

THE UKRAINIAN AGRARIAN SECTOR AND THE GLOBAL ECONOMIC CRISIS*

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1) An inexhaustible source of wealth?

Ukraine possesses agro-ecological conditions that are unique not only in Europe but worldwide. There are more than 52 million hectares of arable land, which constitutes 86 per cent of the country's territory (Bot, A. J. Nachtergaele, F. O. & Young, A. 2000). The 42 million hectares of cultivated land (in 2008) provides an abundance of land (0.9 ha/capita), which is also unique in Europe. The reason for Ukraine's exceptional potential in agriculture is the blanket deposits of loess and the soils developed on these blankets. About three quarters of the country's territory are covered by black soil (*chernozem*).

After Ukraine gained independence the proportion of cultivated land decreased significantly while the amount of fallow land increased fivefold (5 million ha, 15 per cent, 2006). From the second half of the 2000s cultivated land has started to increase; by 2008 it constituted over 50 per cent of the landmass. Taking the dramatic population decrease into account (51.9 million in 1991, 46.1 million in 2009), there are enormous land reserves available (OECD 2003). The central parts of the country and the maritime regions have the highest man-soil density (total population/total cultivated area). From an agro-ecological point of view, the

* This study has been concluded in the Geographical Research Institute under the mandate of the Institution for World Economics, within the framework of the collaboration between the Hungarian Prime Minister's Office and the Hungarian Academy of Sciences, as part of the strategic research project "Hungarian CIS Strategy with Particular Emphasis on Russia, Ukraine and Kazakhstan".

central parts are considered to be the best territories, the major “bread-baskets” of the country. Because of the low population density, the man-soil density exceeds one hectare per capita in the southern regions. Theoretically, one unit of cultivated land in the western regions of Galicia, Bukovina and the densely-populated rural regions of Transcarpathia has to support three to six times the population compared with in the southern regions.

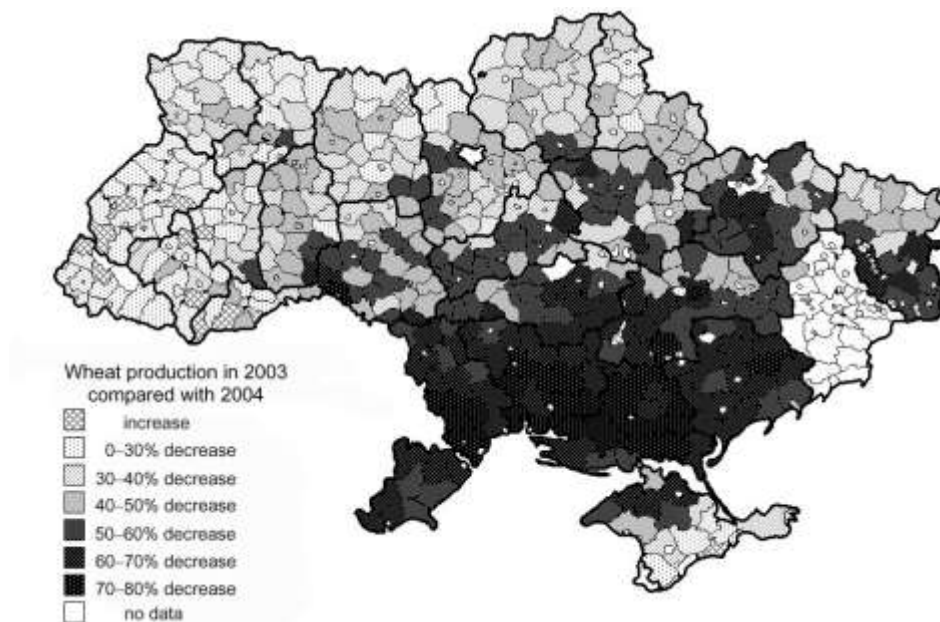
Although according to an OECD study (2004) Ukraine’s favourable potential in agriculture might make the agrarian sector the major economic driver of the country, its importance should not be exaggerated (Zorya, S. I. 2003), since these advantages cannot be exploited under bad economic circumstances. This was especially true for the 1990s when mid-western areas (Podolian) and the steppes were severely affected by the dramatic economic downturn while self-sufficient farms based on small parcels of land in western regions (Transcarpathia for instance) with far worse agro-ecological features experienced a moderate decrease (Van Zon, H. 2001). Because of the improving macroeconomic conditions – with the exception of the droughts of 2003 and 2007 – agricultural production has been steadily increasing since the turn of the millennium. Production has increased in the most fertile regions of Vinnitsa, Cherkassy and Poltava, which illustrates the growing importance of ecological advantages. Because of the relatively low level of production during the socialist era, economic decline of the sector during the transition period also remained moderate in the Carpathian region. In the 2000s these levels have stabilised. Better market environments around big cities provided an advantage for the survival of farms. Economic growth seems to have come to a halt, but the global economic crisis has not seriously affected the agrarian sector so far, which as a result, has become the major economic driving force in Ukraine.

2) Ecological crisis as a long term risk?

While excellent soil conditions and land abundance are the reasons for the auspicious conditions of the agrarian sector, climatic and ecological conditions and the occurrence of droughts paint a less rosy picture for the country. Ukraine is located in the continental zone with growing extremities from west-southwest to east. Climatic conditions are generally worse than in the western parts of Europe. The occurrence of droughts is a serious disadvantage for Ukrainian agriculture, although rainwater falls mostly during springtime and the growing season. The last bad drought in 2003 led to a significant crisis of the grain sector, therefore it is often called the “year of the grain crisis”. Compared to previous years, only half of the crops were harvested from the fields, while in the steppe zone –

which is accountable for most of the wheat production – experienced a 60-70 percent fall in production (*Figure 1*). In some areas of the Tavriya steppe, the decline was close to 80 per cent. From the 1950s giant irrigation systems, such as the North-Crimean, Kakhovskiy and the Krasnozemskiy channels on the Tavriya steppe, were built to counteract the unfavourable rainfall conditions. But irrigation led to secondary salinization on the fields. Additionally, present-day irrigation systems are in a seriously neglected condition. There are grave warnings indicating that drought poses a real threat to Ukraine's most prosperous agricultural lands and its wheat production sector, which is one of the country's leading agricultural sectors (OECD 2004). Droughts are an extremely important factor, especially when the climatic conditions are rapidly changing on the eastern part of the continent as a result of global warming. These territories are expected to have a more continental, an even drier climate as a consequence of global warming.

