

EU ENLARGEMENT AND ITS INFLUENCE ON AGRICULTURE AND MECHANISATION

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1. Current situation of agriculture in the CEEC-10

The contribution of agriculture to the economies of Central and Eastern Europe (CEE) is relatively more important than in the EU-15. For example in the year 2001 agriculture in the Central and Eastern European Countries (CEECs) produced 6.6% of the Gross Domestic Product (GDP), compared to 2% in the EU-15. Employment in agriculture was 16% compared to only 4.3% of the active work force in the EU-15. **Table 1** illustrates that agriculture in the New Member States (NMSs) plays a much more important social, economic, and environmental role than in the EU-15.

Table 1

	New Member States	EU-15
- Utilised Agricultural Area (UAA):	39,000,000 ha	130,000,000 ha
- Share of UAA in total area:	55%	40%
- Employment in agriculture:	16%	4.3%
- Employment in agriculture:	9.2 Mio	6.8 Mio
- Gross value-added of agriculture:	18,000 Mio EUR	168,000 Mio EUR
- Share of agriculture in the GDP:	6.6%	2.0%
- Share of food export in total Export:	37%	17%

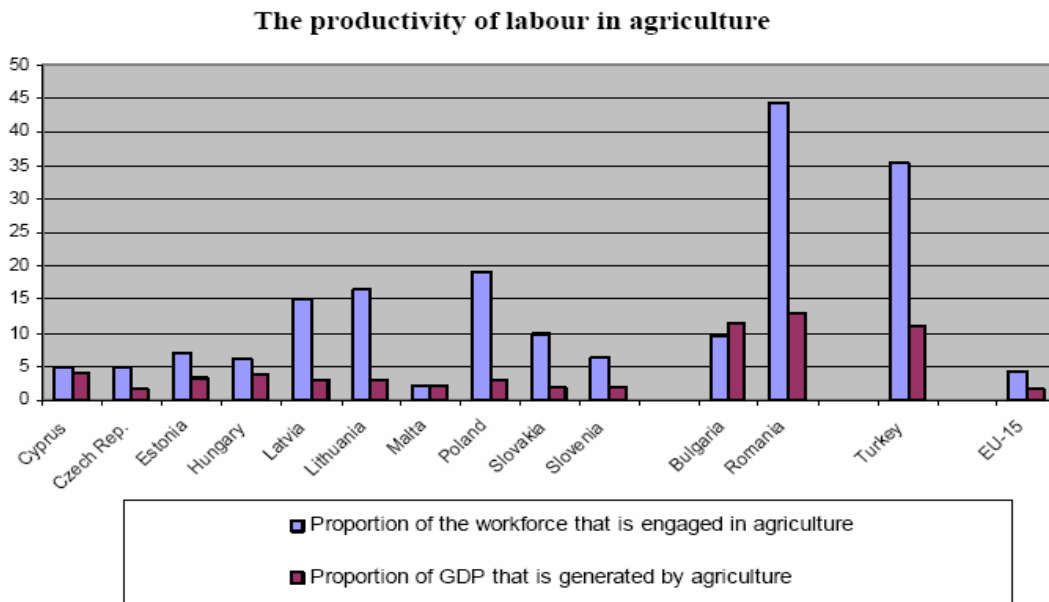
Elaboration from:

- EU-DG for Agriculture, 2004, Agriculture in the EU, Statistical and Economic Information - Year 2003, Brussels;
- EUROSTAT on-line database.

The new Member States will add about 39 million ha UAA (60 million if we count Bulgaria and Romania too) to the 130 million ha in the EU-15 representing an increase of 30%. However, the gross value added of agriculture would increase only by 6%. These numbers confirm that the new Member States have a large agricultural production potential, but the difference between the production potential and the income generated from its use illustrates the significantly lower intensity and profitability of agriculture in the NMSs. The ongoing restructuring process suggests that NMSs' agricultural potential will be gradually exploited and fully used only in the longer term. **Figure 1** shows that although, agriculture plays a vital role in each NMSs' economy, large country specific differences exist among them. The contribution to GDP varies between 15.8% in Bulgaria

and 2.9% in Slovenia. The equivalent range for the EU-15 is between 6.6% in Greece and 0.6% in Luxembourg. The high average employment in agriculture in the CEECs is mainly explained by Romania, Poland, and Lithuania, where 42%, 18.8% and 19.6%, respectively, of the active work force is in the agricultural sector.

Figure 1



Source: European Commission, "Enlargement and Agriculture", Directorate-General for Agriculture, Brussels, April 2004.

Since the beginning of the 1990s, agriculture in the CEECs has changed significantly. Market liberalisation determined a veritable collapse of agricultural production in CEECs. With the advancement of the transition process the situation of agriculture has ameliorated, but improvement has been much less than in industry and competitiveness is still relatively weak. Generally, the quality of farm products of NMSs can not yet meet the EU-15 standards. Farm prices tend to converge towards those of the EU-15, while consumer prices are 2 to 4 times lower. In most countries successful developments restructuring of agriculture and food industries is still not complete.

Much of the land in the NMSs is now farmed by private individual farms, while various types of large corporate farms have emerged and a significant number of co-operatives have survived, though in revised legal forms and often with new management structures. The farming sector in the new Member States is characterised by the existence of a large number of farms, the sum of which exceeds that of the EU-15 by approximately 30%. On the other hand, the land they cultivate amounts to about 50 million ha, slightly less than 40% of that of the EU-15. (**Table 2.**)

Table 2. Farm structure by size and area of cultivated land in CEEC-10

	Unit	Farm groups				Total
		<5 ha	5 to <20 ha	20 to <50 ha	Above 50 ha	
No. of holdings	1,000	7,520	1,384	216	63	9,183
Share of total	%	82	15	2	1	100
Area cultivated	1,000 ha	13,319	13,035	4,557	18,672	49,584
Share of total	%	27	26	9	38	100
Average farm size	Ha	1	9	32	280	5

Source: **IAMO**, Network of Independent Agricultural Experts in the CEE Candidate Countries, “*The Future of the Rural Areas in the CEE new Member States*”, Halle, Germany, 2004.

Table 3 shows that the larger the group’s average farm size, the lower the share of the number of farms belonging to it and the bigger the share in the land they cultivate. Of the total number of approximately 9.2 million farms, the group with the smallest holdings by size of land cultivated (below 5 ha) dominates in number (82%), but not with regard to the share of used farm land (27%). The majority of these small holdings can be classified as subsistence or part-time farms, which can not provide sufficient income for the farm household. The share of small holdings (<5 ha) in the total number of farms is high in all CEE countries.

Table 3. Average size of all farms as well as share of small and large farms in total land cultivated by country

Country	Average farm size (ha)	Share of cultivated land in size group below 5 ha (%)	Share of cultivated land in size group above 50 ha (%)
Estonia	12	9	56
Latvia	12	9	31
Lithuania	4	31	11
Poland	8	16	25
Czech Republic	100	1	93
Slovakia	31	2	96
Hungary	4	18	58
Slovenia	6	46	8
Romania	2	58	19
Bulgaria	4	19	75
Total	5	27	38

Source: **IAMO**, Network of Independent Agricultural Experts in the CEE Candidate Countries,

A. Segrè and H. Petrics “EU Enlargement and its Influence on Agriculture and Mechanisation”. Agricultural Engineering International: the CIGR Journal of Scientific Research and Development. Invited Overview Paper. Vol. VII. Presented at the Club of Bologna meeting, November 12, 2004. March, 2005.

“The Future of the Rural Areas in the CEE new Member States”, Halle, Germany, 2004.

Patterns in land use by different farm groups vary significantly. In Romania, Lithuania and Slovenia the farms belonging to the lowest size bracket dominate the agricultural sector and their average farm size is among the smallest of the countries considered. Due to the large number of small holdings, Bulgarian and Hungarian agriculture is also characterized by a very low average farm size. Dual farm structure is undoubtedly one of the specific features of agriculture in the CEECs. This holds with regard to size of the farms having many small ones, which are often subsistence or part-time-oriented, and very large enterprises. **Table 4** illustrates that duality is also observed in terms of ownership. In all countries, the privatisation processes have almost completely wiped out state farms. Large-scale farming is still, however, an important feature of agriculture in a number of the new Member States. The large holdings cultivate considerable lot sizes, while the small ones operate on very small plots, often too small to use large machinery.

