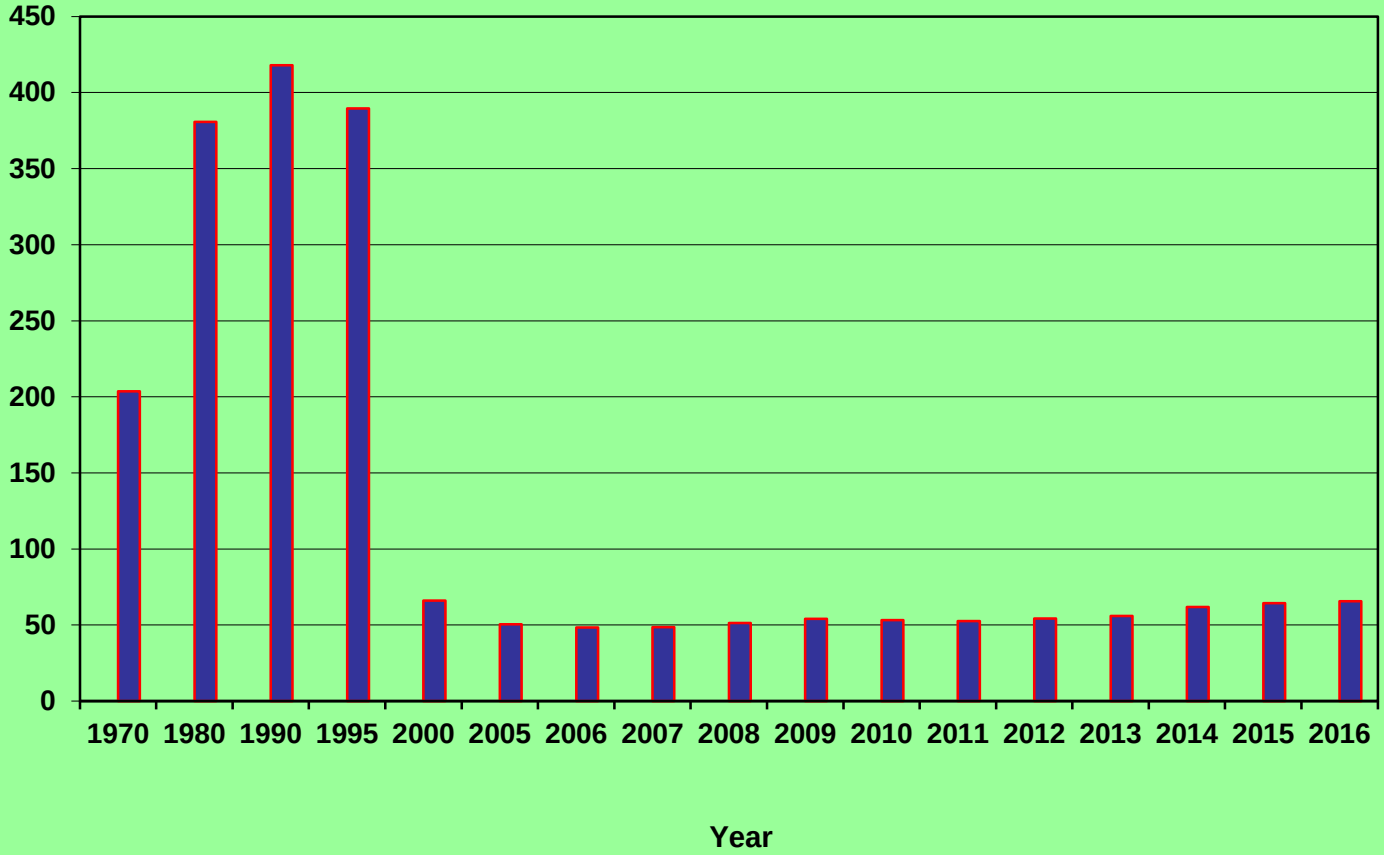


Cost ratio of 1 kg N and 1 kg of grain

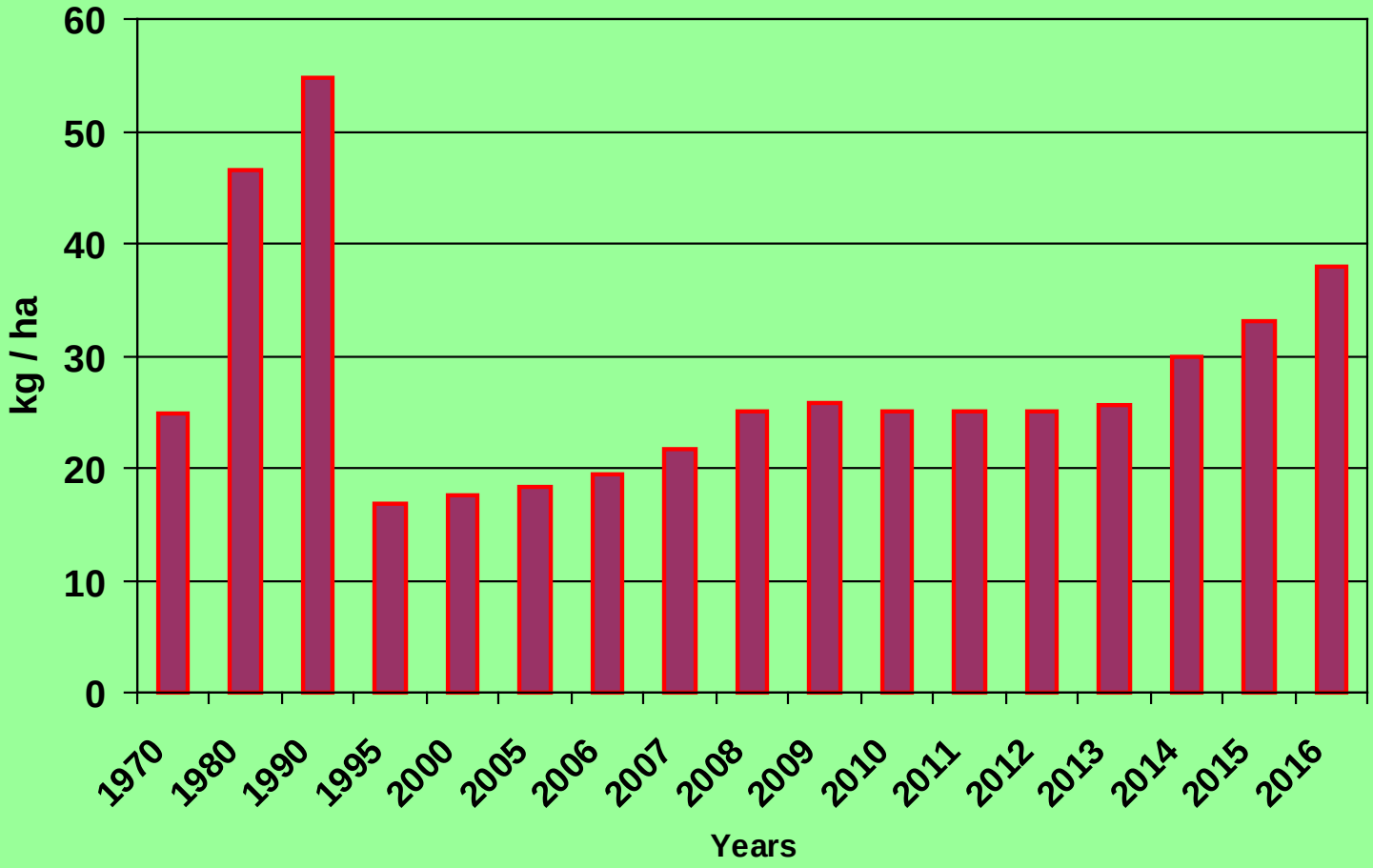


Production and application of nitrogen