



GNU VIM Rosselkhozacademy

MARCHENKO OLEG STEPANOVICH



**Ministry of Agriculture
of Russian Federation**



**Technical and technological modernization
of agricultural production in accordance with
“State Program of Development of Agriculture
and regulation of market agricultural products,
raw materials and food on 2008-2012”**

MOSCOW - 2008

RUSSIAN ACADEMY OF AGRICULTURAL SCIENCES

**Strategy of machine-technological
modernization of the Russian Agriculture on
the period up to 2020**

**Vice-President,
Academician Yr. F. Lachuga**

**The old age Agricultural Machinery
Fleet in Russian Agriculture requires
more maintenance and repair
expenditures**

**Academician of Rosselkhozacademy
V.I. Chernov**

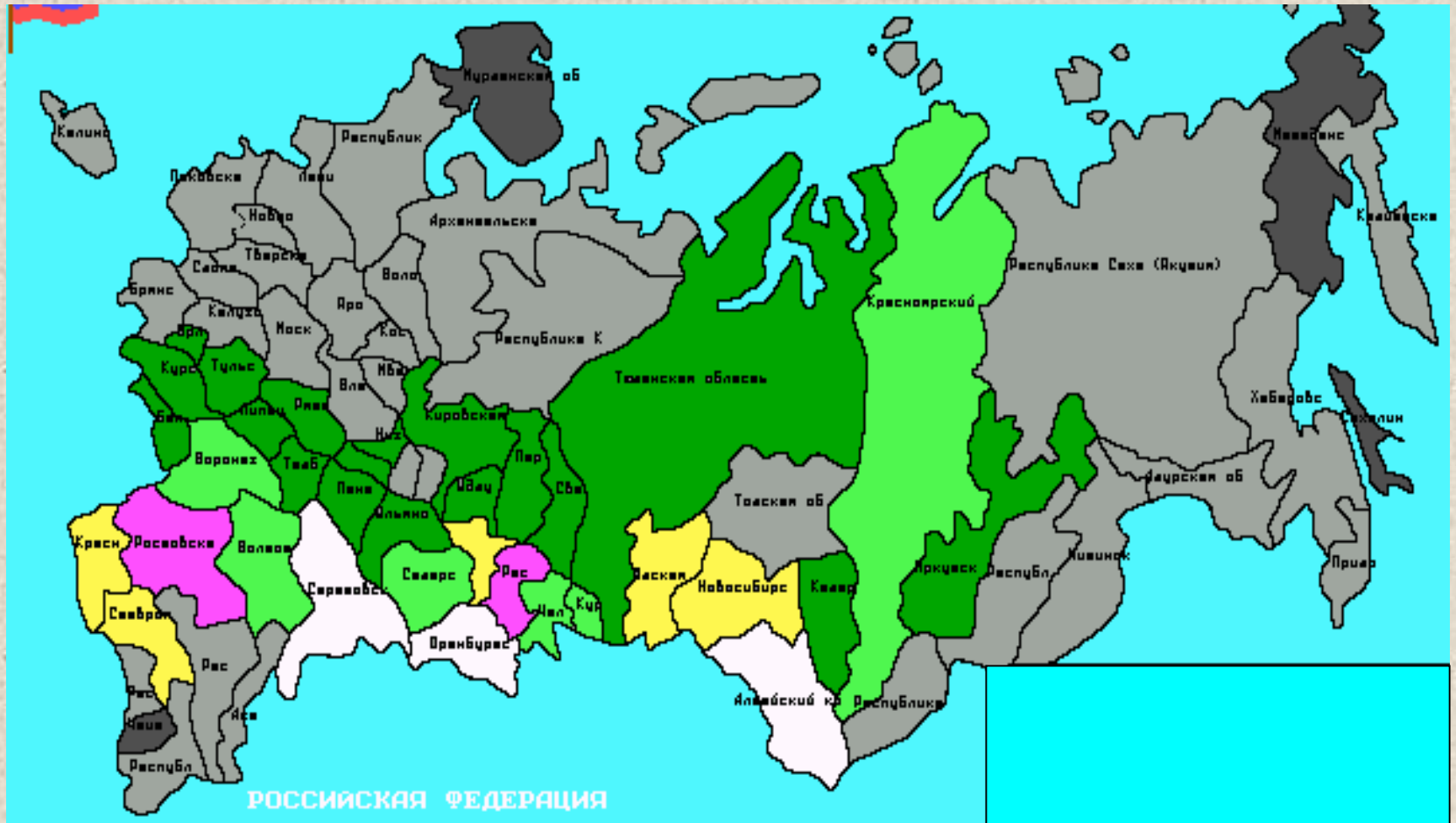
**Modern agricultural technique
for successful development of
Agro-Industrial Complex
(Tendencies and Perspectives)**



“SOYUZAGROMASH”

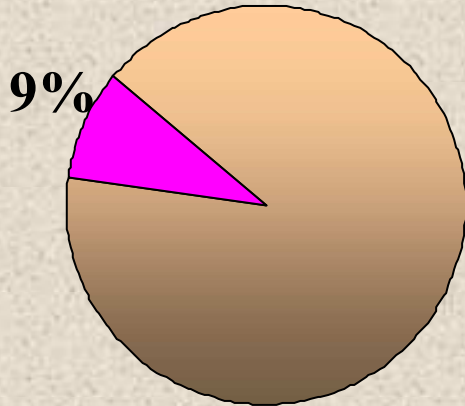
**General Director
Eug. A. Korchevoy**

Regions of Russian Federation

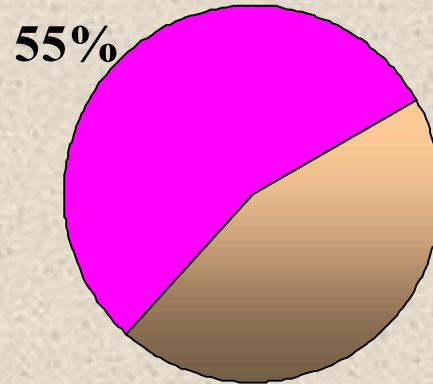


Share of Russia in world resources

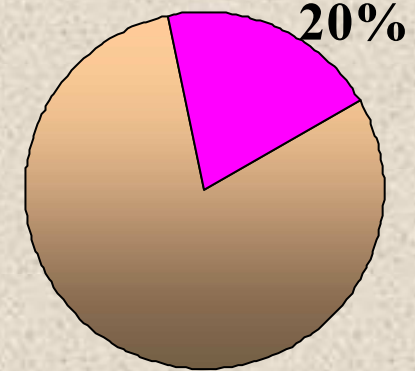
Arable land



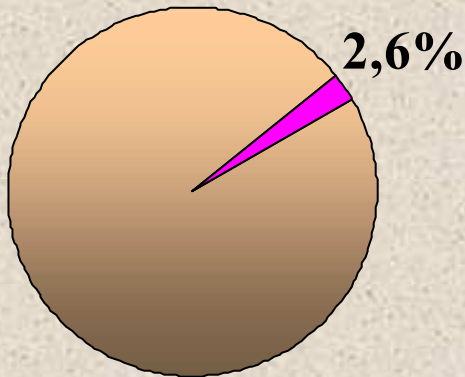
Chernozem soil



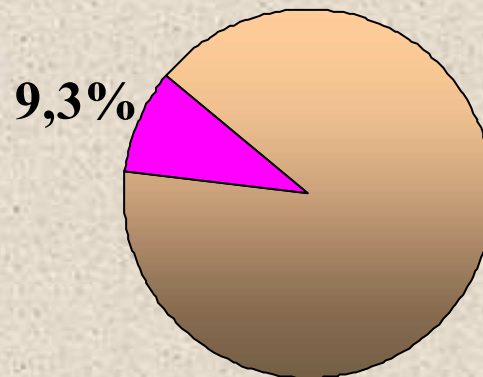
Fresh water



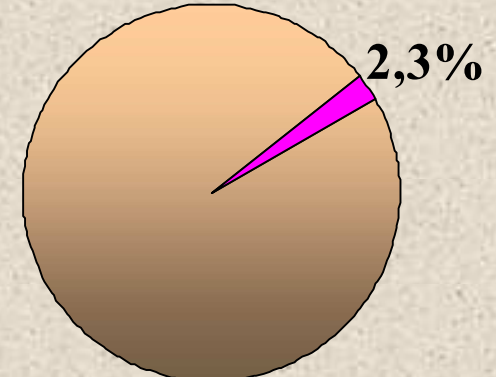
Pastures



Fertilizer



Population



Strategy of resources exhaustion (also of a biosphere) is destructive as for future and for present generations (Rio-de -Janeiro, 1992)

Main Indices of Agricultural production of Russia (1991, 1997-2005)

Indices	1991	1997	1998	1999	2000	2001	2002	2003	2004	2005
Sown area, Mha including under grain and grain-leguminous	115,5	96,6	91,66	88,3	85,4	84,7	84,58	79,6	78,76	77,48
	61,8	53,6	50,7	46,6	45,6	47,2	47,47	42,2	43,75	43,79
Mineral fertilizer used, mln.t including per I ha, t/ha	10,1	1,6	1,3	1,1	1,36	1,35	1,48	1,36	1,52	1,53
	89	18	16	15	19	16	17	17	19,4	19,4
Total fertilized area, %	66	27	24	24	27	27	26	27	27	27
Manure used, mln. t, including per I ha, t/ha	347	87,2	72,1	69,1	66,0	60,0	60,64	59,94	53,2	49,87
	3,5	1,0	0,9	0,9	0,9	0,8	0,7	0,76	0,68	0,64
Total fertilized area, %	7,4	2,3	2,4	2,4	2,9	2,7	2,7	2,6	2,4	2,4
Pesticides used, thousand t,	101,5	36,1	28,1	28,5	25,2	28,7	30,9	24,4	25,0	25,9
Total treated area, %	74,6	35,5	27,4	25,75	32,66	38,3	36,4	35	42,9	45,3
Average yield of grain, t/ha	1,5	1,65	0,94	1,17	1,44	1,8	19,6	17,8	18,8	18,5
Gross grain output, mln.t	89,1	88,55	47,56	54,71	65,51	82,5	86,6	67,2	78,1	78,2

The Differentiation of Provision with Farm-Resources and Technique also the Average Level of Profitability in Priority Regions of Russia

Farm-resources, Technique, Economy Indices	Number of Priority Regions*	Farm-resources Used in Priority Regions, % of total amount
Mineral Fertilizer	9	52
Machines for Mineral Fertilizer Application	20	40
Chemicals for Plants Protection, including:		
-diseases control chemicals	5	70
-pest control chemicals	5	63
Machines for Chemicals Application	10	40
Diesel Fuels, Lubricants	12	50
Tractors	15	44
Grain Harvesters	15	53
Forage Harvesters	15	47
Sugar-beet Harvesters	10	81
Average Gross output of Farm-products per 1 hectare, \$	16	200 and above
	18	130...200
Profitable Farm-producers, numbers	15	(5672 numb.) 58
Level of profitability on all activity without the State subsidies and compensation	8	10 and above
	8	3 and above

*) Total number of regions in Russia – 89 but about 45 regions with developed Agrarian Sector

THE SPECIFIC CONSUMPTION OF DIESEL FUEL IN CROPS PRODUCTION TECHNOLOGIES (l / hectare)