Table 4. Number of different legal type farms and their share in agricultural land use

	Legal types of farms	Number of farms	Share in use of agricultural land (%)
Latvia	State undertakings	1	1
	Co-operatives	-	-
	Commercial companies	477	-
	Individual farms	37,618	49
	Household plots	96,525	39
	Other	6,088	1
Poland	State undertakings	-	-
	Co-operatives	314	1
	Commercial companies	550	11
	Individual farms	1,885,000	83
	Household plots	450,000	2

	Legal types of farms	Number of farms	Share in use of agricultural land (%)
Czech Republic	State undertakings	-	-
	Co-operatives	728	28
	Commercial companies	2,055	43
	Individual farms	35,219	26
	Other	168	1
Hungary	State undertakings	-	-
	Co-operatives	1,886	50
	Commercial companies	9,479	
	Individual farms	949,005	49

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	Legal types of farms	Number of farms	Share in use of agricultural land (%)
Romania	State undertakings	-	-
	Co-operatives	-	-
	Commercial companies	4,376	13
	Individual farms	4,170,000	80
	Other	6,494	6
Bulgaria	State undertakings	-	-
	Co-operatives	2,900	51
	Commercial companies	2,400	23
	Individual farms	763,500	26

Source: **IAMO**, Network of Independent Agricultural Experts in the CEE Candidate Countries, “*The Future of the Rural Areas in the CEE new Member States*”, Halle, Germany, 2004.

As for the economic performance of farms, although there is no common pattern, in the majority of the countries smaller farms generate higher output per ha, which diminishes with the increase of farm size. This is typically a consequence of decreasing intensity of farm organization with farm size. However, in some cases in the largest farms, the total output is high, which suggest that these farms, which usually use more advanced technologies, can be more effective than smaller farm holdings. The income situation in agriculture in the NMSs is quite difficult to assess. The large number of small farm holdings, which provide insufficient incomes for farmers’ families, is one of the particular features in most of the countries. (**Table 5.**)

Table 5. Average income per farm, annual gross wages and GDP per capita in 2001

1. Net Farm Income in € per farm. 2. Net Farm Income in € per ha. 3. Personal Income in € per farm.

	Average income per farm (EUR)	Annual gross wages (EUR)	GDP per capita	
			(EUR PPP)	(% of EU-15 average)
Estonia	4,320 ¹	3,936	8,500	38
Latvia	2,148 ¹	3,360	6,600	29
Lithuania	465 ²	3,600	6,600	29
Poland	2,197 ¹	6,684	8,700	39
Czech R.	11,302 ¹	5,160	13,500	60
Slovakia	105,960 ¹	3,420	10,800	48
Hungary	2,673 ³	4,836	11,700	52
Slovenia	5,589 ¹	11,856	16,100	72
Romania	n.d.	1,980	6,000	27
Bulgaria	n.d.	1,524	5,400	24

Source: **IAMO**, Network of Independent Agricultural Experts in the CEE Candidate Countries, *“The Future of the Rural Areas in the CEE new Member States”*, Halle, Germany, 2004.

EU membership is foreseen to bring about changes in the farm structure and an increase in productivity that is expected to be limited in the short run and more pronounced in the longer term. In the next few years, the number of smallest farms is likely to decrease, and to an even larger extent, agricultural land will be moved to larger holdings.

On average, farm income in the 8 CEEC which became EU members in May 2004 will probably increase in the next few years. Despite of the good income prospects, NMSs will have to raise their competitiveness to

the new challenges on both price and quality. Many farms in the NMSs require modernisation and will have to invest to reach new standards and expand their market shares.

2. CAP Reform 2003 and the NMSs

The Reformed CAP has introduced the following major new elements: single payment scheme (decoupling/direct payments); compulsory cross-compliance; modulation and financial discipline; strengthened rural development policy (food quality, animal welfare, meeting standards, farm advisory service). As far as the implementation of the major new elements in the NMSs is regarded, we can summarise it as following:

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- direct payments will be phased in over a period of 10 years NMSs will thus receive 25% of the full EU rate in 2004, rising to 30% in 2005 and 35% in 2006. This level can be topped up by 30% up to 55% in 2004, 60% in 2005 and 65% in 2006 from national contributions. NMSs will have the option to operate with a simplified system of direct payments – the hectare based Single Area Payment Scheme;
- direct payments depend on farmers' fulfilments of public and animal health, environmental and animal welfare standards, and good agricultural practice (cross-compliance); modulation and financial discipline will not be applicable to the NMSs until the end of the phasing in of direct payments;
- special rural development regime has been introduced based on a new *Temporary Rural Development Instrument* to support the four accompanying measures and the specific rural development measures introduced especially for the NMS: semi-subsistence farms undergoing restructuring, producer groups, compliance with Community standards, technical assistance, complements to direct payments. All other (29) non accompanying measures that already form part of the *acquis* are also available for the new Member States.

NMSs' farmers are expected to take immediately a double advantage from accession and the reformed CAP: a first one in the extraordinary large new market of EU-25, and a further one in their traditional markets where consumers' purchase power will increase significantly faster than in the EU-15. It is generally thought that the CAP Reform will benefit farmers in the NMSs, that markets and prices would become considerably more stable. Rural development funding would provide substantial support to upgrade, modernise and restructure the agricultural sector. Single Payment and de-coupling would offer a simpler subvention system when the initial phasing-in period will be completed in 2013. Looking beyond the short term there is likely to be a rapid convergence of agricultural economies in the existing and new Member States.

3. Comparative outlook on agriculture and economy in the Czech Republic, Hungary, Latvia, Poland and Romania¹

Territories of the Czech Republic, Hungary, Latvia, Poland, and Romania extend over a comprehensive area of 787,560 km², which corresponds to one fourth of the total EU-15 territory (see **Table 6**). The total population of the five countries, 83.3 million inhabitants in 2002, is more than one fifth of the EU-15 population. About 31.8 million persons, nearly 40% of the five countries' total population, live in rural settlements. This value is considerably higher than in the EU-15, where the rural population is less than one fourth of the total population.

¹ 5 countries have been selected to represent the situation of agricultural mechanisation in Central-Eastern Europe. Hungary, Poland and the Czech Republic, already members of the European Union, and with a high importance of agriculture in their economies. Latvia, as the representative of the Baltic States. Romania, with EU candidate status, with a highly important agricultural sector in its national economy.

Table 6. Basic territory and population statistics (year 2002)

Countries	Total area		Total population		Population growth % (1996-01)	Population density (Inh./km ²)	% of rural population in total population
	Km ²	%	000	%			
Czech Republic	78,865	10.0	10,215	12.3	-0.1	129.5	25.4
Hungary	93,030	11.8	10,175	12.2	-0.2	109.4	33.2
Latvia	64,589	8.2	2,344	2.8	-0.9	36.3	40.2
Poland	312,685	39.7	38,237	45.9	0.0	122.3	37.5
Romania	238,391	30.3	22,302	26.8	-0.2	93.6	47.3
Total of the 5 countries	787,560	100.0	83,273	100.0	-	105.7	38.2
EU-15	3,234,295	-	377,787	-	-	116.8	22.9
5 countries/EU-15	24.4	-	22.0	-	-	90.5	36.6

Elaboration from:

- EU-DG for Agriculture, 2004, Agriculture in the EU, Statistical and Economic Information - Year 2003, Brussels;
- EUROSTAT on-line database;
- UN on-line database.

Table 7 shows that that the total Gross Domestic Product (GDP) of the five countries amounts to 406 billion euros, that is less than one twentieth of the EU-15 total GDP, while the proportion between the five countries and the EU-15 total population is around one fifth. In all the five countries the GDP growth is faster than in the EU-15: Latvia (+6.1 in 2002), Romania (+4.9%), and Hungary (+3.5) have the best performances.

Table 7. Basic data on GDP (year 2002)

Countries	GDP at market prices (Mio EUR)	GDP at market prices %	GDP real growth at constant prices (1995 prices)	GDP-PPS per inhabitant (% of EU-15)
Czech Republic	78,186	19.2%	+ 2.0%	61.9%
Hungary	68,920	16.9%	+ 3.5%	53.4%
Latvia	8,941	2.2%	+ 6.1%	34.8%
Poland	202,325	49.7%	+ 1.4%	41.7%
Romania	48,361	11.9%	+ 4.9%	26.6%
Total of the 5 countries	406,733	100.0%	-	-
EU-15	9,171,750	4.4%*	+ 1.0%	100.0% (24,050 EUR)

* Percentage of the five countries' total GDP with respect to the EU-15 total GDP.

Elaboration from: EUROSTAT on-line database.

The population employed in the primary activities sector – including agriculture, hunting, forestry and fishing – of the five countries amounts to 7 million units, 500 thousand more than in all the EU-15 countries. Romania, with 3.68 million agricultural actives, by itself employs more than half of that number, followed by Poland with 2.71 million. Agriculture accounts for about 20% of total employment in the ensemble of the five countries. This is a very high proportion if compared to the EU-15 average of 4%. The weight of agriculture in the whole economy, in terms of percentage of the agricultural Gross Added Value (GAV) in total GAV, is particularly important in Romania with a score of 13%. In the other four countries the value of this indicator is between 3.1% and 4.5%, it is under 2% in the EU-15. (Table 8.)