fertilizsers in Russia, N thousand tons

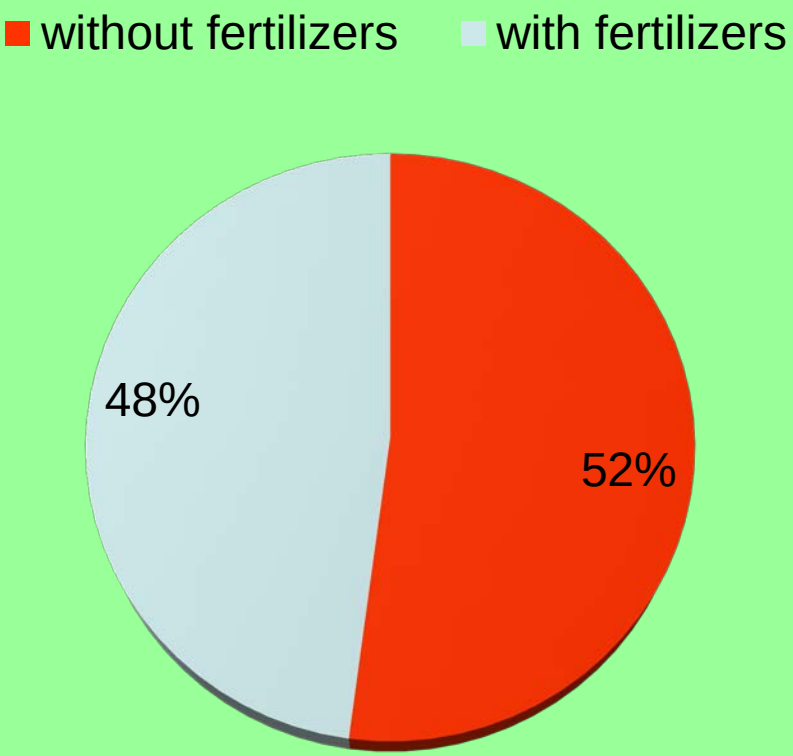
DYNAMICS OF ORGANIC FERTILISERS USE IN AGRICULTURE OF THE RUSSIAN FEDERATION, million tons