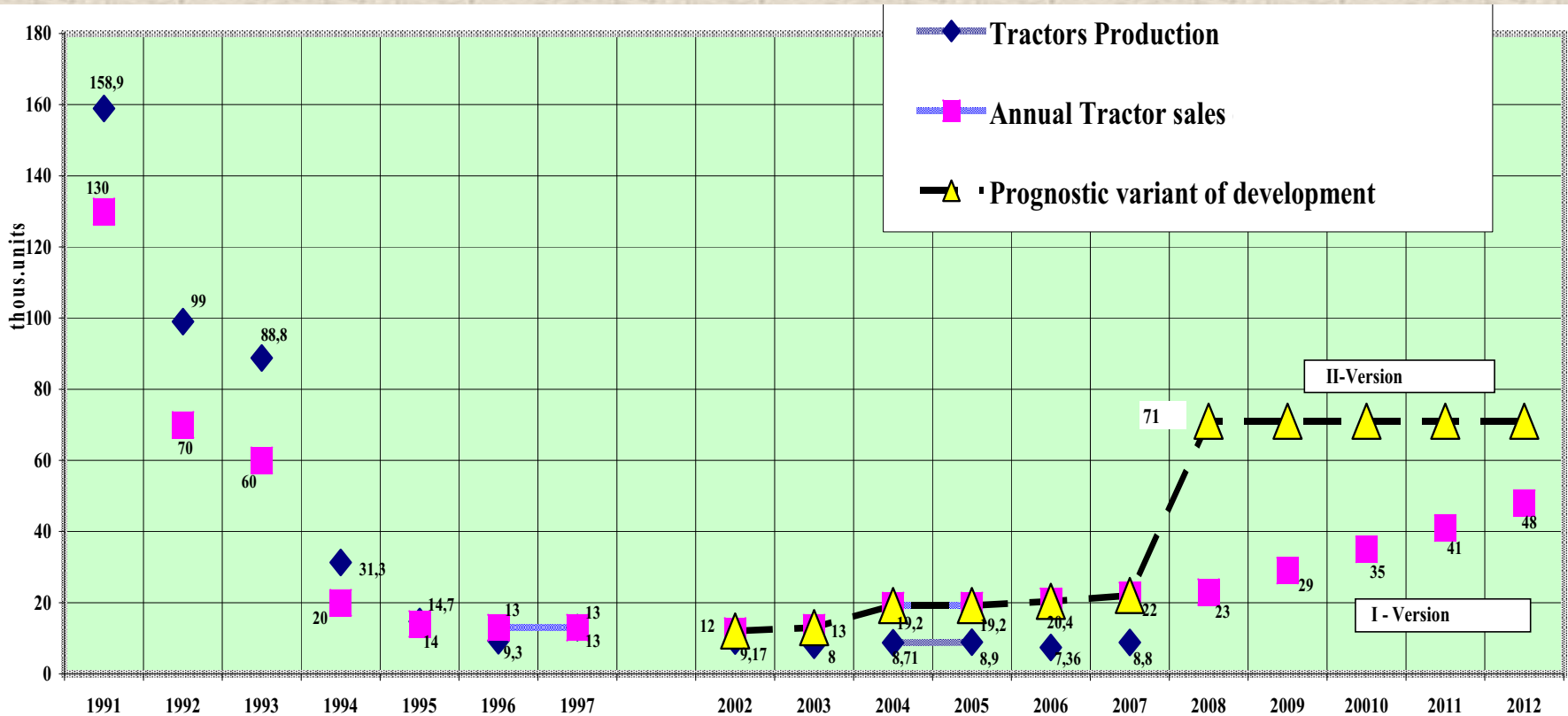
FARM CROPS	USA	RUSSIA
Winter Wheat	30,9...43,9	71,1...96,4
Corn for Grain	74...88	161,5...217
Corn for Silage	52,4...81,3	156,8...206,1
Oat	30,9	60,6...101,6
Barley	30,9	56,4...101,6

***) Data of VIM (Drincha V.M.)**

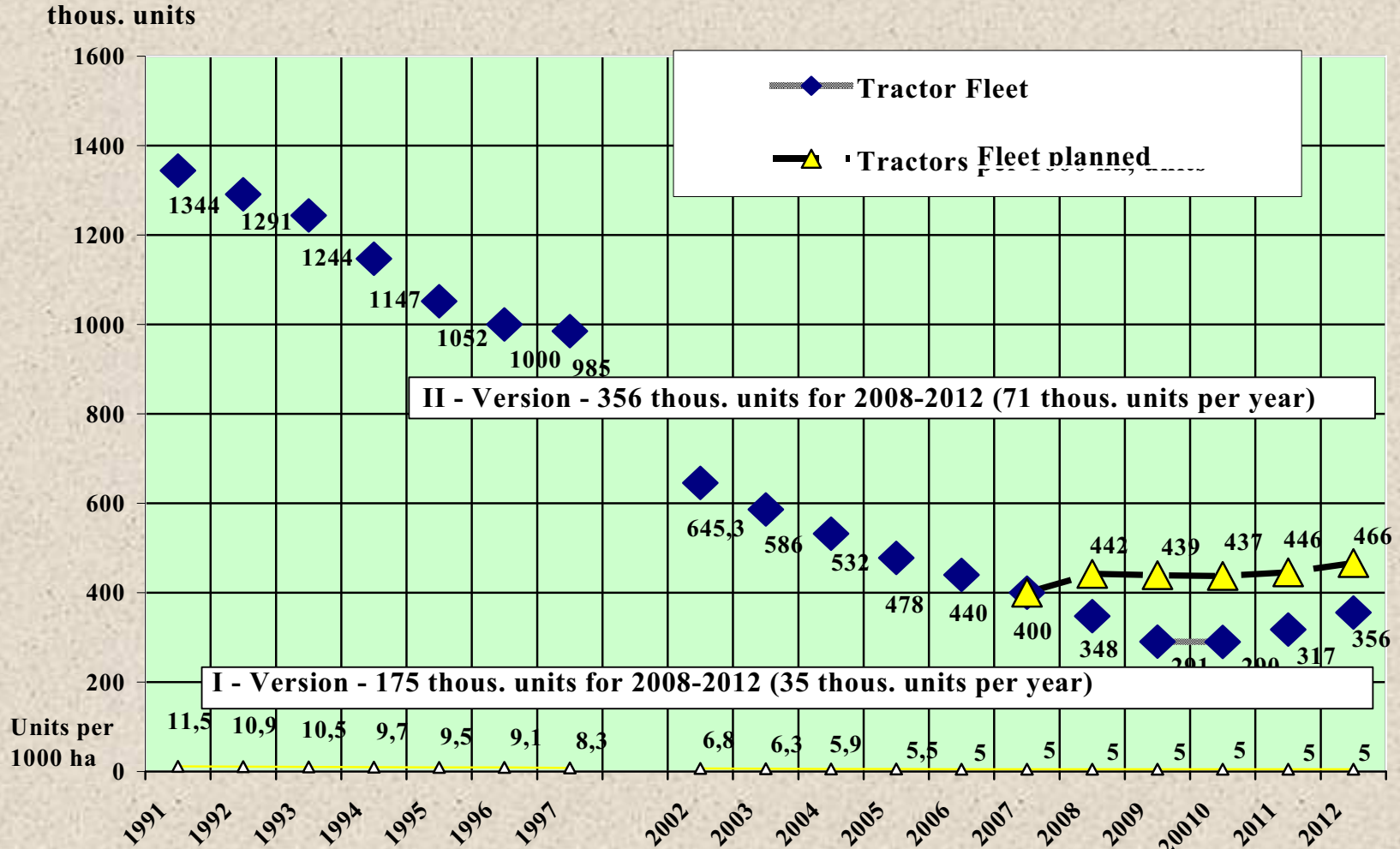
**About 40 mln. ha of arable long-fallow land
in Russia are not used now**



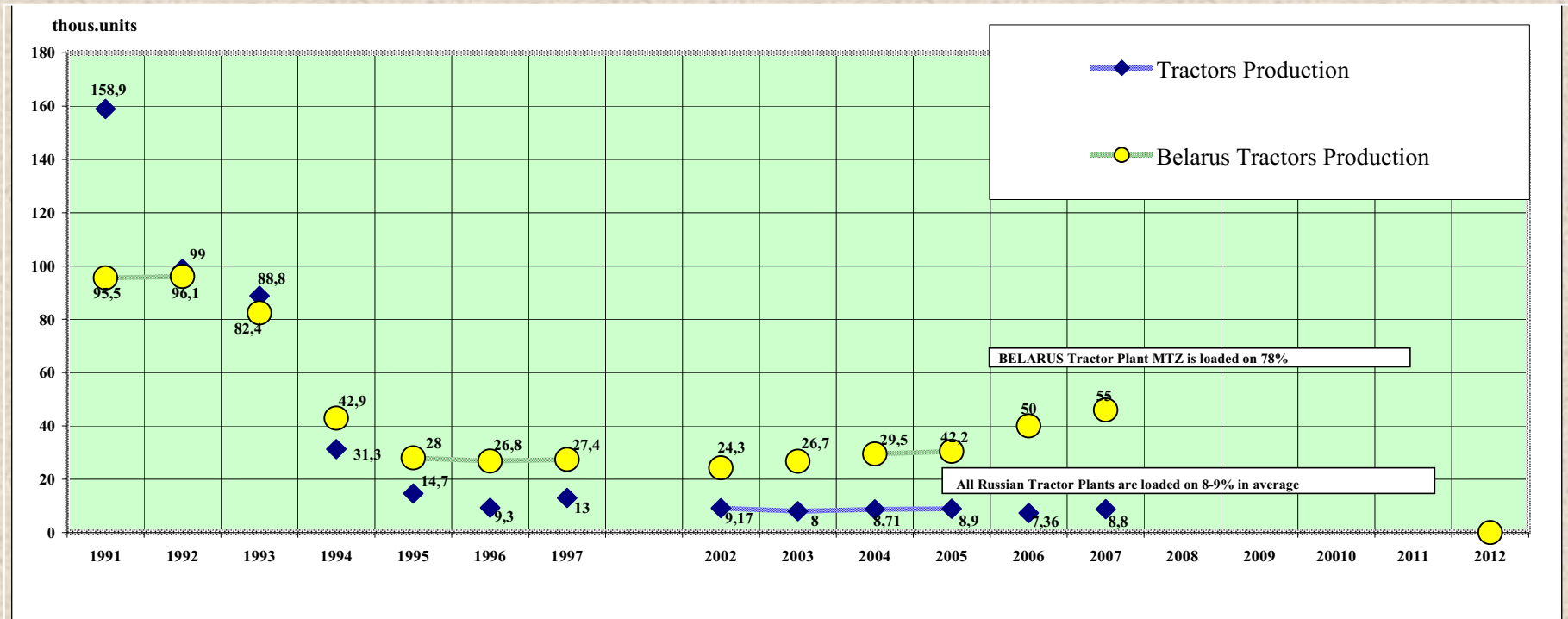
Annual Tractors Production and Sales in Russia during 1991-2007 and two ways of its increasing in 2008-2012