Table 8. Agricultural employment* and weight of agriculture in the five countries' economy (2002)

Countries	Population employed in agriculture* (000 units)	Population employed in agriculture* (%)	Agricultural employment* in total employment (%)	GAV of agriculture in total GAV (%)
Czech Republic	232	3.3%	4.9%	3.7%
Hungary	233	3.3%	6.1%	4.3%**
Latvia	151	2.2%	15.3%	4.5%
Poland	2,713	38.7%	19.6%	3.1%
Romania	3,683	52.5%	37.7%	13.0%
Total of the 5 countries	7,012	100.0%	21.1%	-
EU-15	6,537	93.2%	4.0%	1.7%***

* Including hunting, forestry, and fishing. ** Year 2001. *** Elaboration from EUROSTAT and EU-DG6 data.

Elaboration from:

- EU-DG for Agriculture, 2004, Agriculture in the EU, Statistical and Economic Information - Year 2003, Brussels;
- EU-DG for Agriculture, 2003, Agriculture in the EU, Statistical and Economic Information - Year 2002, Brussels;
- EUROSTAT on-line database.

Table 9 shows that the Utilized Agricultural Area (UAA) amounts to 43.7 million hectares in the five countries altogether: it corresponds to one third of the EU-15 total UAA. Poland and Romania share more than 70% of that amount. The UAA occupies 55.5% of the total land area of the five countries against a portion of 40.4% in the EU-15.

Table 9. The Utilized Agricultural Area (UAA) and its use (year 2002)

Countries	UAA (000 ha)	UAA (%)	% of UAA in total country area	Distribution of UAA*			
				Arable land %	Permanent crops %	Permanent pasture %	Total UAA
Czech Republic	3,652	8.4%	46.3%	71.9%	5.5%	22.6%	100.0%
Hungary	5,867	13.4%	63.1%	78.7%	3.2%	18.1%	100.0%
Latvia	2,480	5.7%	38.4%	74.2%	1.2%	24.6%	100.0%
Poland	16,891	38.6%	54.0%	76.0%	1.8%	22.2%	100.0%
Romania	14,819	33.9%	62.2%	63.3%	3.5%	33.2%	100.0%
Total of the 5 countries	43,710	100.0 %	55.5%	71.7%	2.9%	25.4%	100.0%
EU-15	130,809	-	40.4%	52.2%	7.9%	39.9%	100.0%
5 countries / EU-15	33.4%	-	-	45.0%	11.8%	20.8%	33.4%

* Data on UAA distribution are referred to year 2001.

Elaboration from:

- EU-DG for Agriculture, 2004, Agriculture in the EU, Statistical and Economic Information - Year 2003, Brussels;
- FAOSTAT on-line database.

Average availability of machinery, in terms of tractors per agricultural active, in the five countries results 0.25 less than one fourth of the EU-15 average of 1.1. The best equipped countries are Hungary and Poland, which have around 45% of the EU-15 average. (**Table 10.**)

Table 10. Main structural indicators of the agricultural sector in the five countries (year 2002)

Countries	UAA per agricultural active (ha)	In % of the EU-15 average values			
		UAA per agricultural active	Livestock Units per agricultural active	Tractors per agricultural active*	Livestock Units per ha of UAA
Czech Republic	15.74	78.7%	54.2%	38.3%	69.0%
Hungary	25.18	125.8%	57.9%	45.8%	45.8%
Latvia	16.43	82.1%	17.8%	34.6%	21.6%
Poland	6.23	31.1%	20.3%	44.9%	65.5%
Romania	4.02	20.1%	7.8%	3.7%	38.7%
Total of the 5 countries	6.23	31.1% (6.23 ha)	16.1% (3.48 LU)	23.4% (0.25 tractors)	51.6% (0.56 LU)
EU-15	20.01	100.0% (20.0 ha)	100.0% (21.7 LU)	100.0% (1.1 tract.)	100.0% (1.1 LU)

* Data on machinery are referred to year 2001.

Elaboration from:

- EU-DG for Agriculture, 2004, Agriculture in the EU, Statistical and Economic Information - Year 2003, Brussels;

- EU-DG for Agriculture, 2003, Agriculture in the EU, Statistical and Economic Information - Year 2002, Brussels;

- FAOSTAT on-line database.

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4. Agricultural mechanisation in the Central and Eastern European Countries

To make a comprehensive analysis of the Central-Eastern European agricultural machinery market is generally very hard due to the fact that data is very different from country to country. Modernisation of agricultural machinery of farms in the CEECs will probably be one of the main elements contributing to the improvement of productivity and the development of the agricultural sector in these countries. Currently agricultural mechanisation in the CEECs is in a relatively undersized condition. The agricultural machinery stock in general is characterised by high average age and high level of obsolescence. Access to new agricultural machinery is limited since farms in general do not own sufficient capital to provide for a rational rate of machinery renewal. In some countries the delay in performing mechanisation works is such significant that it can even result in harvest losses.

The amount of machinery and assets is in general low. Agricultural machinery produced nationally is in short supply due to constraints, mainly lack of investments, on the agricultural machinery industry. Although Western European products have already appeared, the machinery market is still dominated by imports from Eastern Europe. This trend, however, is likely to change due to the necessity to improve the structures for national agricultural mechanisation, and to meet the environmental requirements regarding engine emission posed by the European Union. The

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following part is going to overview the agricultural machinery market in five selected CEE countries. In particular it is going to study the followings:

- the degree of which these five countries are endowed by agricultural machinery, taking into account the situation of national production, the amount of machinery available, the condition of the machinery stock what regards age and technological development, the demand for agricultural machines;
- the import and export trends of agricultural machinery;
- the second-hand agricultural machinery market;
- the distribution channel;
- support measures available for farmers to invest in agricultural machinery;
- prospect for the future in the agricultural machinery market.

The information provided here corresponds to the national and international information available to the public. This is why one country report can be richer in information than the others.

4.1. The agricultural machine market of Hungary

Technical conditions of agriculture have not improved significantly over the past decade following the transition. Part of the capacities of the former large scale farms has been put out of use and, due to their deterioration and obsolescence, can not be reactivated again. The relatively low profitability of agriculture and the unfavourable marketing conditions do not cover the renewal or replacement of the deteriorated and obsolete agricultural machinery stock. The average age and the degree of obsolescence of the assets are increasing. As far as private farms are regarded, the transformation of the ownership and organisational structure has not been followed by the improvement of the assets of these farms. Due to their production activity similar in structure but different in size, private farms could not use at all or could only partially exploit the facilities of the former large-scale farms. The newly established individual farms therefore, due to their smaller size and/or different production structures, need machinery and equipment adapted to their own circumstances. Consequently, the demand for machinery suitable for relatively small-sized farms increased, the shortage of capital has however restricted the procurement of modern equipment. Private farms use traditional production technologies/methods and often can not provide sufficient agricultural income to cover the needs of the family. As for the holdings in the larger size classes, they were influenced by the dismantling of the former state co-operatives. Several new specialised holdings have been created, that inherited the assets of the former co-operatives. Due to this reason, the availability of assets of these holdings can be considered sufficient, especially compared to the small farms.

Investments in agriculture

In spite of a significant improvement since 1995, in 2000 the value of agricultural investments (calculated at 1990 constant prices) was only 48.6% of that in 1990, followed by a slight (1.5-2.0%) increase in year 2001. Consequently, renewal of the technical and technological assets could not be realised; production profitability has been permanently low; there are only few sectors where the realised income allows technological modernisation. (**Table 11.**)

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Table 11. Agricultural investments in Hungary (1990-2001)

Type of investment	1990	1995	1996	1997	1998	1999	2000	2001
Investment changes at constant prices, 1990=100%								
Total investment	100.0	36.7	40.4	47.0	56.0	55.6	48.6	49.1
From which buildings	100.0	27.2	30.3	37.9	46.2	41.6	37.8	24.2
...machinery	100.0	46.2	50.0	56.9	67.3	58.0	47.4	45.3
...other	100.0	35.6	42.7	41.6	46.9	118.0	113.4	202.3

Source: Agriculture and Rural Development Operational Programme of Hungary (ARDOP), 2004-2006, version "16 December 2003. Ministry of Agriculture and Rural Development.

Endowment with agricultural machinery

Under socialist rule, the vast majority of agricultural machines was produced locally or imported from other Soviet bloc countries. The only Western tractor available was the John Deere. The market is still dominated by the Belarus MTZ (52.45%) and the leading make is still from Eastern Europe, however, a third of all sales is now covered by imported Western machines. Participation by Western capital in local manufacturers has also risen. The production of agricultural machines has already been totally privatised: 53% of the biggest companies is in Hungarian ownership, 20% in mixed and 27% is in foreign ownership. The major foreign owners come from Germany and the United States. Today tractors produced nationally are in short supply, about 15% of the farm machines and equipment sold in Hungary is produced locally, excluding tractors and walking tractors for which the share rises to a third.