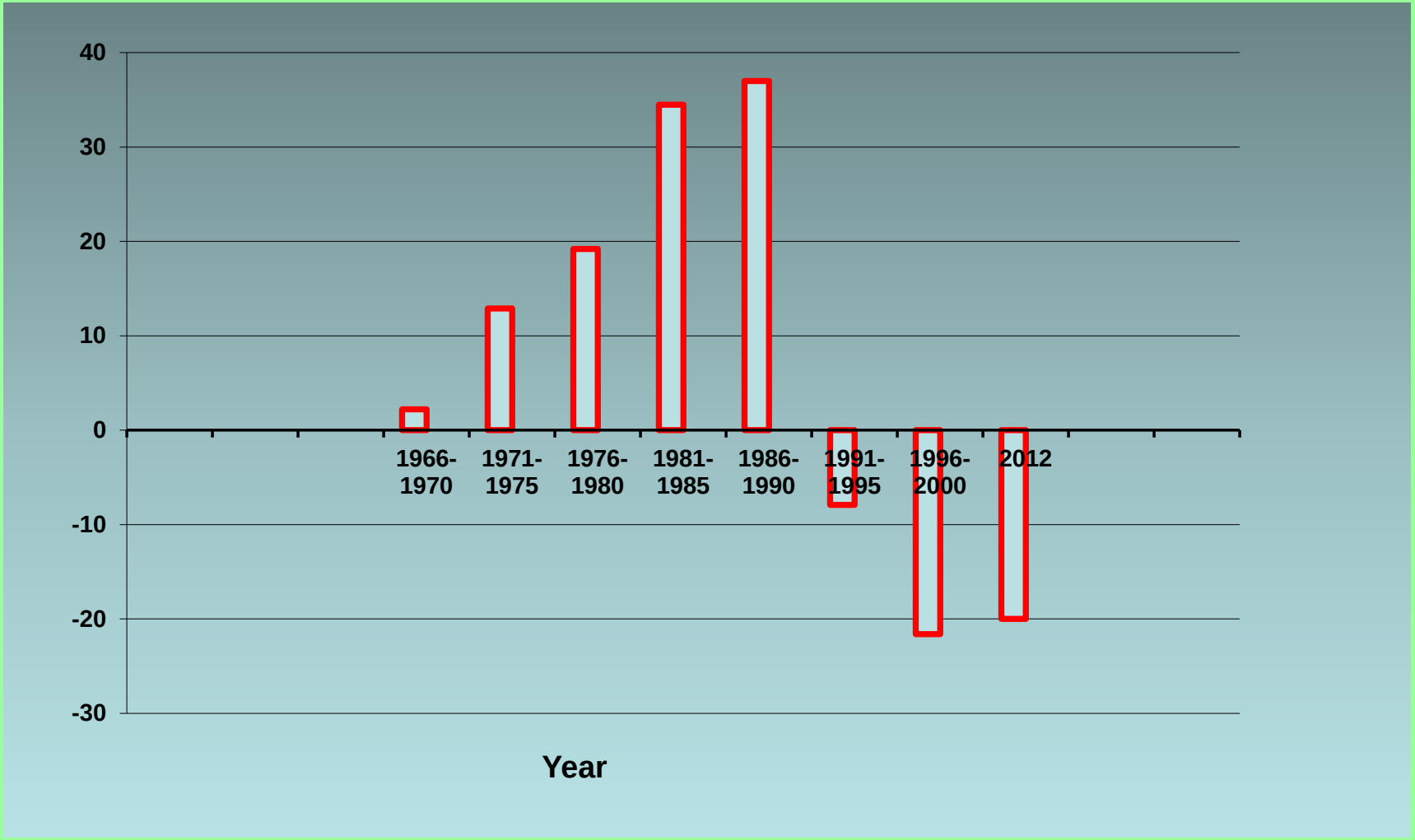
Nitrogen application with mineral and organic fertilisers in the agricultural enterprises in Russia, kg/ ha