Figure 1
Drought – ecological crisis in wheat production, 2003



Source: State Statistical Committee of Ukraine (Derzhkomstat) oblast statistical yearbooks and own calculations.

Most of the country's territory is low-lying land – less than 200 metres above sealevel– intersected by loess valleys. These valleys were created by erosion and are called *balkas* and *ovrags* by the locals. Since completely flat areas can be found only on the territory of the Polesie, on the left shore and the lower course of the Dnepr, for the rest of the land soil ero-

sion is a serious problem (Van Zon, H. 2001). Favourable soil conditions are also defected by catastrophic ecological conditions, which have a devastating effect on the life of individuals and on Ukrainian society itself. Agricultural and industrial activities have caused salinization, acidification and soil pollution, while the Chernobyl disaster has led to radioactive pollution in Polesie, and around Cherkassy and Vinnitsa where the most fertile black soil was contaminated.

3) Agricultural employment: social buffer or retrogression?

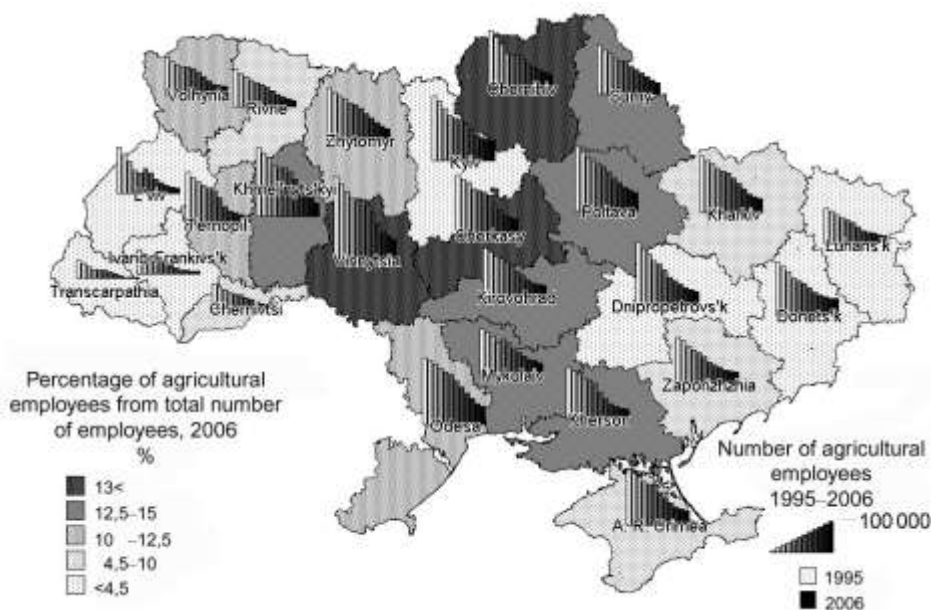
The exact number of people employed in agriculture is doubtful. Various statistics appeared with completely different data and no consensus on the trends and directions of the sector. The core of these discrepancies mostly lies in the definition of agricultural workers (Dövényi Z. – Karácsonyi D. 2008).¹ On the one hand, the number of workers employed at agricultural corporations has significantly decreased since 1990. On the other hand, the number of self-sufficient smallholders has significantly decreased from the early 1990s. More than one third of the economically active rural population (2.8 million people) who lost their jobs on collective farms after the transition became individual farmers on their household plots (OECD 2004). They therefore appear as self-employed agricultural workers from the 1990s (Illés I. 2002). The number of agricultural workers was also raised by economically “forced” suburbanisation and desurbanisation (Karácsonyi D. 2006, 2007). *Dachas* are specific to Eastern Europe and can be thought of as a secondary-suburban living space, a weekend home (Nefjodova, T. 2008b). Actually the *dacha* is also a place where urban population is occupied in self-sufficient agricultural production (Nefjodova, T. 2008a, b). This means that agriculture plays a significantly more important role in the economy than official statistics would suggest.

Employment at agricultural enterprises shows a continuous decrease (Figure 2). This decrease was lowest in the mid-western rural regions of the country, where favourable agricultural conditions provided a better chance of survival for the previously prevailing industrial agriculture. In

¹ According to the data of the Ukrainian State Committee of Statistics, 20 per cent of the population was employed in the agricultural sector. In 2001 12 per cent of employees had agricultural jobs. According to the OECD (2004), the number of agricultural workers has increased since the transition period. “In 2002, about 25 per cent of the labour force in Ukraine depended on primary agriculture as the main source of income and employment” (OECD, 2004, p. 3). According to the population census of 2001, the number of agriculturally employed persons was 3,7 million (21.5 per cent).

the regions of Vinnitsa, Cherkassy and Chernihiv almost one quarter of the population is still involved in agricultural activities. This ratio falls below 5 per cent only in the industrial areas of the east, in Galicia and Transcarpathia, where smallholders are most common, and around the capital, Kiev, where agricultural employment has not been significant either. In the western parts of the country and around big cities, the ploughlands of the disintegrated large collective farms have almost exclusively been replaced by small parcels. With the exception of the Kiev region, at least half of the rural population was working in agriculture in 2001. In some southern and mid-western regions this share rose to 70 per cent, meaning that these rural areas were practically monofunctional agrarian lands.

Figure 2
Employment at agriculture
(1995–2006)



Source: State Statistical Committee of Ukraine (Derzhkomstat) agricultural statistical yearbooks and own calculations.

The share of agriculture in total employment has decreased by 6.9 per cent, but self-sufficient individual farmers are not included in this figure; their number has undoubtedly grown because of the global economic crisis. The reason behind this high share of agriculture in employment is not the abundance of great fertile lands, but economic constraints, and a certain type of forced employment. As a result, agriculture plays the role of a social buffer, but also entails backwardness and degradation.

Wages in the agricultural sector are extremely low. In 2001 an average industry worker had a salary twice or three times higher than an agricultural worker (Onegina, V. M. 2001; OECD 2004; ARIS 2005). The difference has been narrowed to a certain extent since then, but the average agricultural wage was still only half of the industrial wage in 2008. Such low wages in the sector allows very low prices for agricultural products, but also sets the living conditions of employees and small-scale producers at an extremely low level. The increase of the real value of agricultural wages since 2001 has also involved growing regional income disparities.