The average value of tractors and other machinery per holding is between 60,325 Euro (Specialist cereals, oilseed and protein crops) and 230,534 Euro (Field crops-grazing livestock combined) per holding. These holdings are equipped with almost all types of machinery and a substantial part of the income comes from contract work and machinery hire to small farms with 10-20 hectares. The machinery of larger farms is more up-to-date in crop production and/or animal husbandry compared to smaller farms. The amount of machinery and assets is low, determining elements of the market of agricultural machines are the tractors. (Table 12.)

Table 12. Agricultural machine stock in Hungary, (2000)

Denomination	Quantity
Tractors:	
8-20 kW	17 974
21-40 kW	31 383
41-60 kW	44 467
61-100 kW	11 435
100 kW-	80 47
Total	113 306
Earth moving machines	159 005

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Ploughs	72 118
Sowing, planter machines	40 161
Combines harvesters	12 113
Other combine harvesters:	
Self-propelled	3 273
Trailed	10 554
Sprinklers	
Mobile	14 292
Fixed	11 683
Milking machines	18 879
Incubators	2 811
Motorised sprayers	35 725
Cultivators	232 821
Combined milling and mixing unit	281 345
Light tractors (with less than 8 kW)	10 231

Source: Hungarian Institute of Agricultural Engineering, Gödöllő, 2001.

Agricultural tractor market seems to focus on products with low dimension where 75% of the tractors sold have less than 70 kW, one fifth has between 70 and 150 kW and only 3.3 % has more than 150 kW. The market is dominated by the Belarus MTZ (51.9%). (**Table 13.**)

Table 13. Tractor sales in Hungary, 2001

Brand	< 70 kW	70-150 kW	> 150 kW	Total (quantity)	Percentage
MTZ	1 845	44	-	1 889	51.9
New Holland	60	243	22	325	8.9
John Deere	47	205	33	285	7.9
VTZ	150	-	-	150	4.1
Zetor	96	24	-	120	3.3
Landini	64	43	-	107	2.9
Case-IH	-	88	17	105	2.9
LTZ	103	-	-103	103	2.8
Valtra	33	68	-	101	2.8
AGT	89	-	-	89	2.4
Massey Ferguson	-	31	12	43	1.2
Univerzal	42	-	-	42	1.2
Steyr	17	10	8	35	1.0
Deutz-Fahr	16	13	3	32	0.9
Goldoni	29	-	-	29	0.8
Feng-Shou	22	-	-	22	0.6
Same	13	5	-	18	0.5
Shenniu	14	-	-	14	0.4
Challenger	-	-	14	14	0.4
Lamborghini	8	4	1	13	0.4

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Carraro	12	-	-	12	0.3
BCS	11	-	-	11	0.3
Fendt	2	4	10	16	0.4
ZTM-82A	11	-	-	11	0.3
ZTS	-	10	-	10	0.3
HTZ	4	5	-	9	0.2
Valpadana	7	-	-	7	0.2
T-150/170	-	6	-	6	0.2
Ferrari	4	-	-	4	0.1
JUMZ	4	-	-	4	0.1
RÁBA	4	-	-	4	0.1
Other	2	8	-	10	0.3
Total	2 709	811	120	3 640	100.00
Percentage	74.4	22.3	3.3	100	100.00

Source: Hungarian Institute of Agricultural Engineering, Gödöllő, 2002.

The machinery is generally obsolete and the more significant agricultural work is conducted by contractors. The holder, due to his age or the lack of capital, is not able or not willing to innovate. Manure handling equipment are also obsolete, the average age is over 15 years. (Table 14.)

Table 14. Average age of agricultural machinery and buildings in Hungary, (2000)

Asset	In private farms	In economic organisations	In all farms
Machinery, year			
Tractors	16,4	11,7	14,9
Combine-harvesters	18,3	11,5	14,5
Trailers	11,9	12,4	12,1
Building, stock, year			
Cattle-sheds	33,2	29,3	30,9
Pigsties	23,4	26,6	24,6
Sheep barns	20,2	28,3	22,5
Granaries	28,2	27,1	27,6
Storehouses	29,0	18,4	26,3
Cold-stores	12,1	12,1	12,1
Silos	14,9	19,8	19,2

Source: Agriculture and Rural Development Operational Programme of Hungary (ARDOP), 2004-2006, version "16 December 2003. Ministry of Agriculture and Rural Development.

Imports

In 1999 from the total agricultural machine stock 48% accounted for by tractors, and 70% of the total tractors was imported. Particularly significant the high percentage of imported tractors with minimum potential, which is explained by the fragmented agricultural land and thus their small

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dimension. MTZ together with LTZ, VTZ, Zetor and AGT occupy 70% of the tractor market imported as far as imports from Eastern Europe is regarded. The reason for this phenomena is explained by the low cost of these machines due to the low labour cost in the Eastern European Countries. However, this import trend is likely to change. The reasons for this are given by the necessity to improve the structures for the national agricultural mechanisation, on the other hand by the necessity to adjust to the environmental norms on engine emission as it is requested by the European Union. This latter might cause a series of difficulties for companies importing agricultural machines from Eastern Europe, as environmental requirements will inevitably favour Western European products.

Second-hand market

Second-hand sales are also worth looking at since the changes in Hungarian agriculture and modernisation meant replacing and updating many machines. Used agricultural machines are imported mainly from Eastern Europe, while import which once included far away countries like Japan is disappearing. When second-hand machines are exported they are sent primarily to Ukraine, Romania and Russia.

Distribution channel

Agricultural machinery sales in Hungary are handled in large part by about 200 sales points scattered through the country. These handle 70% of all sales and are flanked by about eighty individual or associated medium-sized importers, as well as by a mass of about 700 small distributors, agents, shops and local repairers. The distribution channel is divided into three categories: big distributors and/or importers (occupy 70% of the distribution channel and cover the whole country); associations between distributors/importers of medium size; distributors/importers of medium size.

Support measures and prospects

Having taken into consideration the inadequate technical conditions of agriculture, the improvement of the agricultural machinery stock has been given vital importance in the Hungarian National Development Plan and in the Hungarian Agriculture and Rural Development Operational Programme (ARDOP).

The ARDOP, which mentions “Establishment of competitive basic material production in agriculture” as its first Priority, puts great emphasis on Investment in Agriculture. This Priority has 4 Measures (Assistance to Investment in Agriculture, Structural Assistance in the Fisheries Sector, Setting Up of Young Farmers, Assistance to Vocational Training and Retiring) and has a share of 57% out of the ARDOP budget. One and the most important measures, as far as the share of investment subsidies is regarded (52,8% out of 57%) of the Priority is Assistance to Investment in Agriculture. Assistance to investments in agriculture is likely, to enforce mainly investments in mechanisation. One of the sub-measures of the Measure Assistance to Investments in Agriculture is the “New machinery, power machines, technical-technological equipment affecting all agricultural sector. This measure foresees the purchase of, amongst others, new, newly installed power machines, other machinery and technological equipment, including the purchase of irrigation systems not requiring independent construction.

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4.2. The agricultural machine market of Romania

Romania used to have a large domestic capacity for manufacturing nearly all its farm machinery. The main domestic tractor manufacturer was long the Usina Tractorul Brasov (UTB) at Brasov, which produced 95% of the nation's tractors, turning out as many as 50,000 tractors a year in the early 1980s. Out of this two-thirds were sold at home and the remaining third in other countries with planned economies. Tractors were produced on Fiat manufacturing licence. Another factory in Bucharest produced all Romania's combine-harvesters, of which production was based on the Laverda manufacturing licence.

Present constraints on the agricultural machinery industry are causing problems related to the quantity and quality of the machines produced. Between 1993 and 1997, sales of agricultural machines and tools fell from 45,000 to 15,000. Since the mid-1980s, the plants have suffered from a lack of investment in new machine tools and processes. In 2003, UTB was bought by Italy's Landini. Landini agreed to buy an 80% stake for over 45 million euros and to invest 27 million in modernising the factory.

Endowment with agricultural machinery

The endowment with modern agricultural machinery and equipment is still so low that it defines the rural households as a traditional productive entity. The machines available are way below what is needed, according to some estimates less than half real needs are covered. Moreover, the low degree of farm capitalisation, lack of collateral for accessing credits and small household size preclude the increase and modernisation of machinery and equipment stock.

The crop production structure is influenced by land reform that resulted in the emergence of about 4 million individual small sized farms, with reduced capital and insufficient machinery and equipment. Romanian agriculture's basic problem today is the low productivity which stems from fragmented land ownership. A more alarming phenomenon is the general decreasing trend of average yields owing to the non-compliance with crop rotation, under- or non-utilisation of fertilisers, and pesticides, obsolete and insufficient machinery and equipments and use of non-certified seed. The technical endowment differs among the different economic size classes, improving with the increase of the farm size. Large farms, in terms of area and economic size, hold an important share of machinery and equipment that are, however, technically and economically obsolete. Starting from the end of the 1980s, tractor and agricultural machinery fleet experienced a continuous increase for all types of machinery, except for combine harvesters, which in 1998 represented only 85% of the 1989 endowment. (Table 15.)