Ratio of fertilized and unfertilised crops in the year 2016, %



Gross nitrogen balance in the Russian agriculture, kg/ha



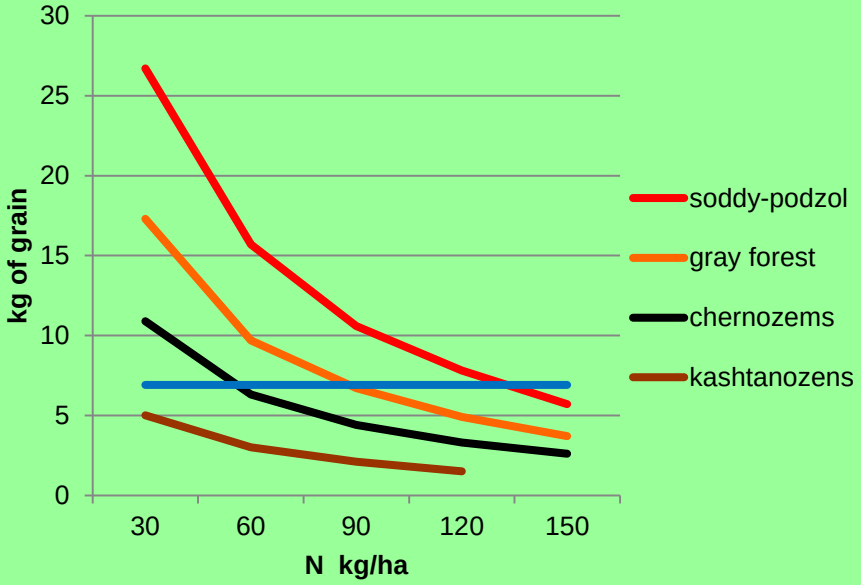
Nitrogen balance in the cultivation of agricultural crops in the Russian Federation, 2006-2014 (average per year) (S. A. Shafran, 2015)

Crops	Crop yield, t ha^{-1}	Input N, kg ha^{-1}			Removal of N, kg ha^{-1}	N balance, kg ha^{-1}	NUE, %
		N fertilisers	Organic fertilisers	Total uptake			
Grain	2.07	22	5	27	58	-31	215
Sugar Beet	30.9	117	12	129	138	-9	107
Potatoes	12.6	76	33	109	74	35	68
Vegetables	18.7	58	14	72	94	-22	130