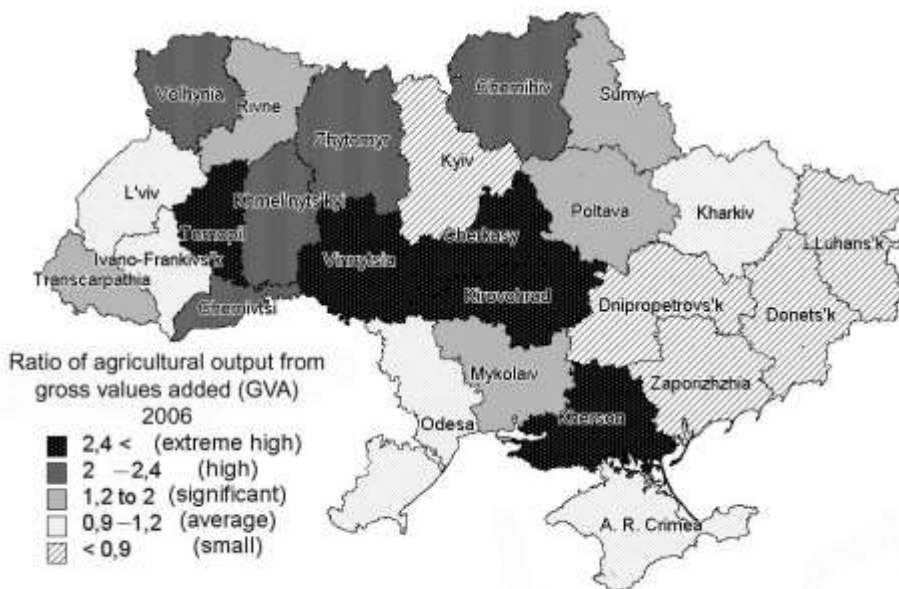
4) Domestic development trajectories: facing the same challenges with different regional structures

Drastic changes were initiated in the Ukrainian agrarian sector in the early 1990s in order to enhance productivity and competitiveness in the sector. The results of these reforms only became visible a decade later, when significant structural changes also took place in Ukrainian agriculture. Just like in other Central and Eastern European transition economies, the scale of the downfall in productivity in agriculture was higher than in other sectors. In 1990 agriculture had a 25 percent share of GDP. By the early 2000s, this share has decreased to 13.3 per cent (OECD 2004). According to the Ukrainian State Committee of Statistics, agriculture's share was 16 per cent of GVA (gross value added). Dynamic economic growth from 2001 and the dramatic decline in agricultural production caused by an extraordinary drought resulted in a further decrease of agriculture's share in GVA to 12 per cent in 2003 and eventually to 7.8 per cent in 2008. The agrarian sector reacted slower to the economic boom and grew substantially slower than other sectors.

The role of agriculture is notably different across regions, as the iron works of the Donbas and the sugar-beet fields of Podolia are both part of the country's image. The Ukrainian State Committee of Statistics only publishes the volume of agricultural production and the GVA of the whole economy at a regional level, therefore the share of agriculture in GVA cannot be determined on a regional level. These two data series (agricultural production and total GVA) can be transformed into regional distribution coefficients, which allow us to draw conclusions concerning the significance of agriculture in each region (*Figure 3*). With the exception of the Kiev region, agriculture has a much greater importance in the mid-western parts of the country than in the southern or the eastern regions (with the exception of Kherson's region), where greater industrial centres are located. In 2001, according to O. Mrinska (2003; World Bank 2002),

agriculture played a more important role than the industrial or the services sector in five (Volyn, Ternopil, Vinnitsa, Kirovograd and Sumy) out of 24 regions (oblasts).

Figure 3
Significance of agriculture in the economy of the regions



Source: State Statistical Committee of Ukraine (Derzhkomstat) statistical yearbooks and own calculations.

4.1. Small parcels in the shadow of giant estates?

During the Soviet era 93.5 per cent of the total cultivated area was owned by collective farms. The two types of these farms were *kolkhozes* and *sovkhazes*, the latter of which were equipped with much more advanced machinery than *kolkhozes*. In Ukraine, *kolkhozes* possessed over three quarters of collectively-used land, while *sovkhazes* accounted for just 24 per cent. The level of agricultural mechanization was generally lower in Ukraine than in other republics. There were millions of small parcels and individual farmers operating on household plots even before the systemic change. These household plots were consolidated from the lands of the *kolkhozes* and the members using them had only usufructuary rights. Already in the 1980s, these individual farms had a considerable share in agricultural production (Hajdú-Moharos J. 1995), reaching 30 per cent of total agricultural production, 25 per cent of cultivation and a 36 per cent of the more work-intensive animal husbandry in 1991 (Table 1). Small parcels accounted for a 6.5 percent share of land (Appendix 1), in-

dicating that their productivity was much higher than the sovkhoses' and the kolkhozes'.

Table 1
Changes in the structure of agricultural production, 1990–2008
(percentage)

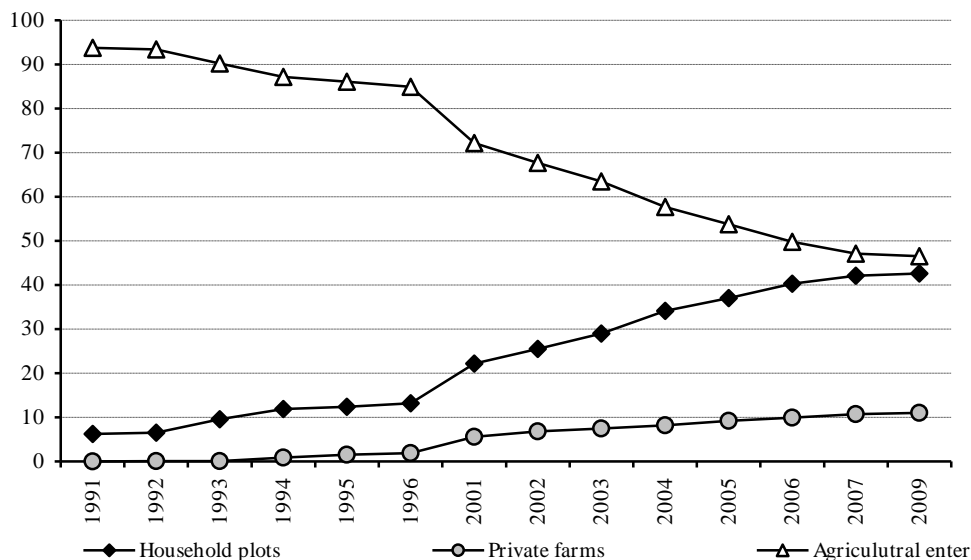
	Agricultural enterprises and private farms			Household plots		
	Total agri-culture	Crop pro-duction	Animal hus-bandry	Total agri-culture	Crop pro-duction	Animal hus-bandry
1990	72	79	66	28	21	34
1995	55	60	48	45	40	52
1996	48	53	42	52	47	58
1997	47	56	34	53	44	66
1998	44	52	34	56	48	66
1999	43	53	32	57	47	68
2000	34	46	26	66	54	74
2001	37	50	27	63	50	73
2002	36	48	29	64	52	71
2003	30	34	26	70	66	74
2004	36	41	28	64	59	72
2005	37	40	31	63	60	69
2006	39	42	35	61	58	66
2007	40	41	38	60	59	62
2008	46	49	40	54	51	60

Source: State Statistical Committee of Ukraine (Derzhkomstat) agricultural statistical yearbooks and own calculations.