Table 15. Evolution of tractor and agricultural machinery fleet in Romania, 1989-1998
(thousand pieces)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
Tractors	129,239	105,142	124,853	139,586	155,953	162,375	161,735	162,809	164,174	167,533
Combine harvesters	38,453	35,385	34,561	34,739	33,875	35,021	36,189	35,927	36,074	32,495
Ploughs	70,708	62,712	73,219	82,003	94,320	102,207	107,401	113,107	114,714	121,629
Disk Harrows	37,119	33,634	36,468	41,105	47,812	51,536	55,398	58,859	60,286	65,149
Grain drills	18,347	15,772	17,018	18,342	21,353	21,973	24,377	26,321	25,735	27,553

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Precision drills	18,111	16,656	17,341	18,918	22,424	24,066	25,980	27,291	28,180	30,013
Tractor trailers	49,990	44,549	61,732	65,794	75,070	73,588	73,111	74,933	76,451	79,794

Source: National Plan for Agriculture and Rural Development under SAPARD, Romania, 2000-2006.

Existing machines are very old, often dating back to the previous regime (out of the 162,000 tractors 87,500 are more than eight years old), and inefficient since locally produced equipment is acceptable only under technical standards well below those normally applied in the West. Thus, for the entire agriculture, 50% of the existing tractors have a service life of more than 8 years. However, the number of available combine harvesters is high, it does not mean elevated potential due to their level of obsolescence: 60% of the combine harvesters are more than 10 year old. The mechanisation potential is very low. (**Table 16.**)

Table 16. Tractor and combine fleets in some European countries, (1996)

	Tractors (thou)	Combines (thou)
Austria	356,018	24,000
Belgium +Luxembourg	106,314	6,011
Denmark	139,619	28,609
Finland	230,000	38,000
France	1,312,000	154,000
Germany	1,215,700	135,000
Greece	232,000	6,100
Ireland	167,500	5,100
Italy	1,470,000	50,177
Netherlands	182,000	5,600
Portugal	150,000	3,900
Spain	823,609	49,408
Sweden	165,000	40,000
U.K.	500,000	47,000
Romania	165,281	41,311
Bulgaria	24,293	5,124
Yugoslavia	420,608	4,442
Republic Moldavia	49,000	6,100
Hungary	30,870	66,000
Ukraine	383,000	82,333

Source: National Plan for Agriculture and Rural Development under SAPARD, Romania, 2000-2006.

In Romania the delay in performing the mechanisation works, both for winter and spring crops, can result in harvest losses. Romania's agriculture encounters difficulties in the increase of the mechanisation rate of the technological processes because of the structure of agricultural machinery domestic offer, which is not fit to the size of agricultural holdings; these difficulties are also due to the financial difficulties (related to the cost of machinery, to the acquisition possibilities).

There are a number of 1,813 service companies for agriculture, which are offering the whole range of mechanical and transportation services. There were 470 mechanisation companies in 1989 and at the present, a great part of them is in an advanced privatisation process. In this sector, the privatisation process delay during the period of 1992-1996 determined a high depreciation of the tractor and agricultural equipment, and because these have not been replaced with new ones, there is now a high wear of the existent mechanical equipment's. The structural deficiency generated by the insufficient equipment is stressed by the physical wear and outdated state of these ones. A replacement rate of the fleet of tractors and agricultural machinery is estimated, keeping into account the planned lifetime of use and the working capacity of the equipment, as following. (**Table 17.**)

Table 17. Planned lifetime utilisation and estimated replacement degree for the agricultural machines existing on 31st December 1997, Romania

Tractors and agricultural machines	Plant utilisation lifetime	Necessary replacement degree (% from total existent inventory)		
		Total	State	Private
Tractors	8	65	94	38
Combine harvesters	12	55	64	18
Ploughs	7	60	94	38
Harrows	7	58	91	19
Drilling machines	10	42	63	0

Source: National Plan for Agriculture and Rural Development under SAPARD, Romania, 2000-2006.

The number of tractors in use has increased in the period 1989-2002 and has reached 169 240 units of which the private sector owns 61.5%. (**Table 18.**) Although the number of combines decreased, the productivity increased and the private sector owns 63.2% of it. The number of ploughs, disc harrows, sow machines and agricultural trailers rose 1.5 times and most of these are owed by the private sector.

Table 18. Agricultural machines in use (quantity), Romania

Denomination	1989	1994	1998	2002

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Agricultural tractors	151 700	161 223	164 756	169 240
Combine Harvesters-Threshers	44 799	42 737	35 805	26 406

Source: FAOSTAT on-line database.

Exports and Imports

According to a study published by UNACOMA in June 2002, the current value of the Romanian market for agricultural machines can be estimated at about 90 million euros of which 35% come from export. Of the total agricultural machinery stock, about 25% should come from imports, even if the current level of imports in terms of units is much lower, at about 7%, because the machines are much more advanced technologically than those made locally and thus cost much more. Tractors would account for a good 70% of the total imports since Romanian farmers have very limited resources to spend on additional equipment and tractors are also used as a normal means of transport. The main supplier is Germany followed by Italy, which in 2002 dispatched 1,156 tractors and 5,295 other agricultural machines. These numbers in 1993 were 70 and 733. (Table 19 and 20.)

Table 19. Export value of agricultural machines (thousand USD), Romania

Denomination	1989	1994	1998	2002
Tillage Machinery	35 440	10 744	5 762	7 534
Other Agr. Machinery	50	217	232	513
Agricultural tractors	116 294	26 021	44 342	8 811
Combine Harvesters-Threshers	2 641	664	3 114	3 351
Milking machines	10	12	67	3

Source: FAOSTAT on-line database.

Table 20. Imports value of agricultural machines (thousand USD), Romania

Denomination	1989	1994	1998	2002
Tillage Machinery	4 000	3 239	3 674	12 532
Other Agr. Machinery	190	3 457	7 407	7 869
Agricultural tractors	2 500	3 585	5 625	16 139
Combine Harvesters-Threshers	65 110	79 233	14 889	31 753
Milking machines	2 127	2 156	5 813	1 028

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Source: FAOSTAT on-line database.

Second-hand market

Almost all second-hand machines are imported. They represent an estimated 8% of all Romanian agricultural machines. But for combined harvester the proportion rises to 15% in values and 30% in units. For tractors the figure is about 6%.

Support measures and prospects

SAPARD is paying Romania about 150 million euros a year in 2000-2006. The third Priority of the Assistance, “Development of the rural economy” includes the measure “Investments in agricultural holdings”, which is to help the development of viable farms through, amongst others, the acquisition of the equipment necessary for the modernisation of the holdings (tractors, combine harvesters, equipment, machines, installations and agricultural equipment, including for calibrating, sorting, conditioning and storing of the agricultural products obtained and processed within the farm, irrigation installations). Estimates from the Ministry for Agriculture, forests and Rural Development say that the funding under Measure 3.1 Investments in agricultural holdings should buy 8,000 tractors, 600 combined harvester and 2,000 other pieces of agricultural equipment by 2006.

Taking account of its size and dynamics, the Romanian agricultural machine market currently looks attractive, provided the products offered are truly competitive in terms of performance/price, and in price. For Western manufacturers, a more interesting prospect is to set up a local factory or assembly plant for imported parts, also with a view to exporting the finished products from Romania to other countries. This approach would make the most of cheap local labour and, in the case of an assembly plant, exploit a technique in which Romanians are already specialist.

4.3. The agricultural machine market of the Czech Republic

The supply of machines on the market is wide and covers the needs of farms. Most sellers seek to address the insufficient solvency of agricultural establishments by offering services that facilitate the purchase of new machines by farm businesses (assistance in obtaining a loan, financial leasing, instalment sale, repurchase of used machines, etc.).

Endowment with agricultural machinery

The main current problem is the rate of renewal of agricultural machinery. Agricultural establishments do not have sufficient own capital resources to provide for a rational rate of machinery renewal and it is difficult for them to get access to outside capital. This leads to an unfavourable average age of machinery and its continuing ageing. For instance, according to Czech Statistical Office (CSO) data, 80% of tractors were older than 8 years in 1995 while in 1999 the figure was 88%. This has an adverse effect on the maintenance of the machines’ reliability, economics of their operation, the environment and ultimately on the economics of production. **Table 21** lists information on the numbers of machines, their age and the number of hours in use per year. The table shows that the machinery is obsolete and the renewal is insufficient. At the same time, the use of machinery in farms in the Czech Republic is high. The numbers of agricultural

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machines are affected substantially by the opportunity to receive support for the purchase of machinery that is provided by the Support and Guarantee Fund for Farmers and Forestry (SGFFF).