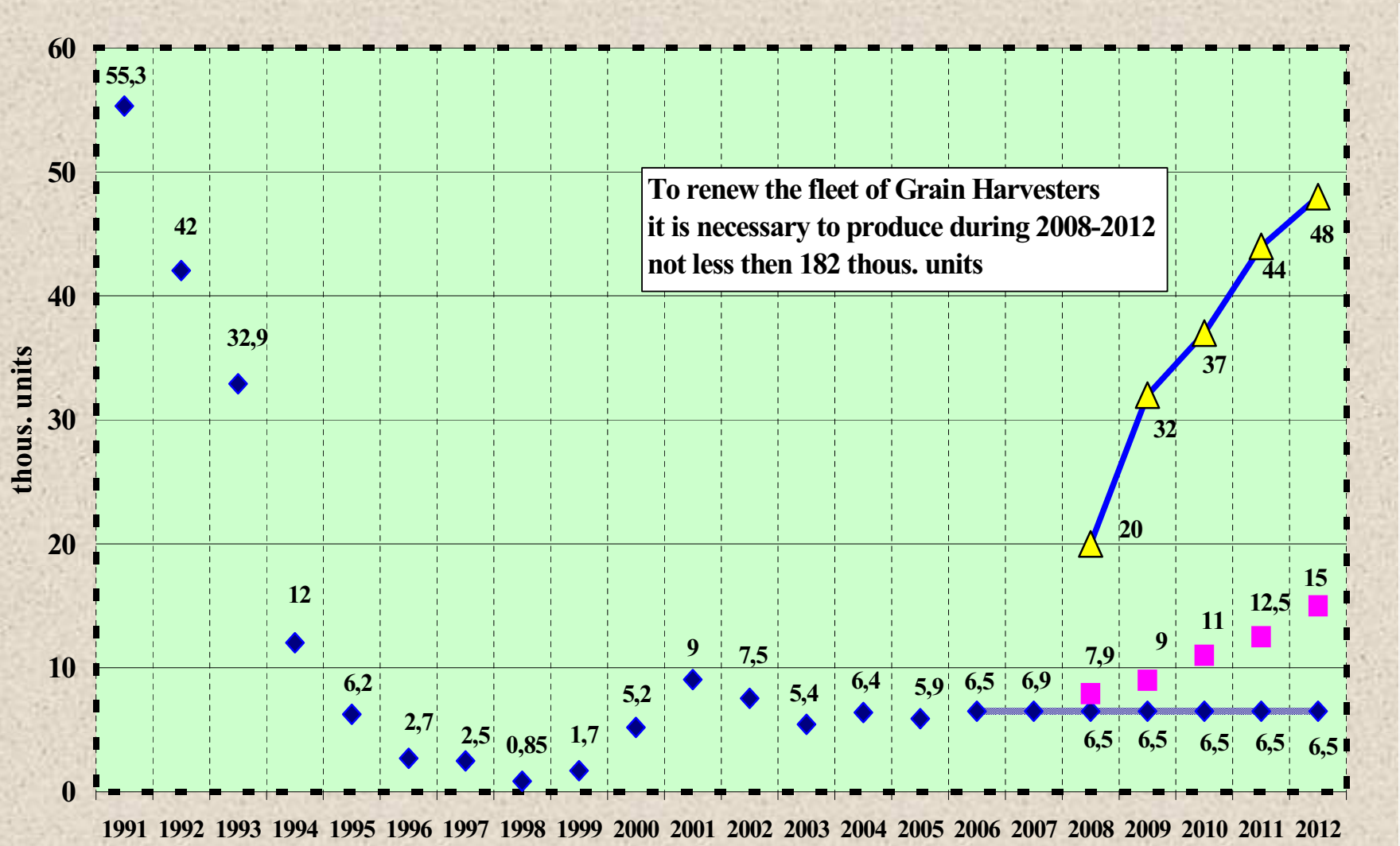
Russia Agriculture Tractor Fleet decreasing for 1991-2007 and conditions of its stabilization on the level of 2006



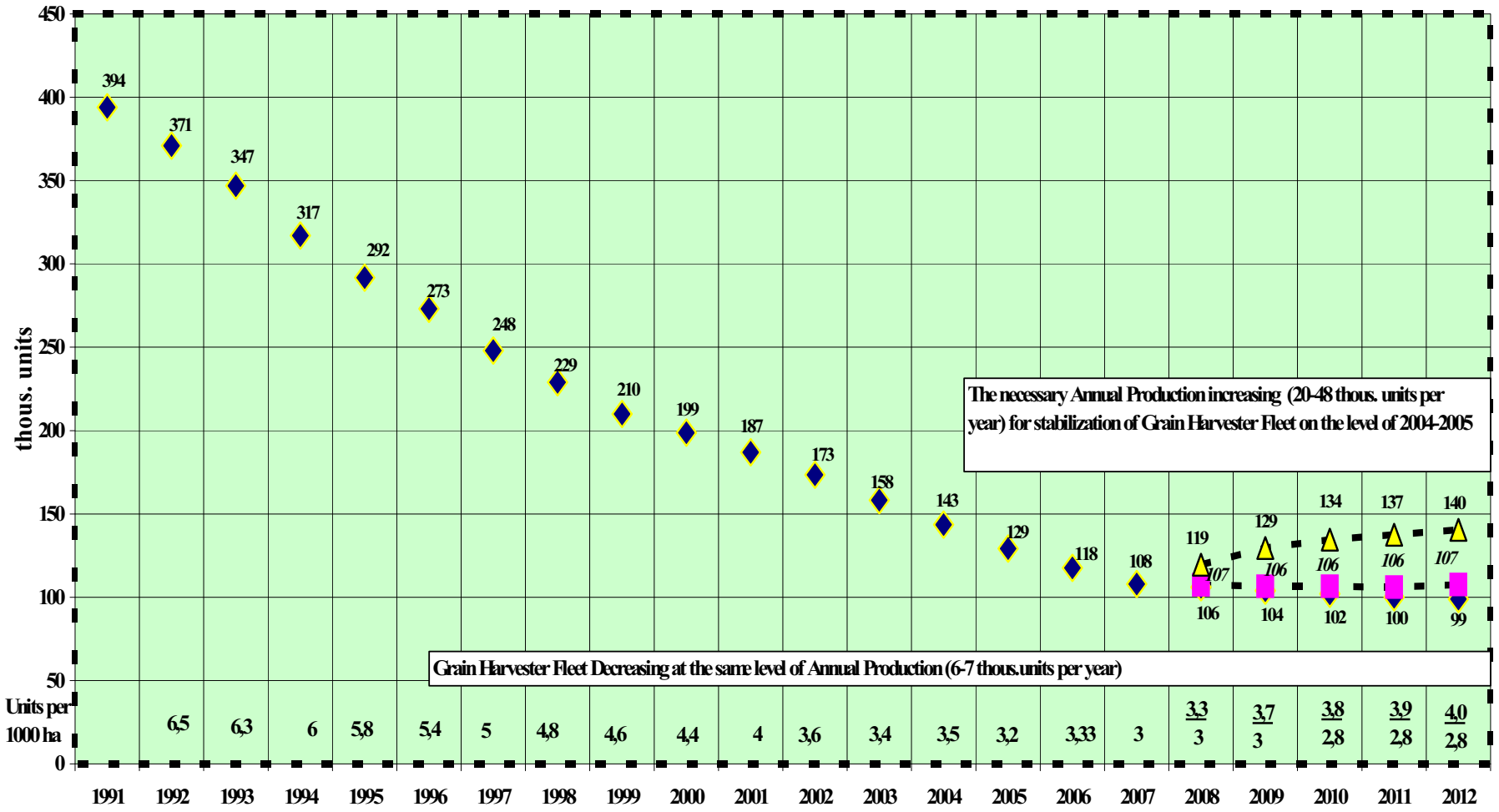
Tractors Production and Sales in Russia and Belarus during 1991-2007



Grain Harvester Annual Production and the necessary its increasing



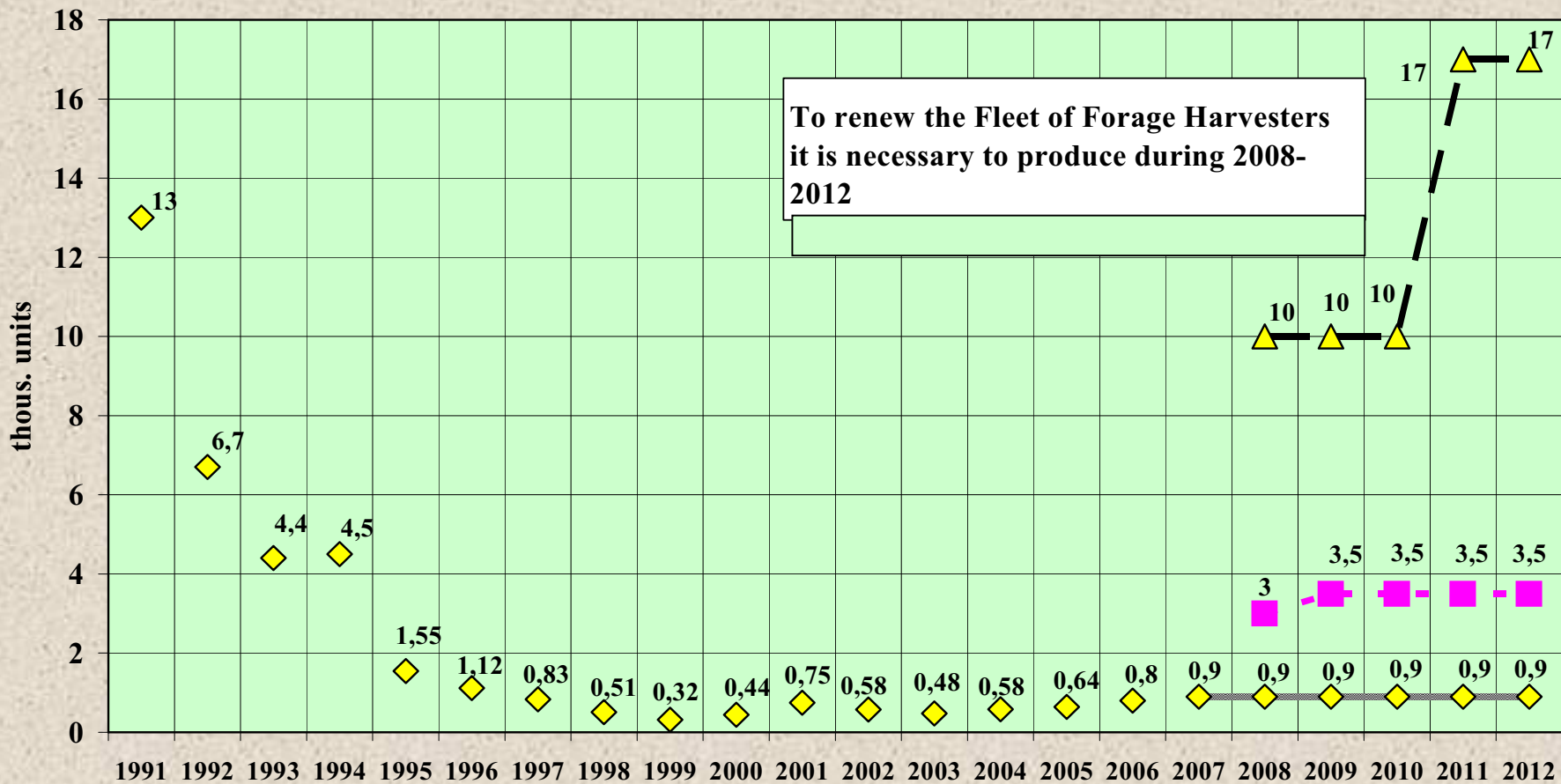
Grain Harvester Fleet decreasing for 1991-2007 and the conditions of its stabilization during 2008-2012