As a first step during the process of privatisation the state monopoly of land ownership was abolished (Penkaitis N. 1994). In the case of kolkhozes, land ownership was transferred from the state to the collectives of the kolkhozes. Peasants won their small parcels, which they had already been using. These parcels were supplemented with some of the land which had previously belonged to the sovkhoses and kolkhozes (OECD 2004). Consequently, the share of small parcels rose to 12 per cent by 1995 and a lot of economically unviable micro parcels were created, which later became the building blocks of rural self-sufficiency, however. There was no restitution during the privatisation process; land was distributed among the workers of the kolhozes and sovkhoses by using vouchers (Illés I. 2002). Although reforms have formally abolished the system of kolkhozes, ownership structures mostly remained untouched; the same land was rented by joint or cooperative farms, or private corporations. By the turn of the millennium 65 per cent of the arable land became private property (OECD 2004), but only 5 per cent of agricultural land (2.2 million hectares) was affected by land-structure change. Sovkhoses were trans-

formed into joint-stock companies, but the state remained in its role as the major stockholder. The number of large agricultural enterprises has increased 1.5 times since the mid-1990s, while the average farm size has decreased from 3000 to 2000 hectares.

Figure 4
Change in land ownership
(1991–2009)



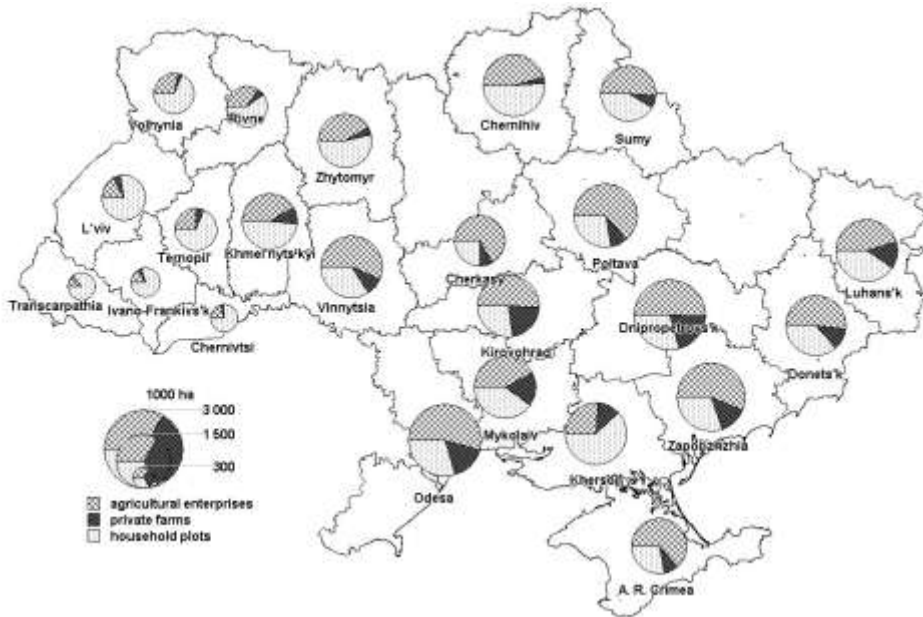
Source: State Statistical Committee of Ukraine (Derzhkomstat) agricultural statistical yearbooks and own calculations.

Another result of the reforms was the appearance of private (or family) farms receiving significant amounts of state aid, using over half a million hectares and having a 1.5 percent share in total arable land by 1993 (Schubert W. 1997). Ukrainian statistical terminology and the OECD's essay collection from 2004 differentiate between three types of farms, which reflect the newly created structures: agricultural enterprises, private farms and household plots. Agricultural enterprises are the successors of Kolkhozes and Sovkhozes in various forms. The main difference between private farms and household plots lies in their dimensions, as the size of private farms exceeds 2 hectares and their production levels go beyond self-sufficiency, making it their main source of income.

In 2000, private farms and household plots represented an approximate 30 percent share in agricultural land, agricultural enterprises a nearly 70 percent stake, while only 5 per cent remained as state property. By 2006 the share of agricultural enterprises fell below 50 per cent, however this is an average number. There are significant differences in land structure in the different regions (*Figure 5*). In the western regions, agri-

cultural land is almost exclusively owned by smallholders: agricultural enterprises only have a 25 percent share here. Agricultural enterprises are prevalent in other regions, although private farms play an important role in the steppe areas and in the region of Kherson, where orchards provide a solid base for horticulture and the production of fruits and vegetables. The share of smallholders is lowest in the middle of the country, by the Dnepr River.

Figure 5
Structure of land ownership, 2006

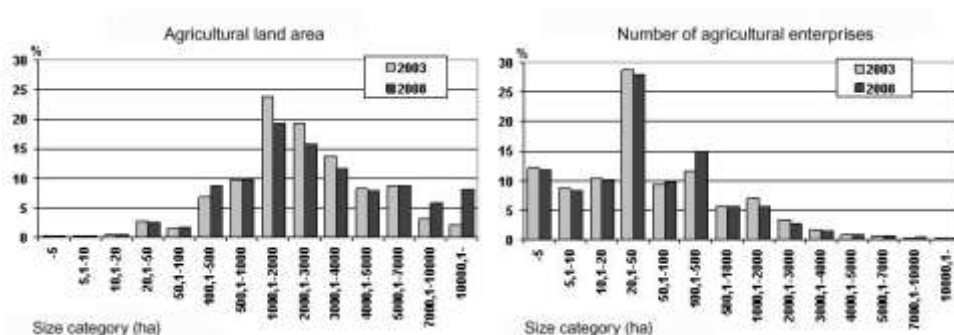


Source: State Statistical Committee of Ukraine (Derzhkomstat) agricultural statistical yearbooks and own calculations.