Table 21. Number and age of machines and the number of hours in use per year, Czech Republic

Machines	Number	Age (%)			Number of hours in use per year
		up to 4 years	4 to 8 years	above 8 years	
Tractors and small tractors	79 304	4.2	7.8	88.0	1200
Trailers	14 354	2.5	4.6	92.9	1500
Ploughs, single-sided	23 880	2.5	12.1	85.4	325
Ploughs, double-sided	5 888	24.8	40.3	34.9	400
Sowing machines	15 408	5.3	16.5	78.2	200
Potato planters	5 547	6.7	26.2	67.1	40
Tractor distributors of solid industrial fertilisers	12 421	10.5	23.3	66.2	370
Tractor manure and compost spreaders	10 238	3.8	13.0	83.2	330
Sprinklers	8 622	20.1	23.8	56.1	500
Combine harvesters	12 836	6.8	5.3	87.9	325
Self-propelled forage harvesters	3 270	4.6	6.4	89.0	400
Rotary mowers	13 956	9.7	22.8	67.5	240
Hay rakes	19 643	11.0	20.8	68.2	220
Gathering trailers	18 345	2.4	10.4	87.2	300
Root harvesters	53	2.6	9.6	87.8	200
Tractor trailers	63 045	0.5	5.0	94.5	
Self-propelled loaders	5 318	4.1	5.5	90.4	750
Tractor loaders	9 901	4.0	13.8	82.2	590

Source: Operational Programme, Rural Development and Multifunctional Agriculture. Ministry of Agriculture of the Czech Republic; January, 2004.

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The development of the sales of tractors and combine harvesters in the past eight years is shown in **Table 22**. A comparison of the data in the two tables confirms that the renewal of machinery in Czech agriculture is slow and does not provide even for a simple reproduction. However, a purposeful and economically justified equipping of farms is one of important prerequisites for the stability and competitiveness of farms in the Czech Republic. It will take considerable investments. Just reducing the average age of agricultural machinery to 8 years will require investments of some CZK 45 billion (1.48 billion EUR²).

Table 22. Annual sales of tractors and combine harvesters, Czech Republic

Machine	Year								
	1994	1995	1996	1997	1998	1999	2000	2001	Total
Tractor	1065	1077	1308	1224	869	493	528	1017	7581
Combine harvesters	213	200	539	327	121	92	109	154	1855

Source: Operational Programme, Rural Development and Multifunctional Agriculture. Ministry of Agriculture of the Czech Republic; January, 2004.

Support measures and prospects

Czech farmers can count on support for farm machinery acquisition through the “Operational Programme, Rural Development and Multifunctional Agriculture” of the Czech Republic. The Operational Programme puts Support to Agriculture, Processing of Agricultural Products and to Forestry as its first priority. In the framework of this Priority Measure 1.1 regards Investments in agricultural holdings aiming primarily at increasing the labour productivity, competitiveness and quality of products. Under this Measure support can be given, amongst others, to the acquisition of tractors, machines and facilities for sowing, for plant protection, for fertilization, for harvesting and post-harvest treatment.

4.4. The agricultural machine market of Latvia

The general situation in agriculture is characterized by a vicious cycle of low prices for farm products, a limited added value of agricultural production, inappropriate farm structures resulting from privatisation. Land reform resulted in big collective and state farms transforming into a large number of comparatively small private farms. As yet, many existing private farms do not participate actively in the market. As at least one third of them does not possess the necessary production facilities, they lease the land to those farmers who are already established and who possess the necessary machinery.

² Exchange rate on 11 January 2005, Czech National Bank

Endowment with agricultural machinery

The agriculture sector is still restructuring. Although, the larger farms have increased production it was only due to the use of fertilisers, the efficiency of overall agricultural production is undermined by lack of sufficient scale. Access to new agricultural machinery is limited. Production levels in all sectors are below the EU average. Agricultural machinery is critically outdated. In 2002, only 4.7% of the tractors owned by farmers were less than 6 years old. If the state support remains as hitherto, farmers would be able to renew the tractor machinery only by 2% per year in the following years. Farms are characterized by bad condition of building infrastructure, and poor state of farm capital including machinery and buildings. The result is a low demand for services and parts of the farm sector lapsing back to a semi-subsistence position with home produced inputs and limited specialisation.

One of the reasons of low productivity of the agricultural production is thus the outdated machinery inherited by producers after the privatisation of collective farms. They are mostly produced in the CIS countries. The average age of tractors owned by farmers is 16 years. 38% of all tractors have been in use for more than 15 years, but only 18% are new to 5 years old. In the enterprises offering melioration services the machinery has not been renewed for the last 10 years. However the machinery is designed to be in exploitation for 5 years and the actual depreciation is 80 – 90%. (Table 23, 24.)

Table 23. Distribution of registered tractors by age as on January 1, 1999, Latvia

Age of tractors, in years	Under 5 yr.	5 - 10 yr.	10 - 15 yr.	15 - 20 yr.	>20 yr.	TOTAL
Number of tractors, units.	2,936	23,076	20,789	1,5466	14,164	76 431
Structure, %	3.8%	30.2%	27.2%	20.2%	18.5%	100%

Source: SAPARD Programme for Agriculture and Rural Development for Latvia, 2000-2006.

Table 24. Provision with agricultural machinery of rural farms in 2001, % of the total number of farms, Latvia

	Number of farms with machinery	Use of borrowed or jointly owned machinery	Machinery manufactured the last 6 years
Wheeled tractors	26.6	57.0	6.1
Tracklayers	2.9	1.0	0.7
Trucks	5.4	2.8	2.6
Combine harvesters	5.1	18.3	49
Sowing machines	5.1	18.3	49

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Grass mowing machines	15.9	40.5	3.9
Tractor-drawn ploughs	19.6	55.9	3.8
Milk coolers	3.7	3.9	n.d.
Milking equipment	3.8	4.2	n.d.

Source: Annual Report of the SAPARD Programme of Latvia, 2002.

Support measures and prospects

Latvian farmers can count on support for farm machinery acquisition through the Latvian Single Programming Document and the Latvian Rural Development Plan. In the “Single Programming Document Objective 1 Programme 2004-2006” the 4.4.1.1. Measure “Investments in Agricultural Holdings” of the Priority “Promotion of Development of Rural Areas and Fisheries” aims at the assistance for investment in new machinery and equipment, information technologies and software intended for production of agricultural products, including perennial energy crops (incl. packaging, utilisation of the production waste and by-products, holding level land drainage systems). The Measure “Support for semi-subsistence farms” of the Rural Development Plan for Latvia 2004-2006 aims at the assistance for investment in new machinery and equipment, construction, reconstruction and renovation of buildings and purchase of necessary construction materials, investments in animals and establishment of perennial plantings.

4.5. The agricultural machine market of Poland

The small size of most Polish farms, where the fields are often small, irregularly shaped and scattered, makes widespread mechanisation difficult. Before 1990 state farms and co-operatives cultivated around 19% of farmland and owned more than 50% of domestic machinery in agriculture. However, by 1996 the proportion of private farms purchasing machinery was substantially higher. During 1987-1996, tractor ownership increased by 26.9%. In 1996, there was 1 tractor per 14 hectares of agricultural land. Today private farmers own about 96.2% of the national tractor stock. Despite of this high percentage of private ownership, the major part of the Polish farmers is not in possess of machinery due to the fragmented farm structure.

Endowment with agricultural machinery

In 2002 in comparison with 1996 the number of agricultural machines increased in the whole agriculture (exception: forage harvesters, collector trailers and can-milkers, which amount inconsiderably decreased). The biggest, because by around 50%, increase was in the amount of collector presses and piping-milkers, and around 30% of canvas milk coolers, grab-loaders, cereal combine-harvesters and tractor-sprayers. The number of other machines increased in the frames of 4% to 17%.

Technology used in agriculture

A considerable part of the market during the 1970s and 1980s was made up of tractors of low potential (18 kW) imported from the Soviet Union, Belarus, the Czech Republic. These tractors are still in use in the small farms. In the 90s imports from Russia has decreased. Relatively small

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number of firms with big production scale is starting to have a significant share of the equipment market imported from Western Europe. The most utilised tractors are CASE, John Deere, Same, Lamborgini and New Holland. Starting form 1998 more than half of the harvesters were imported from Germany.

Polish farmers have to face difficulties rising from the elevate level of obsoleteness of the agricultural machinery stock. According to the Central Statistical Office, the level of obsoleteness of the agricultural machines in 2001 has reached 78%, while those of the means of transport, of which tractors make part, has reached 94.8%. In 1996 23.9% of the tractors had more than 20 years and 4.8% more than 30 years. While the medium age of the tractors was 17 years in 1996 it has reached 20 years in 2002. The low level of acquisition of new machines is one of the main reasons for the further ageing of the machine and tractor stock.