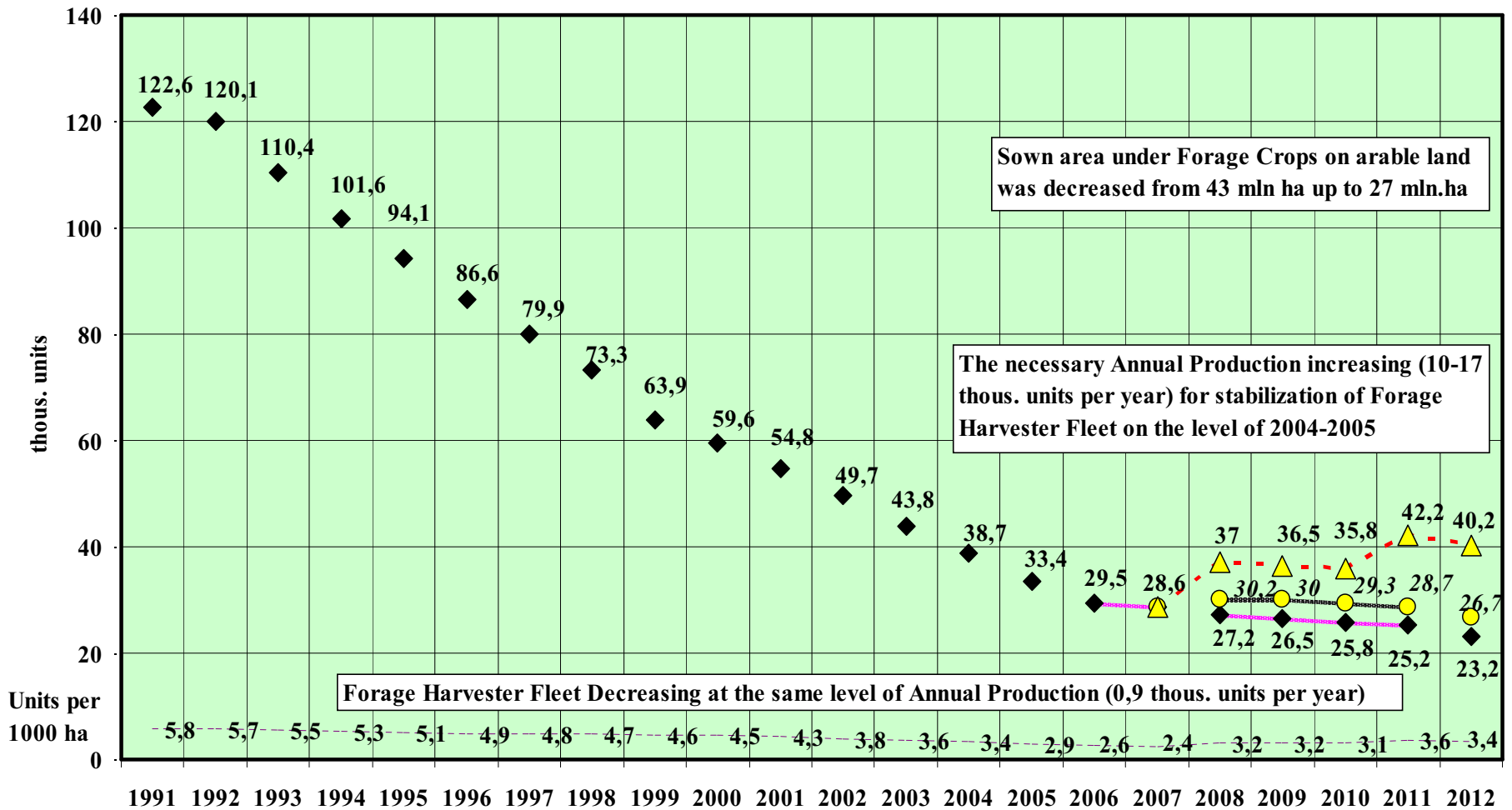
The necessary Annual Production increasing (20-48 thous. units per year) for stabilization of Grain Harvester Fleet on the level of 2004-2005

Grain Harvester Fleet Decreasing at the same level of Annual Production (6-7 thous. units per year)

Forage Harvester Annual Production for 1991-2007 and the necessary its increasing during 2008-2012 for stabilization of the Forage Harvester Fleet on the level of 2004-2005

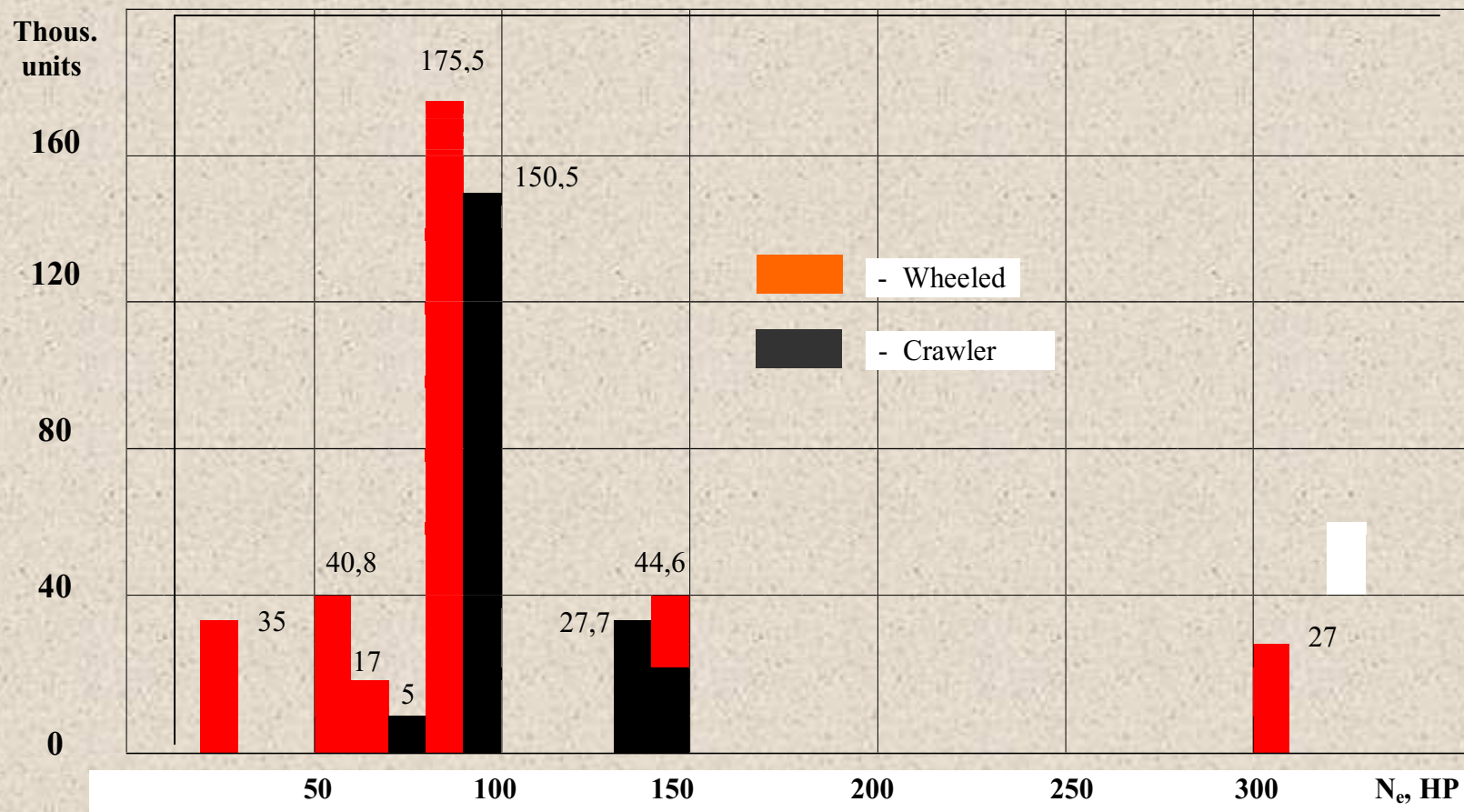


Forage Harvester Fleet decreasing for 1991-2007 and the conditions of its stabilization during 2008-2012



Structure of Agricultural Tractor Fleet of Russia (2004)

*Total amount – 532 thous. units (412 thous. units behind of the service life)
Average power of tractor unit is ~100 HP*

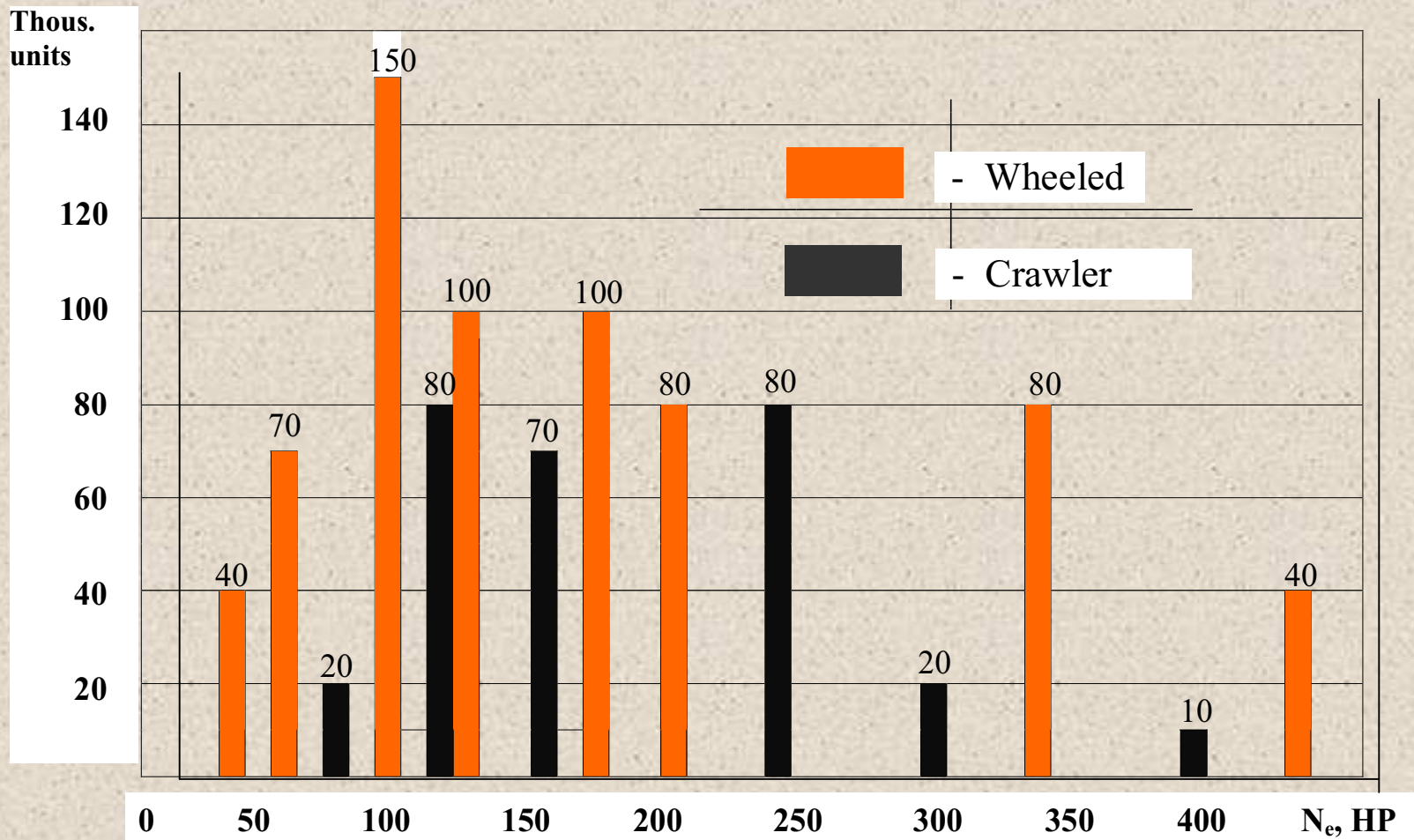


Structure of tractors and self-propelled harvesters in Power

Machines	Power, HP			
	до 100	130 -240	250- 300	350-450
Tractors	87	8*	5*	-
Grain Harvesters	-	99*		-
Forage Harvesters	-	30	3*	3,7*
Sugar beet Harvesters	10	16,5*	0,2*	0,1*