There is a vast variation in farm sizes with a considerable ownership concentration process starting between 2003 and 2008 (*Figure 6*). On the one hand, the share of farms exceeding 7000 hectares has significantly increased at the expense of ex-kolkhoz farms of the 1000 to 4000 hectares of size. Although 70-80 per cent of agricultural land is used by farms bigger than 1000 hectares, they represent only 10-14 per cent of agricultural producers. The share of agricultural enterprises in agricultural land is shrinking, but their average size is constantly increasing. On the other hand, there is another reason for ownership concentration, the growing average size and share of private farms of 100-500 hectares. This growth in average size can be partially explained by the gradual decrease of smaller, less competitive farms. Over 60 per cent of farms are barely viable from an economic point of view: they are smaller than 50 hectares in size, use only 3 per cent of total agricultural land, and 12 per

cent of them operate on land strips smaller than 5 hectares. It is highly likely that agricultural enterprises of 100 000 hectares, private farms of 100-500 hectares and self-sufficient household plots of 1-2 hectares (household plots do not appear on Figure 6, since they are not considered to be economic organisations) will play a decisive role in the future on Ukraine's agriculture sector.

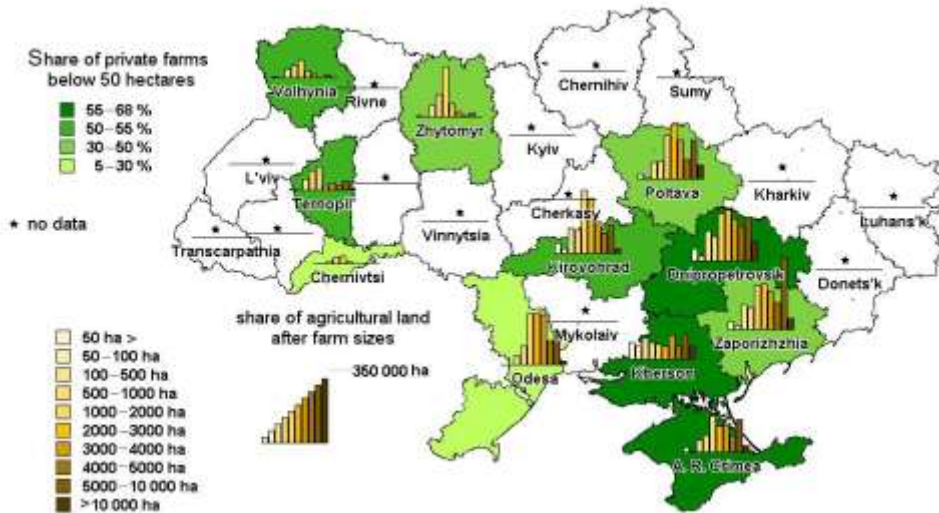
Figure 6
Size of agricultural enterprises and private farms
(2003–2008)



Source: State Statistical Committee of Ukraine (Derzhkomstat) agricultural statistical yearbooks and own calculations.

There are significant regional differences in Ukraine in terms of land use, which can be explained by sociological and natural-environmental factors. From the forest belt up to the steppes the landscape also changes, as the ploughlands intersected by small forests on the scarcely populated northern border of the steppe gradually turn into flat, endless parcels. Farm sizes over 1000 or 2000 hectares are quite common in the steppe, while in the western regions private farms of 100 to 1000 hectares are most common (*Figure 7*). Smaller private farms are a rare phenomenon in the west, just like in Poland; there are hundreds of thousands of small self-sufficient farms, as opposed to the steppe, where the share of private farms below 50 hectares is also considerable. But the high share of giant agricultural enterprises with a farm size of 5 to 10 thousand hectares is noticeable in the region of Zaporozhe. Because of the horticultural activities, land structure is rather evened out in the region of Kherson.

Figure 7
Size of agricultural enterprises and private farms, 2006



Source: State Statistical Committee of Ukraine (Derzhkomstat) agricultural statistical yearbooks and own calculations.

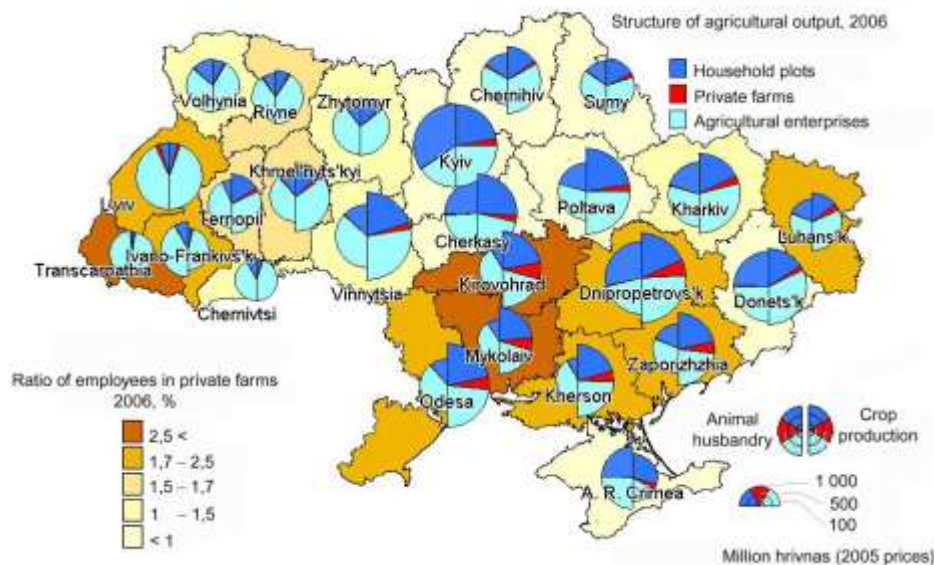
4.2. Increasing efficiency with decreasing standards?

The economic significance of small parcels has been constantly decreasing since 2004, when their added value reached its maximum. After 2000 agricultural enterprises and private farms have experienced the highest growth in the sector. However, the added value of economic organisations in 2008 is still 50 per cent less compared with 1990 levels. Household plots play an important role in the west, especially in Transcarpathia, where their share reached 80-90 per cent in agricultural production in the mid 2000s. The east should not be neglected either: half of agricultural products there are grown on these tiny parcels. The substantial role of agricultural enterprises in animal husbandry cannot be questioned around big cities (Kiev and Eastern Ukraine), where the markets for animal products are in very close proximity to the production sites. Cultivation is also dominated by big enterprises in the central regions of the country, where favourable agro-ecological settings allow them to maximize their profits.