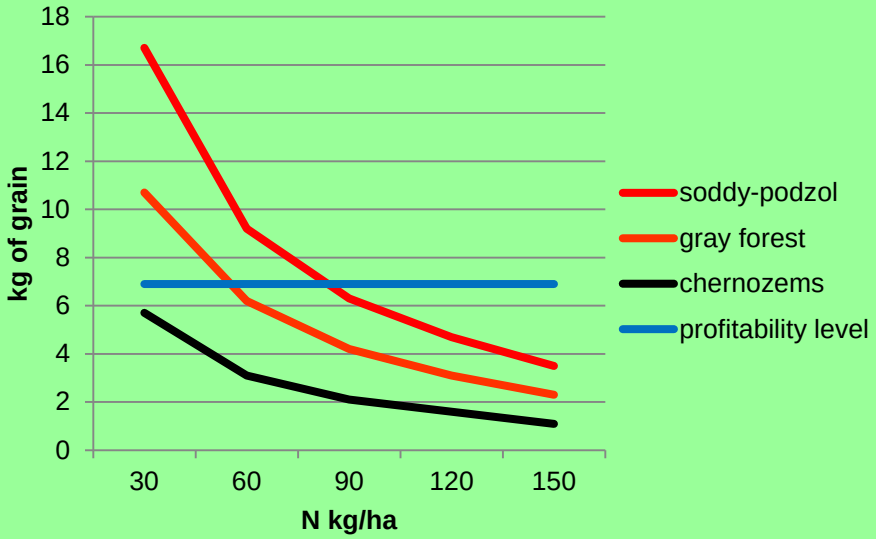
State Program of Development of Agriculture and Regulation of Markets of Agricultural Products, Raw Materials and Food for years 2013-2020:

- food sovereignty of the Russian Federation;
- accelerated import substitution in respect of meat (pork, poultry meat, beef), milk, field and greenhouse vegetables, seed potatoes and fruit and berry products;
- increasing the competitiveness of Russian agricultural products in the domestic and foreign markets;
- improving the financial stability of agricultural enterprises;
- ensure the epizootic welfare on the Russian Federation territory;
- sustainable development of rural territories;
- improving the efficiency of agriculture land and other resources use and greening of production.

The return of nitrogen fertilizers yield increase (kg of grain per 1 kg of nitrogen)



winter wheat



spring wheat

Amount of N fertilisers for the planned harvest area of 85 mln ha

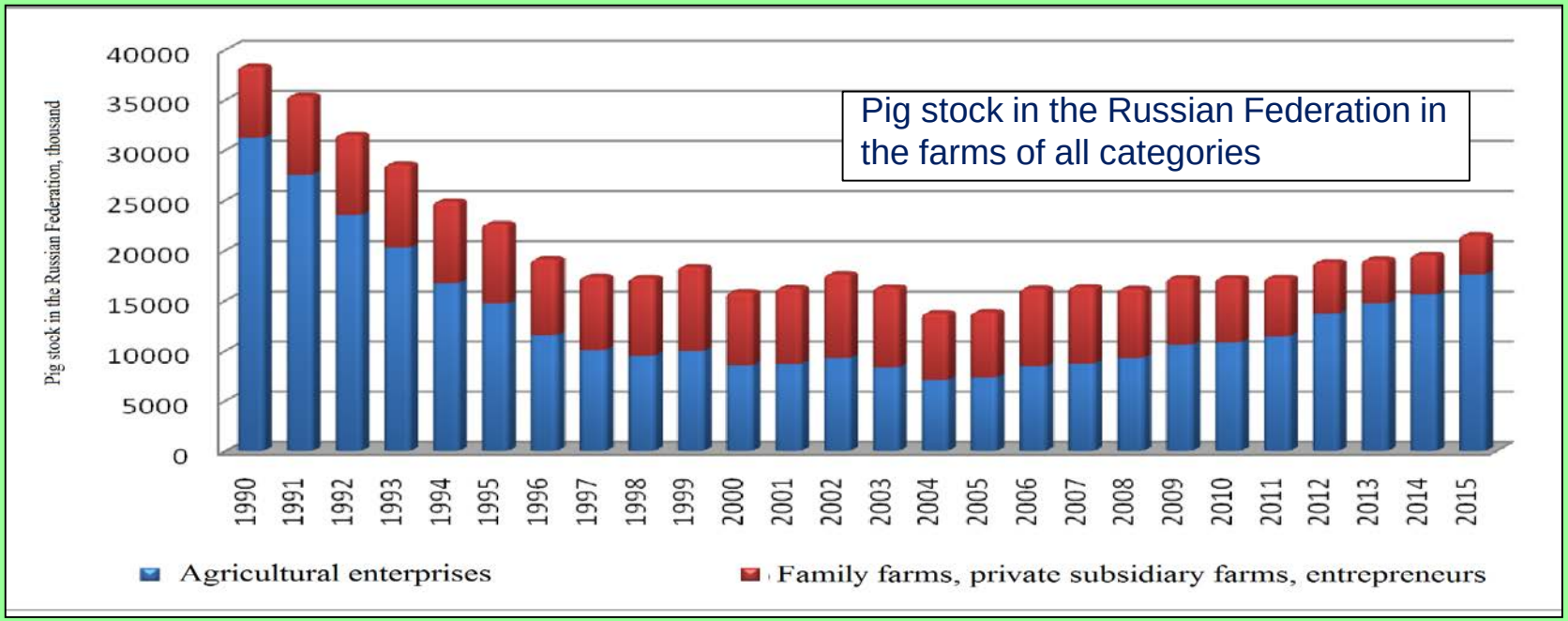
(grain – 120 mln t, sugar beet – 35 mln t, sunflower – 6 mln t, potatoes - 40 mln t, fodder crops – 50 mln t, vegetables and fruits – 20 mln t