***) Imported tractors (except from Belarus) are less than 1%,
Grain harvesters ~ 0,7%,
Forage harvesters ~3,7%,
Sugar beet harvesters ~1,8%.**

Structure of Perspective Tractor Fleet for the period up to 2015 (~ 940 thous. units with average power of tractor ~ 200 HP)



Number of tractors per 100 ha of arable land in countries of «8th» (2003 г., except Japan)

№	Country	Arable land, mln. ha	Tractor fleet, thous. units	Number of tractors per 100 ha
1.	USA	172,0	4760	2,8
2.	France	18,4	1264	6,9
3.	Canada	45,9	733	1,6
4.	Italy	8,0	1680	21,0
5.	Germany	11,9	944	7,9
6.	Great Britain	5,6	500	8,9
7.	Russia	122,6	586	0,48
Total		384,4	10,467	2,7

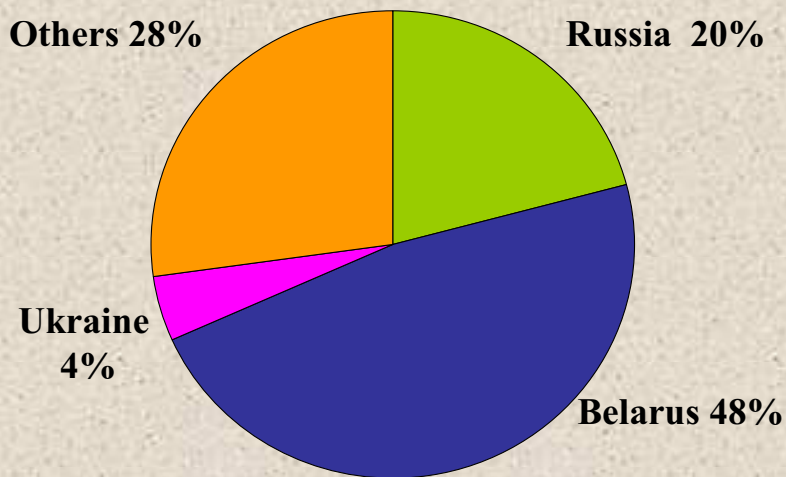
Russia: **1990:** Arable land– 131,8 mln.ha; | → 1 тр. / 100 га
 Tractor fleet – 1365 thous units.

2007: Arable land– 115 mln.ha; | → 0,4 tractor /100 ha
 Tractor fleet– 480 thous. units;
 (inventory data – 560 thous. units ~ 0,5 tractor /100ha)

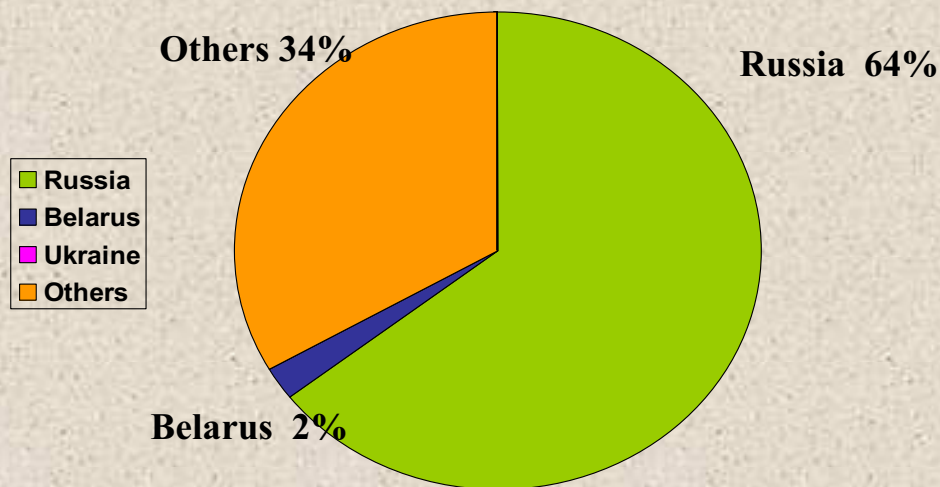
From 1990 to 2007 - numbers of tractors per 100 ha are decreased to 2,5 times.

Structure of deliveries of the agricultural tractors and grain harvesters to the Russian Agriculture in 2007

Tractors (150 models)



Grain harvesters (96 models)



Country of manufacturing	units
Russia	7452
Belarus	17130
Ukraine	1593
Others	9735
Total	35910

Country of manufacturing	units
Russia	4538
Belarus	150
Others	2357
Total	7045

Remark: In 1990 the deliveries to Russian Agriculture were consisted as follows:
tractors – 143700 units, grain harvesters – 43000 units.

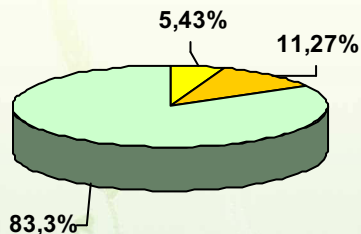
The age characteristics of the machine-tractor fleet of the all agricultural producers of different forms of property (data of All-Russia inventory on 1 of July 2006)

Name of machines	Total, units	The age characteristics of the technique, %		
		Up to 3 years, %	4 - 8 years, %	9 years and more, %
Tractors	689649	5,43%	11,27%	83,3%
Grain harvesters	192068	8,93%	13,66%	77,41%
Forage harvesters	33785	9,05%	15,48%	75,43%

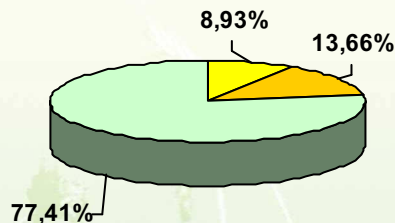
Remark:
The data of State Statistic Service in 2006

Tractors – 478543 units
Grain harvesters – 117577 units
Forage harvesters – 29522 units

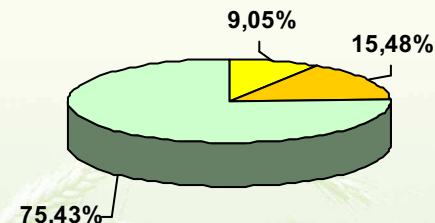
Tractors



Grain harvesters



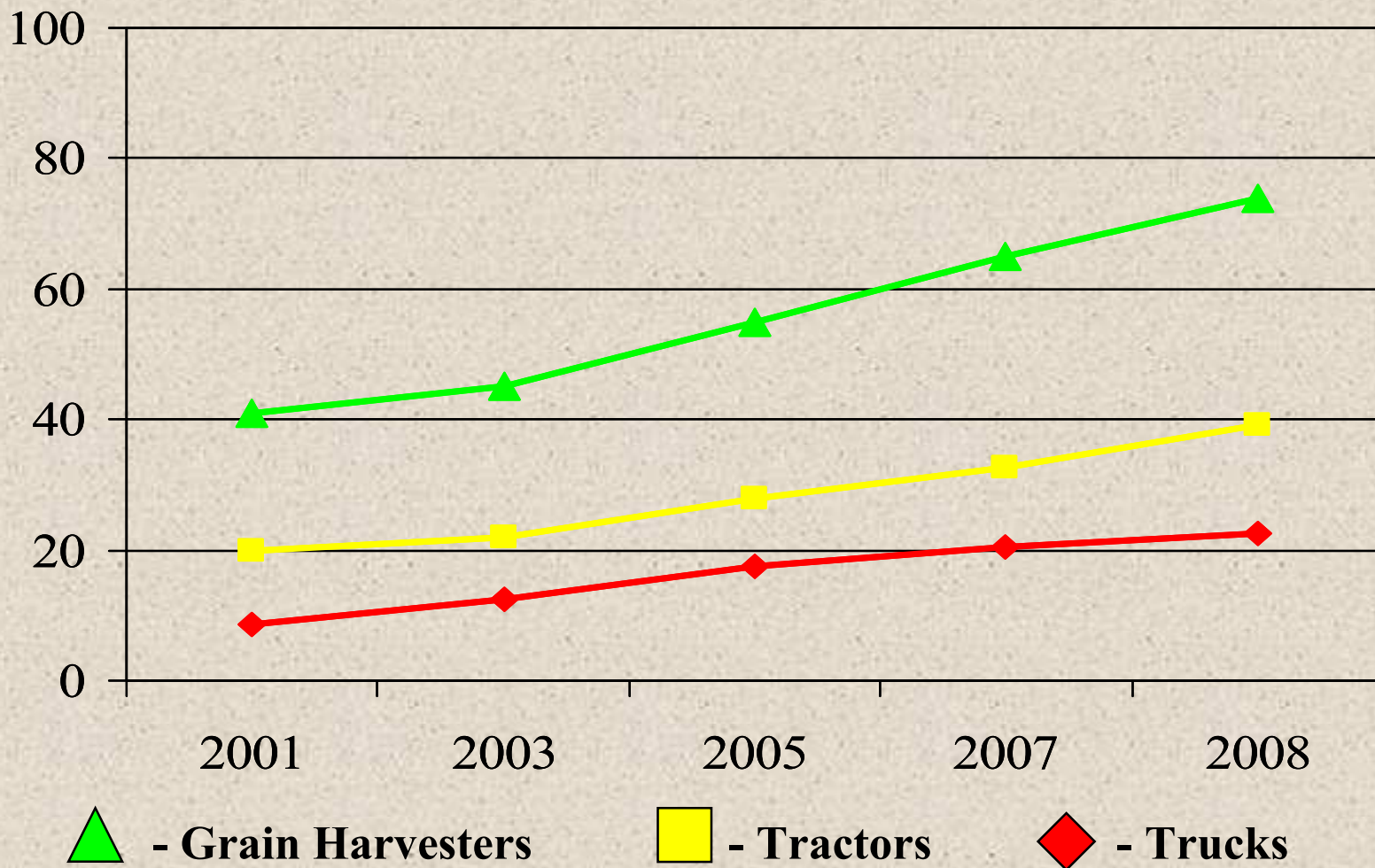
Forage harvesters



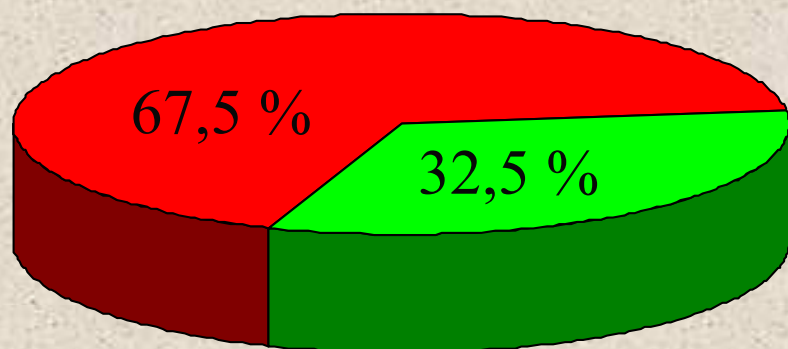
**WHAT ARE
THE EXCLUSIVE FEATURES
OF THE RUSSIAN
AGRO-INDUSTRIAL
COMPLEX
NOW**

Annual repair cost for the one machine renovation after its full term of life (average in Russia)

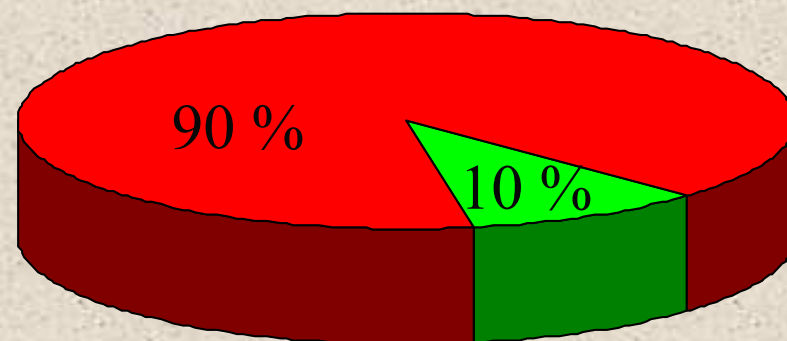
Thous. rub. (30 Euro)