Production sector

Concentration of production in the machine industry is declining. In 1996, there were approximately 400 domestic producers of machinery, including state factories and newly developed medium and small-scale units often based on joint venture with foreign capital. Production and sales of agricultural machinery during the first half of 1997 declined by 3.0% and 3.2% respectively, due to the worsening price ratio of agricultural machinery to agricultural products. In the second half of the 1990s the production of agricultural machines and tractors has diminished, a dramatic decrease in production can be observed between 1997-2001. (**Table 25**).

Table 25. Production of agricultural machines in Poland (thousand USD)

	1997	1998	1999	2000	2001
Total	615 069	454 389	366 298	431 978	425 289
Tractors	313 516	211 546	155 131	68 835	55 338
Other agricultural machines	301 552	242 843	211 167	363 143	369 950

Source: Italian National Institute for Foreign Trade, “*Poland, Market of the agricultural machines*”, Warsaw, May 2003.

The diminution of the production of tractors and other agricultural machines was visible both in the turnover. In 2001 Poland has produced $\frac{1}{4}$ of the number of tractors produced in 1997. It means a decrease from 22.8 million to 5.7 million units produced in 1997 and in 2001. (**Table 26**.)

Table 26. Structure of the production of agricultural equipment, Poland

	Agricultural machines	Tractors

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1997	49%	51%
2001	87%	13%

Source: Italian National Institute for Foreign Trade, “*Poland, Market of the agricultural machines*”,
Warsaw, May 2003.

A change has occurred even in the structure of tractors produced. In 2001 the production of tractors of 18 kW was broken up. The production of tractors of 18-37 kW, which were addressed mainly for export, has diminished as well, together with those of 59-75 kW and 70-90 kW. An increase has been registered, however, what regards the tractors of medium potential (37-59 kW) and that of high potential (over 90 kW). On some markets, however, after an unfavourable economic trend registered in 1997-1999, in 2000 a progressive increase of the agricultural machines produced could be noticed: plough machines, harrows, planting machines, harvesters, spraying machines, machines for the selection and drying of cereals. Even today, Polish demand for agricultural machinery remains poor, although there has been growth in recent years. Demand in 2001 totalled 565.7 million USD of which 15.4% for tractors, compared to 450.9 million USD in 1999. (**Table 27.**)

Table 27. Agricultural machine demand (million USD), Poland

	1997	1998	1999	2000	2001
Tractors	279,0	179,1	134,6	67,0	86,9
Agricultural machines	528,3	401,3	316,3	438,6	478,8
Total	807,4	580,4	450,9	505,6	565,7

Source: Italian National Institute for Foreign Trade, “*Poland, Market of the agricultural machines*”,

Warsaw, May 2003.

Actually in Poland more than 300 agricultural machinery and tractor producers can be found. Most of them are small and medium local enterprises. The major tractor manufacturing company in Poland is the Ursus Ltd. The market share of Ursus is approximately 48%. Ursus deals mainly with the production and manufacturing of tractors, and the manufacturing of spare parts. The second place is occupied by the PRONAR MTZ with a market share of 23%. (**Table 28.**) Pronar collaborates with the Belarus MTZ and produce tractors with potential of 28 to 148 kW. In 1999-2000 the domestic production of tractors has covered 44% of the Polish market demand, import including the assembling of the new tractors covered 32% and the import of second-hand tractors covered 23.5%.

Table 28. Market share of the main tractor suppliers present at the Polish market, (2000)

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Ursus	Pronar	Same-Deutz-Fahre	New Holland	Escort (India)	T-25A (Russia)	Zetor (Czech Republic)	Far-Mot (China)	Other
48%	23%	11%	4%	4%	3%	2%	1%	4%

Source: Italian National Institute for Foreign Trade, “*Poland, Market of the agricultural machines*”, Warsaw, May 2003.

Foreign investments

In the 1990s firms with a share of foreign capital have started their activity. Foreign investments in the tractor and agricultural machine sector have reached 40 million USD in 2001 (15% of the total foreign investments in Poland). The group of the foreign investors in the tractor and agricultural machine sector can be divided into two categories:

1. Foreign enterprises which have developed the production of machinery in the Polish market in order to realise sales in Poland and other close markets. (New Holland Belgium N.V. –Fiat Group, Italy, Same Deutz Fahr -Italy, Kongskilde -Denmark, Alfa Laval Agri –Sweden.)
2. Group of investors which established branches of foreign holdings in Poland and deal only with marketing, sales and technical assistance for the machinery produced in the investor’s country of origin. (WESTFALIA Landtechnik - Germany, Väderstad - Sweden, Gregoire-Besson - France, ZETOR - Czech Republic).

The major investor in the tractor and agricultural machinery is the New Holland Belgium N.V., which makes part of the Italian Fiat Group. The second most important one is the Same Deutz Fahre, what regards the value of capital invested.

1. New Holland Belgium N.V. (Belgium, Italy)
2. Same Deutz Fahr (Italy)
3. Kongskilde Industries (Denmark)
4. Alfa Laval Agri (Sweden)
5. Westfalia Landtechnik (Germany)
6. Vaderstad-Verken (Sweden)
7. Gregoire-Besson (France)
8. ZETOR (Czech Republic)

Exports and imports

Most of the imported tractors are in the high power class, since the ones made in Poland are almost exclusively small or medium (no more than 40-45 kW), reflecting the smallness of the plots. During the period 1997-2000 there was a significant change in the Polish import market. However tractors with high potential (120 kW) still dominate imports, their share has decreased from 56% in 1997 to 28% in 2001. The reasons are the followings:

- shift in the demand (the highest increase in demand was registered for tractors with 37-59 kW and 90-120 kW,
- the import of second-hand tractors has increased,
- increase in the domestic production of tractors with higher potential.

More than one third of the tractors are imported from Germany, Italy occupies the second post and is followed by the Czech Republic. Imports from the United States has diminished, while imports from the EU has increased due to favourable custom duties. (**Table 29 and 30.**)

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Table 29. Main suppliers of agricultural tractors in Poland, 1997-2001 (thousand USD)

Country	1997	1998	1999	2000	2001	Share in 1997	Share in 2001
Total	40 437	33 392	22 313	32 583	59 717	100%	100%
Germany	12 075	8 608	6 087	9 827	19 335	29.9%	32.4%
Italy	1 696	974	2 589	5 447	8 466	4.2%	14.2%
Czech R.	6 081	8 020	3 104	3 172	8 314	15.0%	13.9%
United Kingdom	432	1 871	936	2 862	7 694	1.1%	12.9%
USA	9 438	7 714	4 732	5 722	5 679	23.3%	9.5%
France	666	259	734	859	5 166	1.6%	8.7%

Source: Italian National Institute for Foreign Trade, "Poland, Market of the agricultural machines", Warsaw, May 2003.

Table 30. Agricultural machinery imports in Poland (thousand USD)

Country	1997	1998	1999	2000	2001	Market share in 2001 (%)
Total	286 458	238 451	184 115	180 648	219 605	100%
Germany	151 117	105 249	72 450	74 714	92 256	42.0
Italy	25 989	31 067	24 486	25 929	25 898	11.8
Belgium	9 149	7 675	4 962	7 129	14 344	6.5
France	8 183	10 373	9 986	9 185	11 546	5.35
The Netherlands	17 727	17 255	11 553	10 632	10 066	4.6
Denmark	16 174	12 357	8 075	8 504	10 029	4.6
Hungary	1 056	1 014	2 894	3 501	7 936	3.6
Sweden	7 677	7 546	6 709	5 827	7 234	3.3
Brazil	535	1 861	4 049	2 093	6 893	3.1
USA	16 989	13 311	12 775	8 535	6 633	3.0

Source: Italian National Institute for Foreign Trade, "Poland, Market of the agricultural machines", Warsaw,

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The figures in any case show a strong advance by Western-made tractors in terms of market share, to the disadvantage not only of locally made tractors (Ursus), but also those produced in other Eastern and Central European Countries (if we consider that in 1989 there were sales of 75,000 tractors a year of which more or less 50,000 were Polish made Ursus, with 5,000 Czechoslovak Zetors and 20,000 from the Soviet Union). Similar developments are found with combined harvester, where to compete for the market were the Poland's Bizon (in a losing position) and the Western manufacturers as long as Bizon was absorbed by New Holland in 1998.

Poland exports mainly new machinery, while exports of second-hand machines has diminished in the last years. More than half of the machines are exported to Ukraine. The other most important partners what regards exports are Belarus, Germany, and Denmark. The volume of exports to Belarus was 20 times higher in 2001 than in 1997. Poland exports mainly tractors (**Table 31.**). The highest share of tractors exported is made up of tractors with 18-37 kW. The share of these kinds of tractors in the total tractor exports has increased to approximately 72% during 1997-2000. The main purchasers of Polish tractors are Italy, Portugal, Germany and Ireland.