	N fertilisers	Mln t N	%
1.	Ammonium nitrat	0.7	16.7
2.	Urea	1.3	31.0
3.	Ammonia	0.4	9.5
4.	Ammonium nitrat + urea	0.8	19.0
5.	Ammonium sulfate	0.02	0.5
6.	Complex fertilisers	0.92	21.9
7.	Other	0.06	1.4
	Total mln ton	4.2	100
	Kg N /ha	49.4	

Main paths for decreasing the gaseous nitrogen losses from soil and fertilisers:

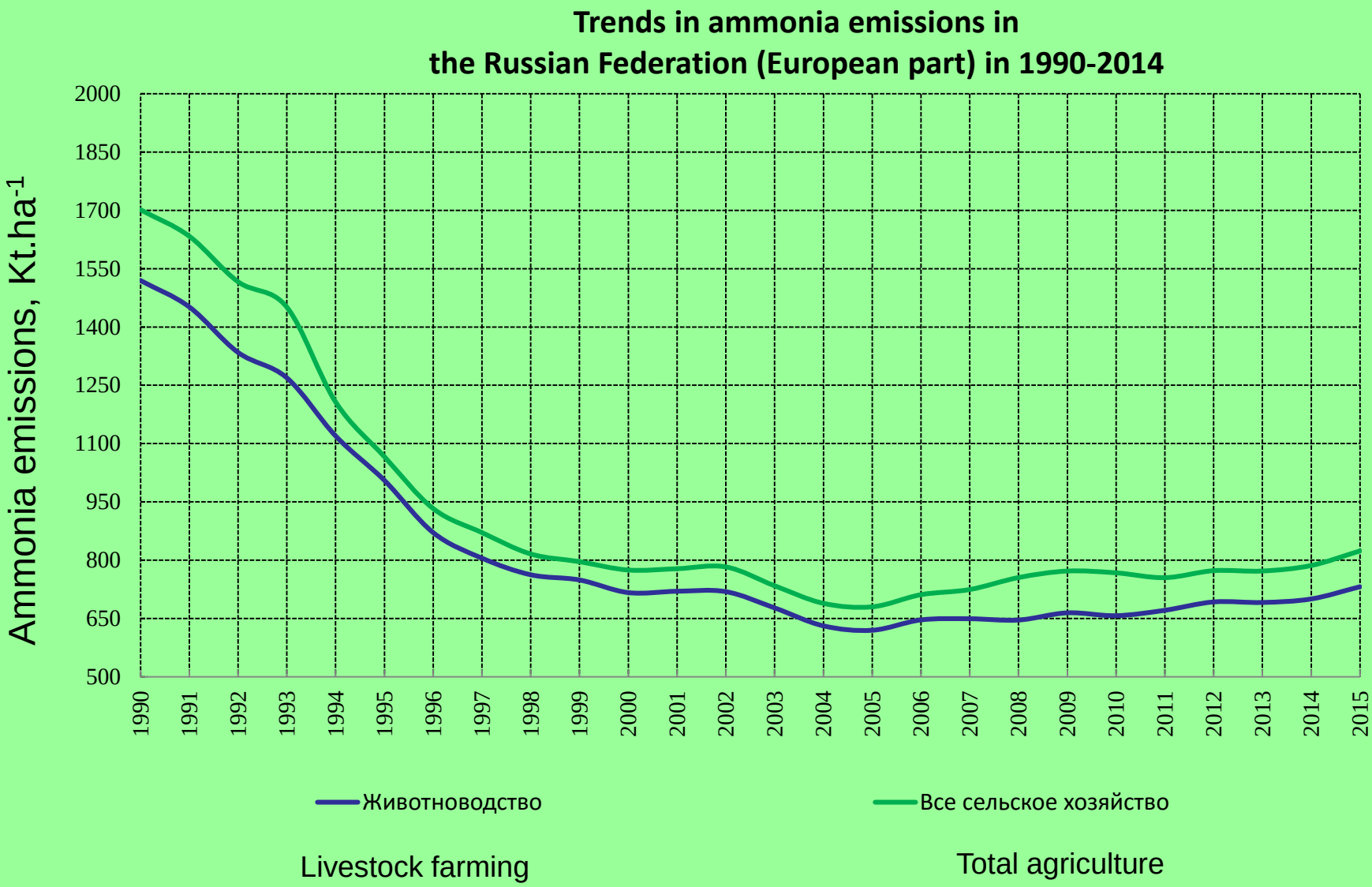
- Shorter gap between the date of fertilizer application and the period when plants start to actively uptake the nitrogen.
- Deep incorporation of fertilisers.
- Precise application of fertilisers.
- Taking into account the forms of nitrogen when choosing the means of their application
- Balanced mineral nutrition of plants increases nitrogen consumption from soil and fertilisers.
- Liming of acidic soils helps to increase the utilisation coefficient of fertiliser nitrogen.
- Use of slow release nitrogen fertilisers.