Cost structure of tractor's life cycle (example on the tractor MT3-82.1)



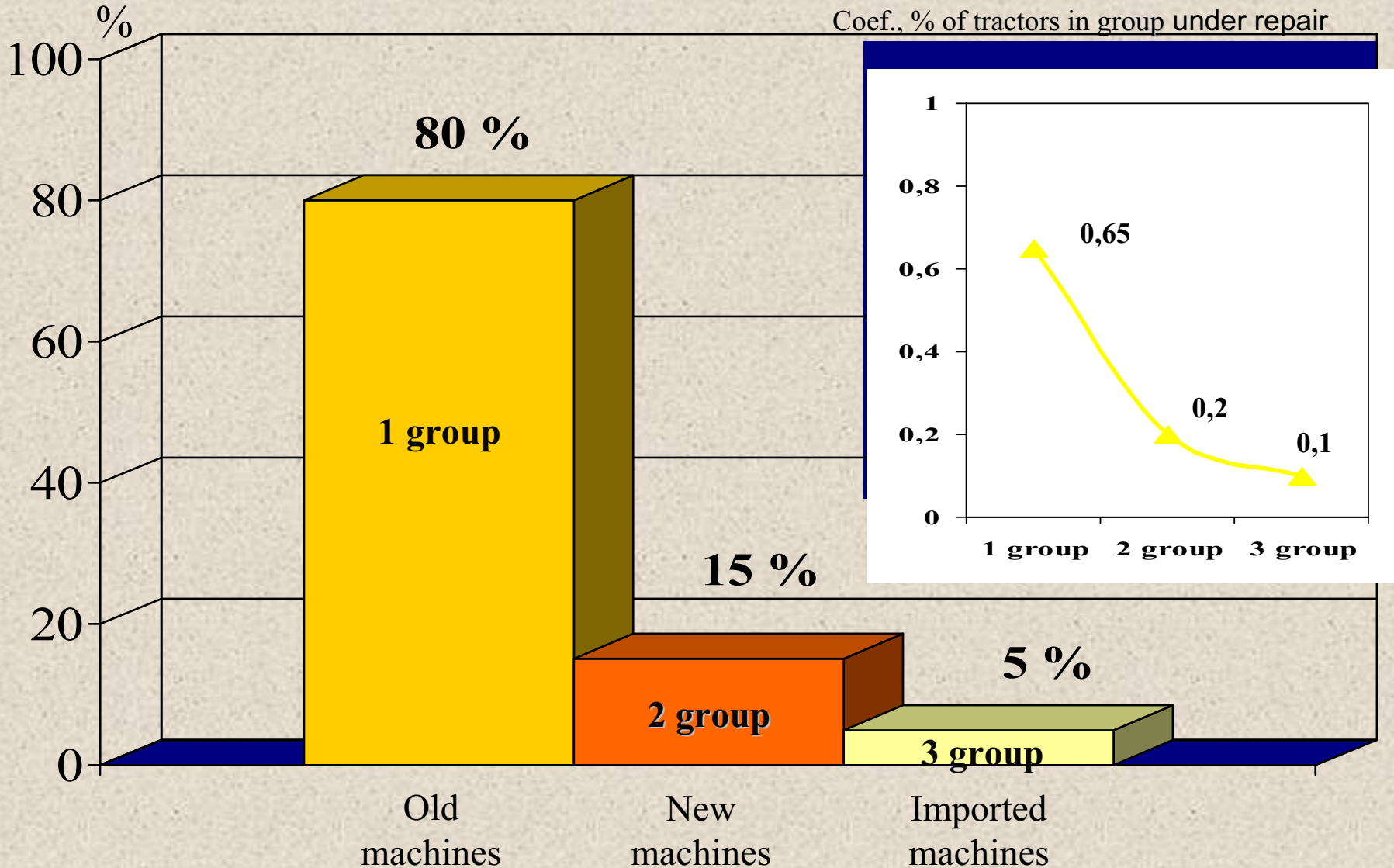
In prices of 2008 –
for 10 years use



In prices of 2008 – for 10 years use
with the inflation increase

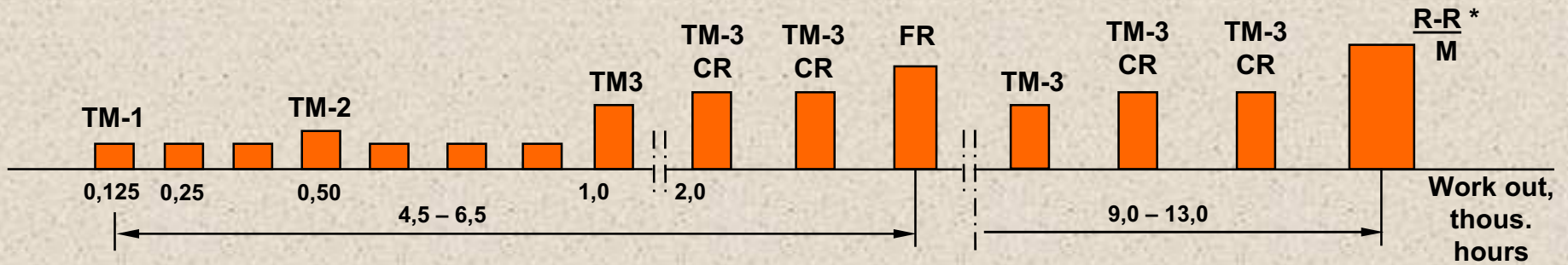
-  - Cost of a new machine, % of total expenditures
-  - Cost of spare parts, materials for maintenance and repair, %

Structure of Agricultural Tractor fleet subdivided on three groups concerning the years of utilization, % and scales of their repairing in groups, Coef., %



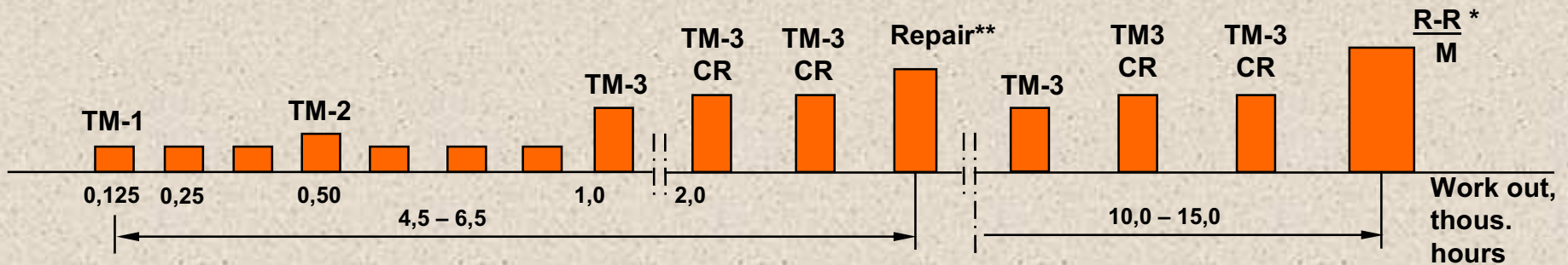
Structure of repair and technical maintenance of agricultural tractors in three groups

1 group – old machines (more than 6 years old)

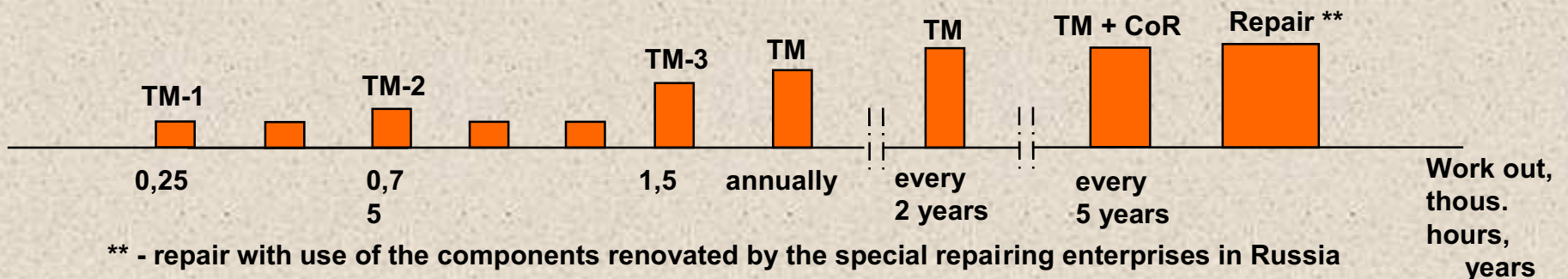


(TM-1, TM-2, TM-3) -technical maintenance; (CR) –current repair; (FR)- Full repair; (R-R*/M) -renovation repair + modernization;

2 group – New machines (1 – 5 years old)



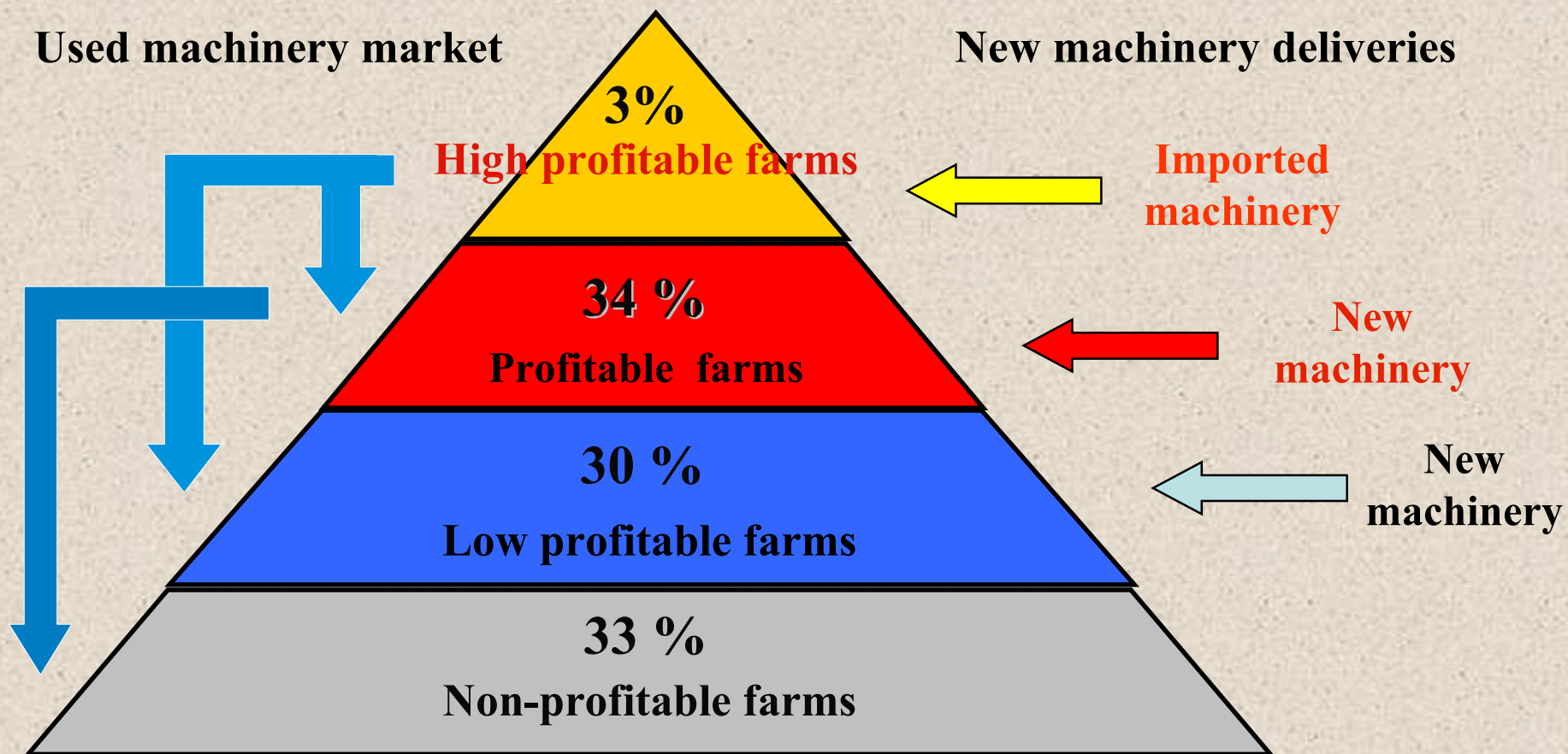
3 group – Imported machines (example on “John Deere” tractors)



** - repair with use of the components renovated by the special repairing enterprises in Russia

(CoR) –components replacement only, TM – technical maintenance;

Scheme of supplying with agricultural techniques the farms of different level of profitability



	Level of profitability		Level of profitability
High profitable farms	40 – 100 %	Low profitable farms	0 -10%
Profitable farms	10 – 40 %	Non-profitable farms	- losses

Remarks

1. The presence of huge amount of different models of key machines also more than 80% of old machines in the agricultural machinery fleet are the specific features of current state of technical maintenance in Russian Agriculture.