Despite the temporary decrease of the area sown, the share of cultivation in agricultural production has increased to 62 per cent compared to the 50 percent share in the Soviet era. The share of cultivation is highest at the middle course of Dnepr, but exceeds to 50 per cent everywhere in the steppe, where southeast of a virtual line drawn from Uman to Kharkiv (Karácsonyi D. 2006) private farms play a significant role besides agricul-

tural enterprises (*Figure 8*). Private farms can flourish on the lightly populated steppes, where the rural population have access to relatively greater amount of land.

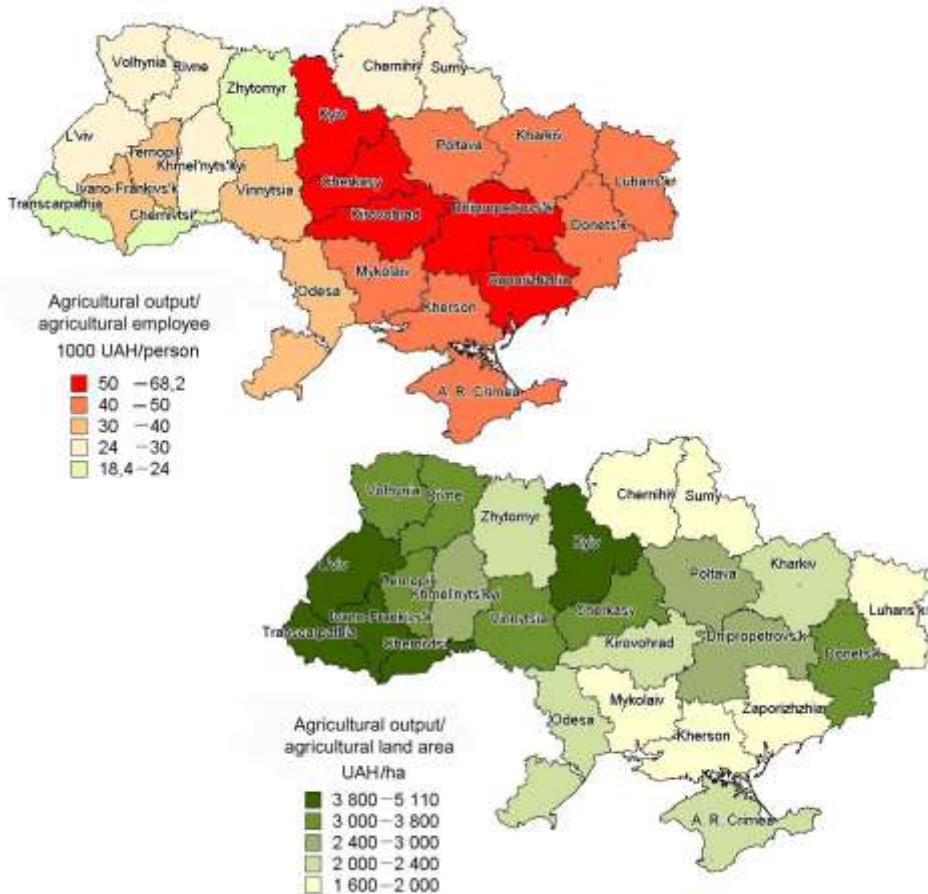
Figure 8
Structure of agricultural production



Source: State Statistical Committee of Ukraine (Derzhkomstat) agricultural statistical yearbooks and own calculations.

During the transition the standards of agricultural mechanization, chemicalization, the technical standards and the intensity of production techniques have fallen to drastically low levels (Siedenberg, A. – Hoffmann, L. 1999). Only the use of chemical fertilizers has increased, if slowly, since the early 2000s. Labour efficiency at agricultural organisations has also started to grow from the 2000s. On the production side, growing milk yields from the 2000s demonstrate some improvement in agricultural standards. Despite the fact that the intensity of agricultural output is highest in the western and the most urbanised regions of Kiev and Donetsk (*Figure 9*), labour efficiency of agricultural production is highest in the steppe, especially along the Dnepr River. Small parcels have a high intensity in the west, but labour productivity is extremely low. Extremely developed agriculture with high intensity and high efficiency can be found only in the region of Kiev, and along the middle course of the Dnepr, Cherkassy, Poltava and Dnipropetrovs'k regions, where capitalization and mechanization of agriculture are at most favourable levels.

Figure 9
Labour efficiency and intensity of agriculture, 2006



Source: State Statistical Committee of Ukraine (Derzhkomstat) agricultural statistical yearbooks and own calculations.

Urbanised areas such as the Kiev region and Eastern Ukraine along with the extensive agriculture of the southern steppe area had the best perspectives in the 2000s. Low agricultural density, favourable land, ownership and competitive product structures, and the proximity of ports gave them good export opportunities (World Bank 2005). Mid-western regions were characterized by social tensions, originally high, constantly decreasing economic significance and employment rates, big farm sizes, favourable ecological conditions and increasing competitiveness in agriculture. Western regions were seemingly the “favourites” of the transition period and the 1990s, but in the 2000s much of their might was lost, because self-sufficient farms and unfavourable small parcel structures remained dominant at that time. Although in the 1990s work-intensive agriculture was the key to survival, growing average wages in the sector

have gradually cancelled out the preliminary advantages of these structures.

5) Competition on the global food market – transforming product structures in Ukraine

The transformation in agriculture has not only influenced land use, land structure, production levels and standards, but has also brought about new challenges in market competition, which have had to be met by introducing a new production profile. The old, obsolete and less competitive Soviet production focus on animal husbandry, forage and sugar-beet production (Siedenberg, A. – Hoffmann L. 1999; ARIS 2005) has been shifted to growth in the exportable production of grain and sunflower and the intensive production of potatoes, vegetables and milk in household plots (OECD 2004).

5.1. Cereals – a renewing tradition

Grains, potato, vegetables, sunflower and rape have gained ground on sowable land (*Appendix 1*), although the absolute value for grains has decreased in the 1990s. The favourite of the 2000s was soy and rape, as their share on sown areas has rapidly grown. Forage has lost ground most spectacularly because of the decrease in animal production, but sugar-beet fibre flax has been ousted as well due to the collapse of the textile industry.