Trends in animal husbandry development in the Russian Federation



- In general all directions of animal and poultry farming feature the tendency to large-scale enterprises and concentration of livestock on separate sites.

  244 new objects were put into operation and 175 ones were reconstructed in 2008-2013


Trends in ammonia emissions in
the Russian Federation (European part) in 1990-2014
Ammonia emissions, Kt.ha-1
2000
1850
1700
1550
1400
1250
1100
950
800
650
500
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
Животноводство
Все сельское хозяйство
Livestock farming
Total agriculture

Volume of excrement on livestock enterprises of the Central region of the Russian Federation

Region	Farm	Volume of excrement, thousand ton	NPK ton	Area of existing agricultu-ral land, ha	NPK per 1 ha of agricultu ral land, kg	The required area of agricultu-ral land, ha
Ivanovo	Poultry farm 10.4 million broiler	61,1	1363	1900	717	2463
Vladimir	Pig farm, 150 thousand pigs	143,7	3469	320	3469	1738
Moscow	Pig farm, 26 thousand pigs	26,4	294	40	7350	479
Kaluga	Poultry plant 10.4 million broiler	50,1	2081	326	6383	3761
Tver	Pig farm, 370 thousand pigs	333,0	4800	1500	3200	9847

Environmental legislation and regulations concerning livestock farming in Russia

The reforming of the Russian environmental legislation is currently in progress. Application of BAT criteria is one of the harmonization elements of Russian and European environmental policies.

Review of the relevant Russian legal, regulatory and guideline documents shows that they include the basic BAT principles from the EU BREF but these principles are scattered in various documents – federal laws, construction rules and regulations, sanitary rules and standards, managerial directives and others.

On 1 January, 2015, the Federal Law of the Russian Federation № 219-FZ "Concerning the Introduction of Amendments to the Federal Law "On Environmental Protection" and Certain Legislative Acts of the Russian Federation" came into force. This Law provides for the introduction of Best Available Techniques.

It is planned to use the European experience in BATs introduction

The release of the Russian reference books on BAT "Intensive rearing of pigs" and "Intensive rearing of poultry" is scheduled for 2017

The annual contribution of biological nitrogen of legumes in the nitrogen balance in the agriculture of Russia (Zavalin A. A., Sokolov O. A., 2016)

parameter	Soybean	Peas, Bean	Annual herb, hay	Perennial herb,herb	Total
Area, thousand ha	860,5	1123,3	3916,6	9138,6	15039, 0
Yield, t/ha	1.00	1.44	1.65	2.20	
The accumulation of total N in the legume biomass, thousand tons	135,4	155,7	129,8	446,0	866,9
The accumulation of fixed N, thousand tons	81,3	77,9	81,8	303,3	544,3

СПАСИБО ЗА ВНИМАНИЕ!

THANK YOU FOR ATTENTION!