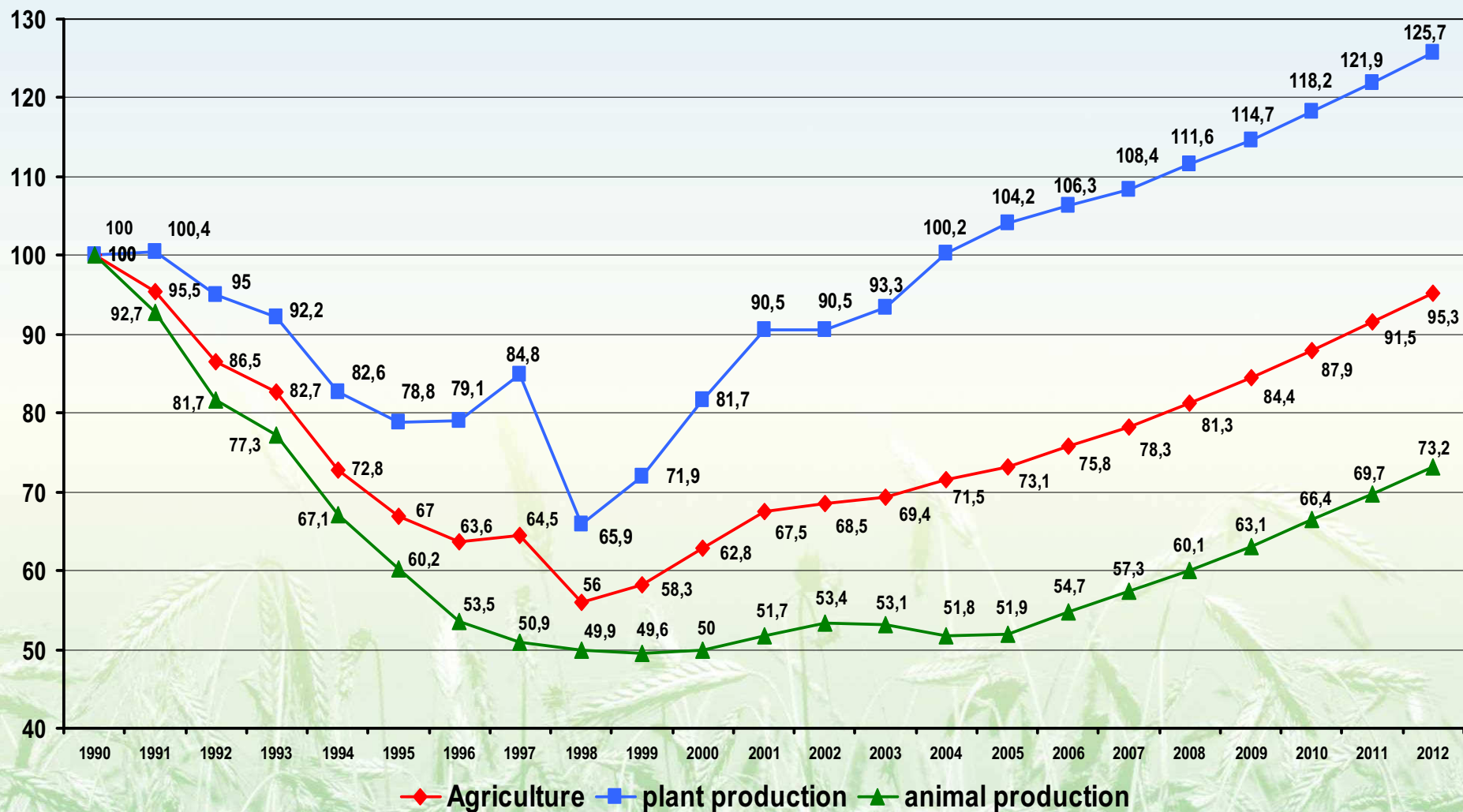
2.Reorganization of System of technical maintenance is a main reserve of the resources saving in Russian Agriculture and Industry.

3. System of technical maintenance should be adapted to the three different groups of machinery including imported machinery.

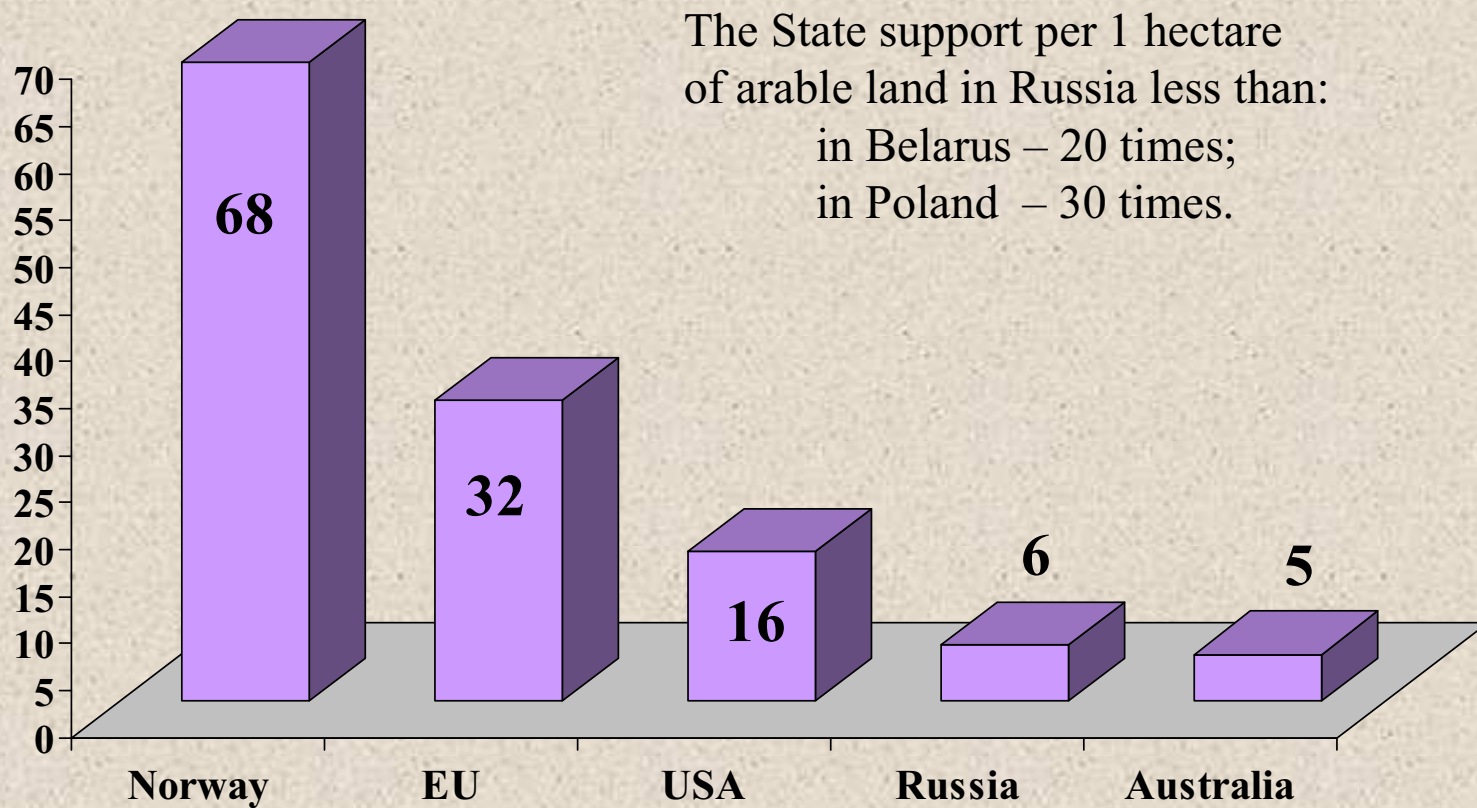
The current state of the technological resources use in Russian Agriculture

- Low level of utilization of the comparatively high potential land and soil resources;
- Modern efficient technologies are used only on 10 - 15% area and the same on animal farms;
- Technical and technological potential of agricultural resources are used only on 50% of requirements, the average specific power is about 1,3 HP/ha when the optimal meaning of it should be not less than 3 HP/ha;
- Rural area of Russian Federation is characterized with high level of unemployment of rural population and large lack of the professional operators in machine-technological branch;
- Hard handwork of population on small own plots (0,04-0,3 ha) but they produce about 50% of gross agricultural products in Russia.

Index of production of agricultural products (in comparable prices, in % to 1990)



State support of agricultural producers (in % to unit products cost)



The main directions of technical and technological modernization of Agro-Industrial Complex (AIC) in Russia

- The application in the Agriculture with the modern, resources saving and ecologically efficient and safety technologies;
- The equipment of the Agriculture with techniques of a new generation, resources saving and high efficiency;
- The formation of innovation systems for development of the Russian Agro-Industrial Complex;
- The modernization of system of testing and certification of the agricultural machinery, increase the role of Machine Testing Stations (MTS) in the new conditions in the Russian Agriculture and Industry;
- The improvement of System of Maintenance and Repair of agricultural machinery, increase the role of “GosTechNadzor”;
- The development of Autonomous Energy Supplying into the farms.