Despite significant fluctuations (*Table 3*), meaning that the whole production is completely dependent on weather conditions, output of Ukrainian grain crops is responsible for 3-4 per cent of global, and around 10 per cent of European production. Grains, especially wheat – except during droughts – are Ukraine's most important agricultural export products (*Table 7*) (OECD 2004). Ukraine is among the 10-15 biggest wheat producers in the world and occupies third place along with Germany in Europe, after France and Russia. In years with favourable weather conditions, like in 2002 or 2008, wheat production exceeded 20 million tons, but in years of drought, like in 2000, output barely reached 10 million tons. After 2000 Ukraine was a net importer only once, in the year of the “grain crisis” in 2003, when 3 million tons of wheat had to be shipped to the country from abroad. Because of the significant fluctuation in produc-

tion, cheap Ukrainian wheat might appear on the global market at dumping prices in one year, while the following year Ukraine may become the biggest wheat importer in Europe. Wheat export destinations are well spread out, as its main markets are located in the Mediterranean region, in the Middle East and in some highly populated third world countries, which have good and cheap maritime transport opportunities (*Table 2*).

Table 2
Main export markets of Ukrainian wheat
(percentage)

	2004	Ratio of the market	2005	Ratio of the market
1	Spain	16	Spain	25
2	Israel	15	Tunisia	9
3	Italy	10	Israel	9
4	Indonesia	9	Italy	6
5	Tunisia	7	Algeria	6
6	Egypt	6	Morocco	6
7	Hungary	5	Indonesia	6
8	Philippines	5	Rep. of Korea	5
9	Rep. of Korea	4	Hungary	5
10	Morocco	3	Libya	3
...

Source: FAOSTAT, <http://faostat.fao.org/>

Although in central and southern regions of Ukraine the planted area of autumn grains and autumn wheat has shrunk to some extent, with a share of 25 per cent in ploughland by 2000, this position has stabilized since then. The formerly insignificant share of spring wheat in the planted land of grains has increased to 2-3 per cent as autumn harvests have become uncertain. By 2000 private farms and small parcels were responsible for 25 per cent of wheat production (OECD, 2004).

In the northern forest belt rye is the most important cereal produced. The levels of rye production have changed similarly to wheat's, but the fall in rye output was much less severe. The year 2003 was also unfavourable for rye harvest. When Ukraine gained independence, it was responsible for 3-4 per cent of the world's rye production, but this share has fallen back considerably since then. A remarkable share of Ukrainian rye export goes to the CIS region, especially to Russia.

Table 3
Output of major crops
(thousand tonnes)

	Wheat		Rye	Sugar Beet	Maize	Sun- Flower	Rape	Soy- Been	Flax	Potatoe
	All kind	Sum- mer								
1987	19655	40	1374		8308					
1988	21709	25	1056		8638					
1989	27400	29	1298		7026					
1990	30374	26	1260	44264	4737	2571	130	99	108	16732
1991	21155	22	981		4747					
1992	19508	35	1156	28782	2851	2127				20276
1993	21831	60	1180	33717	3786	2075	44			21009
1994	13857	137	941	28138	1537	1569	18			16102
1995	16273	304	1208	29650	3392	2860	40	22	48	14729
1996	13547	197	1094	23008	1837	2123	23	15		18410
1997	18404	300	1348	17662	5340	2308	44	18		16701
1998	14937	300	1140	15523	2301	2266	67	36		15405
1999	13585		919	14064	1737	2794	147	45		12723
2000	10197	422	968	13198	3848	3457	132	64	8	19838
2001	21348	554	1822	15575	3641	2251	135	74	12	17344
2002	20550	578	1500	14400	4171	3270	61	125	11	16100
2003	3599	733	620	13392	6875	4254	51	232	11	18453
2004	17520	115 9	1592	16600	8866	3050	149	363	16	20754
2005	18699	101 6	1053	16360	7210	4400	285	613	13	19300
2006	13947	106 7	582	22421	6426	5324	606	890	5	19467
2007	13938	765	561	16978	7421	4174	1047	723	4	19102
2008	25885	835	1050	13438	11447	6526	2873	813	3	19545
2009				7811		6345				19547

Source: State Statistical Committee of Ukraine (Derzhkomstat) statistical yearbooks, ukr-stat.gov.ua

The central regions are responsible for the highest cultivation yields. Practically all of the country's maize production and a significant part of wheat production is located on these territories, as rainwater conditions and annual heat levels are suitable for maize cultivation. In the second half of the 1990s, the annual maize production levels were 30-50 per

Table 4
Concentration ratio of export markets in
case of some agrarian products

	2004	2005
Wheat	0.09	0.10
Maize	0.15	0.09
Sunflower cake	0.11	0.13
Sunflower oil	0.09	0.09
Sunflower seed	0.13	0.41
Sugar of beet	0.32	0.42
Alcoholic beverages	0.67	0.78
Wine	0.59	0.54

Source: FAOSTAT, <http://faostat.fao.org/>

ducer in Europe together with Hungary, but since 2000 this means just 1 per cent on a global level. The levels of maize production cannot even be compared with the United States, which is the world's biggest producer. In the Soviet Union, and later in Ukraine, maize production has only been remarkable on a European level. Most of the maize export goes to Russia and Belarus, but the weight of the Mediterranean region and the Middle East has grown lately, which has led to a significant diversification of export markets.

cent below the level of the 1980's, but from 2002 the situation has considerably improved; the bumper crop of 2008 has approached the records of Khrushchev's maize campaign in the early 1960s. The volume of Ukrainian maize exports has been constantly increasing since 2000. In 2004 Ukraine exported the same volume of maize as Hungary, taking the second place of European exporters after France. For the first time, in 2003 and 2004, Ukraine was the fourth biggest maize pro-

5.2. The boom of oil crops – sector of the future?

The two success stories of the steppe belt are wheat and sunflower. Sunflower cultivation has been a success not just among industrial crops, but also in the whole Ukrainian agricultural sector, as it can be profitably grown and its planted area has grown 2.5 times since 1985. Production of oil crops is the most dynamically growing sector in Ukrainian agriculture, taking second place among agricultural exports after 2006 (*Table 7*). Sunflower production since 2000 exceeds the levels of the 1980s. Besides Argentina and Russia, Ukraine is the second/third biggest sunflower producer of the world, being responsible for 10-18 per cent of global production with a constantly increasing share after 2005. The world's biggest coherent sunflower area is located in Ukraine and Russia from the lower course of the Dnepr River to the foot of the Caucasian mountains, around the Azov Sea. One third of the world's production comes from this area. Half of the sunflower oil produced in Ukraine has previously been exported to Russia, but from the second half of 2000s Russian exports only have a 20 percent share. Sunflower oil occupies third place in the country's ag-

ricultural exports (OECD, 2004). Unlike the export of sunflower oil and oil cake, the export of sunflower seeds is highly concentrated in the European Union for biodiesel production and the Middle East for other purposes.