Table 31. Agricultural machine trade account (million USD), Poland

	1999	2000	2001	2002
Total Imports	206,4	213,2	279,3	351,9
Tractors	22,3	32,6	59,7	93,7
Other agricultural machines	184,1	180,6	219,6	258,1
Total Exports	121,8	139,6	138,9	172,1
Tractors	42,8	34,4	28,1	34,96
Other agricultural machines	78,96	105,1	110,8	137,2

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Total	-84,7	-73,7	-140,4	-179,7
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Source: Italian National Institute for Foreign Trade,
"Poland, Market of the agricultural machines", Warsaw, May 2003.

Demand for agricultural machinery

In 2001 the complex demand for machinery and tractor has reached approximately 600 million USD. During 1997-1999 a considerable decrease in demand can be observed. While in 2000-2001 a slow increase has started. (Table 32.)

Table 32. Total demand for agricultural machinery and tractors in Poland (million USD)

Denomination	1997	1998	1999	2000	2001
Machinery	528.3	401.3	316.3	438.6	478.8
Tractors	353.9	244.9	177.3	101.3	114.9
Total	882.2	646.2	493.6	539.9	593.7

Source: Italian National Institute for Foreign Trade, *"Poland, Market of the agricultural machines"*, Warsaw, May 2003.

Second-hand market

One predictable aspect of the Polish market is the importance of second-hand machines, a direct effect of the lack of funding. In 1999 for example, 24% of the agricultural machine market was second-hand, mostly foreign, and predominantly German and the trend is even more noticeable for tractors. Taking into account that the 7 year old machine is worth about 15% of a new one, the second-hand market was worth about 24 million USD in the early 2000s, and Germany was the main supplier of used tractors (32%) and other agricultural machinery (73%). The main items were tractors, sugar-beet harvesters and combined harvester.

The extensive wear and tear suffered by the machines coupled with the smallness of the farms is the root of the fact that despite the relatively high rate of tractors per hectare of agricultural land and other machinery per hectare of crop, agricultural mechanisation in Poland is still at an unsatisfactory level. It worth mentioning that 58% of the second-hand agricultural machinery market is constituted of tractors. Main suppliers of second-hand agricultural machines are Germany, France, Denmark, Belgium, the Netherlands, Sweden, Norway, United Kingdom and Italy. Main supplier of second-hand tractors are Germany, the Czech Republic, France, the Slovak Republic, Italy and the United Kingdom. (Table 33.)

Table 33. Import of second-hand tractors (thousand USD), Poland

Country	1997	1998	1999	2000	2001	Market
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						share in 2001 (%)
Total	7 106	6 478	6 239	8 192	14 037	100.0
Germany	2 116	2 272	2969	2 763	4 555	32.4
Czech Republic	1 892	1 602	1 520	2 385	4 371	31.1
France	253	122	212	676	1 289	9.2
Slovak Republic	76	165	171	339	777	5.5
Italy	179	337	266	245	599	4.3
United Kingdom	378	609	136	466	561	4.0

Source: Italian National Institute for Foreign Trade, “*Poland, Market of the agricultural machines*”, Warsaw, May 2003.

Distribution channel

According to a survey made by UNACOMA and the Distribution of Agricultural Mechanisation in Poland and Romania the sales network for agricultural machines consists of 350-400 medium - large distributors, often also importers, handling 50% of the sales flow, and a large number (2,500-3,000) of small retailers, many also active as leasers or sub-contractors, as well as farmers on their own account. A good 20% of the total flow goes through manufacturers’ sales points, selling directly to the end users more than is the case in other countries.

Prospects

In Poland modernising the agricultural machines in use is one of the crucial points. Advantageous openings for Western manufacturers can be achieved by taking market shares from traditional suppliers or producing locally taking advantage of a well-qualified and comparatively cheap labour force with a view to selling locally as well as exporting. A foreign investor now receives the same treatment as his Polish counterpart. This allows the creation of companies that are 100% foreign owned. There are also tax breaks for total exemption up to 50% for ten years for new companies set up in a number of designated special economic zones. According to the Italian Foreign Trade Office foreign investment in agricultural machine making has a cumulative value of 40 million USD or 15% of foreign capital in the machine industry. Two strategies seem apparent: local production of machines and spare-parts (CNH, Same, Kongkilde, Alfa Laval Agri) and the opening of local sales branches (Westfalia, Vaterstad, Gregoire-Besson, Zetor). Somewhat neglected until a couple of years ago, leasing is becoming increasingly popular. The share taken by sales of machines for leasing in the turnover of individual dealers varies between 5% and 40% according to the dealer and type of machine. The most expensive machines, tractors and combined harvesters are the ones most commonly involved.

Collaboration possibilities

In the EU territory custom duties for tractors and other agricultural machinery has been reduced to zero. What regards other countries (mainly USA, China, India, Russia and Belarus) a 35% custom

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duty is in force. Agricultural machines sold in Poland must satisfy a series of safety requirements. Certification and registration is the job of the Warsaw based Certification Unit of Products of the Quality and Reliability Section of the Institute for Building, Mechanisation and Electrification of Agriculture. This Institute effects obligatory certification for a safety hallmark.

Support measures

Polish farmers can count on funds for investment in agricultural machinery from the Rural Development Plan for Poland, 2004-2006. The Measure “Support for semi-subsistence farms undergoing restructuring” aims at the increasing the possibility of restructuring of agricultural holdings with low own economical potential, which to a large degree produce for self-supply. As a result, the support eligible under this measure shall lead to the stabilization of Polish agricultural sector.

5. CLOSING REMARKS

The fragmentation of farm structure is the most commonly-mentioned weakness in the ten CEECs. On the other hand, a high share of large farms, allowing the exploitation of economies of scale, is listed as strength of the Czech Republic, Slovakia and Hungary. In the latter two countries, however, a dual farm structure exists with a high share of small holdings, which can be considered as weakness. Other most common weakness is the low level of farm mechanisation in general in all the CEECs. For a number of countries, easier access to the EU markets after enlargement is seen as an opportunity, and at the same time, the possibility of increased competition on domestic markets is a threat. Other opportunities most frequently-mentioned are related mainly to improvements in technologies of agricultural production, and more widely to the dissemination of more environmentally-friendly practices and the development of organic production. This could result in increased productivity, but also improved quality of agricultural produce.

In Western Europe demand for agricultural machines has declined during the period 1974-1992. After 1992 the trend started to improve. The turning point in 1992 coincided with the Mc Sharry reform of the CAP which has introduced substantial changes in farm sector incentives. Emphasis have been put on quality, rather than on quantity, stimulating investment in new technology to improve crop techniques and modernising farm organisation, while paying attention also to the safeguarding the environment and animal welfare. The second turning point came with the Agenda 2000, which stressed income support and aimed at the reduction of aid to production. This has created the need for updated technology to reduce production costs and improve product quality.

Today in the EU-15 the agricultural machinery market can be considered quite stable, even increasing as far as turnovers are regarded, but in general the sales show a decreasing trend for the last two decades. Investments in machinery might fall in the coming years as unviable, insufficient farms close down and available resources fall. However, this might be true only for the traditional machines. It is expected that demand for machines for typical produce with a high added value and multifunctional use will develop in conformity of the reformed CAP and the EU Rural Development Policy. The Fischler Reform of 2003 has further severed the link between subsidies and production, but has put greater emphasis on the respect of environmental, food safety and quality, and animal welfare standards. Taking into account thus the main points of the latest CAP

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Reform we can draw the following conclusions as far as the European agricultural machinery market is regarded:

- Investments in machinery might fall in the coming years as unviable, insufficient farms close down and available resources fall. However, this might be true only for the traditional machines.
- It is expected that demand for machines for typical produce with a high added value and multifunctional use will develop in conformity of the reformed CAP and the EU Rural Development Policy.
- The purchase of machinery is expected to become increasingly dependent on real productive necessity since financial resources will be different.
- Mechanisation will be in a position to develop provided the machines produced respond to the requirements imposed by the new approach and incentives are given to process rationalisation, the qualification and environmental compatibility.
- Machines will have to have increasingly extensive automation to reduce labour costs.

According to estimates made by the Italian Prometeia the volume of exports in the Western European countries will diminish by 0.4% while in the Eastern European countries it is expected to increase by 7.8%. What regards agricultural tractors the increase can be even more significant, more than 10%. This trend is foreseen to occur due to the expected seek out for higher productivity through the rationalisation and higher efficiency in the use of productive input. The purchase of machinery is expected to become increasingly dependent on real productive necessity since financial resources will be different.

Certainly, the entry of the 8 (with Romania and Bulgaria 10) CEECs to the EU will significantly influence the agricultural machinery market due to, on the one hand, the high importance of the agricultural sector, on the other hand, the current generally obsolete and inefficient machinery stock available in these countries. Replacing manual labour with machines seems to be a necessary passage if the system is to become competitive in the countries in question. Demand for modern machinery is expected to increase in these countries so as to meet European standards of production, and to meet the requirements posed by the latest CAP Reform. The need to meet with environmental standard requirements might be the most significant direct factor to bring about changes in the demand for agricultural machinery in favour of the modern and mainly Western ones.

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