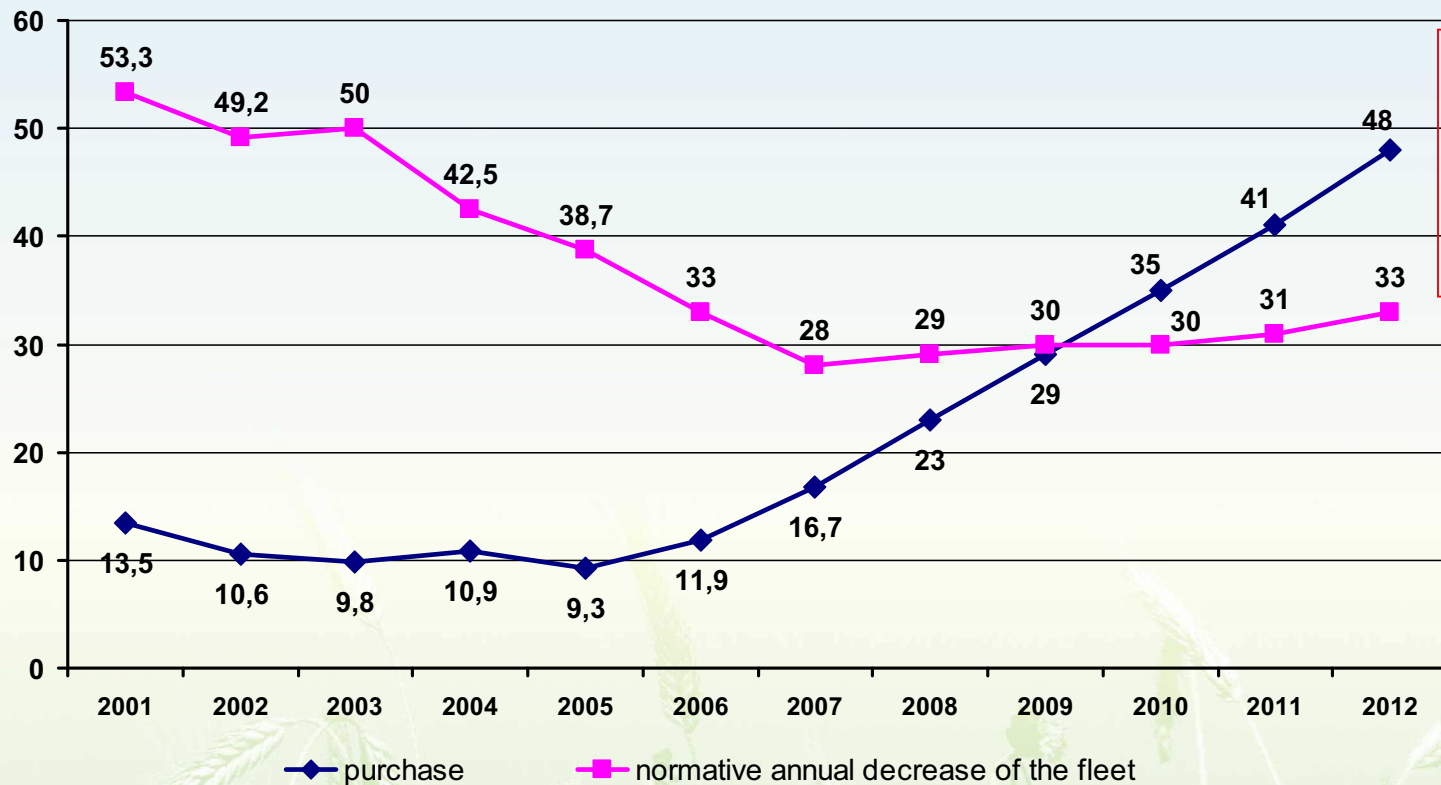


Technical and technological modernization of Russian Agriculture on the period of 2008 – 2012

	Coefficient of renewal, %	2008	2009	2010	2011	2012	For 5 years
Tractors, thousand units	40,0	23,0	29,0	35,0	41,0	48,0	176,0
Grain harvesters, th. units	50,0	7,9	9,0	11,0	12,5	15,0	55,4
Forage harvesters, th. units	55,0	3,0	3,5	3,5	3,5	3,5	17,0
Power supply, HP/100 ha	—	134,0	145,0	152,0	161,0	168,0	+34
Volume of credits, bln rub.	—	49,0	46,5	59,8	55,0	55,0	255,3
Subsidy for compensation of payments for credit percentage rate, bln rub.	—	2,450	5,360	8,450	10,297	11,547	38,1



Annual purchase of tractors and annual normative rate of tractor fleet decreasing for the period of 2001 – 2012 in Russian Federation

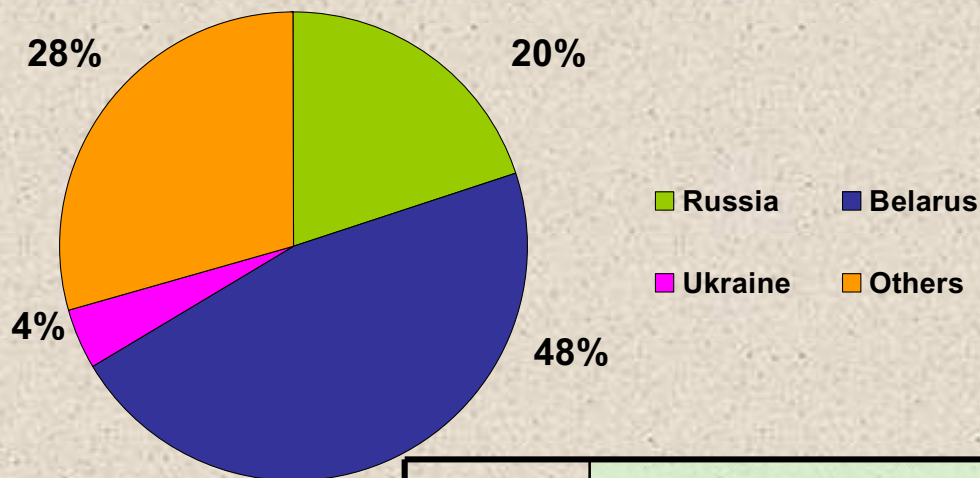


2012, thous. units:	
Tractors	– 500
Grain harvesters	– 145
Forage harvesters	– 40

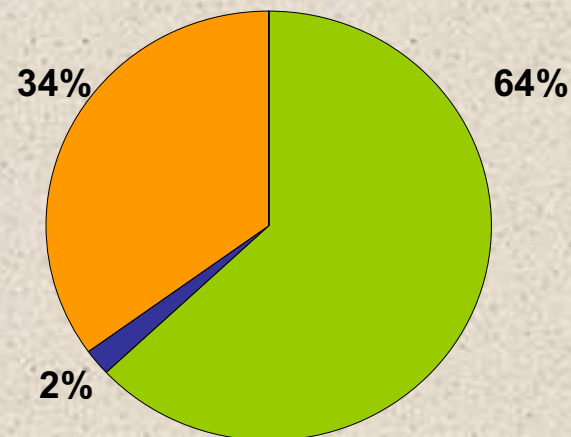


Structure of domestic market of agricultural tractors and grain harvesters in 2007

Tractors



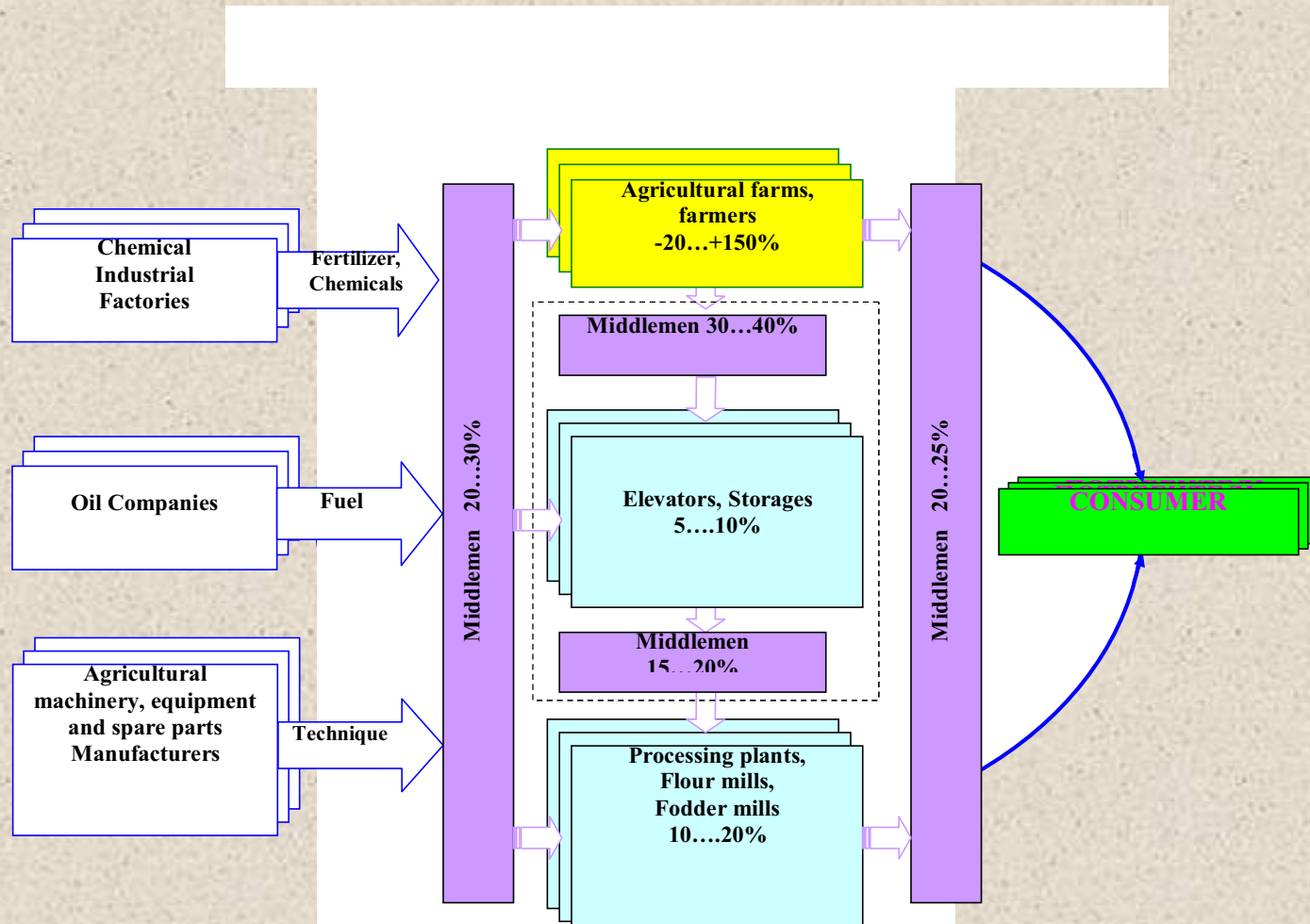
Grain Harvesters



Thous. units	Country	Thous. units
7,452	Russia	4,538
17,130	Belarus	0,15
1,593	Ukraine	0
9,735	Others	2,357
35,910	Total	7,045



Increase of Agricultural products costs and Middlemen's interests on the way of producing, storage, processing and realization



Scientific and professional support of technical and technological modernization of Russian Agriculture

Rosselkhozacademy

206 scientific organizations, including:

196 Institutes;
9 experimental stations;

Central Scientific Selkhoz Library;

317 organizations of scientific assistants including:

293 experimental-production farms;
24 experimental-industrial enterprises;

Totally:30 thousand people including:

1,5 thous. Doctors of science;
More than 5 thousand PhD.

Research organizations of Ministry of Agriculture

13 Research organizations;

9 design and project bureau;

13 machine-testing stations;

Totally: 25 thousand people including:

1,8 thous. Doctors of science;

More than 10 thousand PhD.

High educational organizations

59 High educational organizations :

22 University;

36 Academy;

1 Institute;

48 scientific-experimental enterprises;

63 organizations of additional education;

Totally: Scientific-educational staff 23,6 thousand people including:

3,4 thous. Doctors of science and

professors;

11,2 thousand PhD.

THE MOST EFFICIENT PROJECT
FOR THE FUTURE
OF AGRICULTURAL PRODUCTION
IN UNION STATE

(RUSSIAN FEDERATION - REPUBLIC OF BELARUS)

2006 - 2009

Complexes of machines on the base of UES-450