Table 5
Main sunflower seed, cake and oil markets
(percentage)

	Sunflower cake	Ratio of the market	Sunflower cake	Ratio of the market	Sunflower oil	Ratio of the market	Sunflower oil	Ratio of the market
	2004		2005		2004		2005	
1	Poland	18	Belarus	27	Switzerland	19	Russia	17
2	Latvia	17	Latvia	14	Russia	15	UK	15
3	Belarus	15	Poland	12	UK	9	Switzerland	10
4	Turkey	7	Israel	11	Netherlands	6	Spain	10
5	Israel	7	Morocco	9	Italy	6	Turkey	8
6	Switzerland	7	Turkey	5	Germany	5	Egypt	6
7	Lithuania	6	Lithuania	4	S.Kitts&Nevis	5	Italy	5
8	Morocco	5	Denmark	4	Egypt	5	Iran	4
9	Italy	4	Italy	3	Algeria	4	France	4
10	Hungary	4	Switzerland	2	France	4	Belarus	4
...

Source: FAOSTAT, <http://faostat.fao.org/>

Table 6
Main Ukrainian sunflower-oil markets
(percentage)

	Sunflower seed 2004	Ratio of the market	Sunflower seed 2005	Ratio of the market
1	Turkey	23	Spain	57
2	Hungary	16	Hungary	13
3	Spain	13	Lithuania	6
4	Georgia	13	Germany	6
5	Switzerland	8	Poland	5
6	Italy	6	Bulgaria	2
7	Netherlands	4	Russia	2
8	Portugal	3	Georgia	1
9	United Kingdom	3	Finland	1
10	Saint Kitts&Nevis	2	Estonia	1
...

Source: FAOSTAT, <http://faostat.fao.org/>

Table 7
The share of selected agricultural products in total exports
(percentage)

Ratio from total export	2005	2006	2007	2008	2009
<i>I. Live animals and livestock products</i>	<i>2.14</i>	<i>1.03</i>	<i>1.52</i>	<i>1.17</i>	<i>1.46</i>
01 live animals	0.01	0.01	0.01	0.01	0.02
02 meat and meat preparations	0.45	0.09	0.21	0.11	0.20
03 fish and crustacean	0.03	0.02	0.01	0.01	0.05
04 milk and milk products; eggs; honey	1.61	0.89	1.26	1.03	1.18
05 other animal products	0.03	0.03	0.02	0.01	0.02
<i>II. Plant products</i>	<i>4.95</i>	<i>5.09</i>	<i>3.51</i>	<i>8.33</i>	<i>12.59</i>
06 seedings and other trees	0.00	0.00	0.00	0.00	0.00
07 vegetables, root crops	0.11	0.23	0.14	0.12	0.47
08 eatable fruits and nuts, citrus plants	0.30	0.39	0.29	0.26	0.37
09 coffee, tea, spices	0.01	0.01	0.01	0.01	0.02
10 cereals	4.04	3.53	1.55	5.53	9.01
11 flour-grinding products	0.09	0.09	0.15	0.27	0.24
12 oil seeds and fruits	0.40	0.82	1.35	2.13	2.46
13 varnishes, resin (pitch)	0.00	0.00	0.00	0.00	0.00
14 plant materials	0.01	0.01	0.01	0.01	0.01
<i>III. 15. Animal or plant fats and oils</i>	<i>1.71</i>	<i>2.53</i>	<i>3.49</i>	<i>2.91</i>	<i>4.51</i>
<i>IV. Finished food industry products</i>	<i>3.77</i>	<i>3.63</i>	<i>4.18</i>	<i>3.76</i>	<i>5.18</i>
16 preparations from meat, fish	0.08	0.06	0.07	0.06	0.10
17 sugar and sugar confectionery	0.32	0.30	0.32	0.25	0.43
18 cocoa and cocoa preparations	0.70	0.68	0.71	0.75	1.08
19 preparations from cereals	0.29	0.30	0.34	0.37	0.53
20 products of fruits, vegetables processing	0.35	0.35	0.51	0.29	0.37
21 other mixed foodstuffs	0.14	0.13	0.15	0.15	0.22
22 alcoholic and non- alcoholic beverages	1.22	1.09	1.05	0.84	1.15
23 remains and wastes	0.41	0.44	0.69	0.72	0.80
24 tobacco	0.26	0.29	0.33	0.33	0.52
<i>Total agricultural export</i>	<i>12.56</i>	<i>12.28</i>	<i>12.69</i>	<i>16.17</i>	<i>23.73</i>

Source: State Statistical Committee of Ukraine (Derzhkomstat) www.ukrstat.gov.ua

The other important oil crop is rape, which is gradually taking the place of sugar-beet and flax in the forest belt and the forest steppe areas. Since 2000 and 2007 the planted land of rape exceeds the sown area of flax and sugar-beet. There has been a radical boom in rape production after 2004 as output has increased 60 times in five years. While in 2005 Ukraine's share was 0.5 per cent of the world's production, this share has increased to almost 5 per cent by 2008. Ukraine's share in European production was 12 per cent in 2008. Sown area for rape was 20 times bigger than five years before, while yields have significantly improved, reaching the world average. Since 2006, by overtaking Poland, Ukraine has become the second biggest rape seed exporter in Europe after France, and the sixth largest producer in the world. More than half of the exports are directed to Hungary, as in the second half of the 2000s Hungarian agriculture could not supply sufficient volumes of rape seed for the newly opened Hungarian biodiesel factories. Moreover, Ukrainian seeds can be obtained at a much lower price.

The importance of soy has been growing constantly since 1996; by 2008 Ukraine was the 8th biggest producer in the world. Since Ukraine gained independence, planted areas for soy have increased fivefold. Although Ukraine's share in global production is insignificant compared to Argentina, Brazil, China or the United States, from 2006 it has become the biggest European producer, being responsible for one third of the continent's total output. Ukrainian soy export is directed mainly towards Hungary and Turkey.

5.3. Sugar-beet and fodder crops – precarious remnants of the past

Although the importance of sugar-beet was once comparable with that of oil crops, its significance is rapidly decreasing. The sugar industry, unlike sunflower production, was among the losers of the transition, partly because its sugar content was lower than that of Western European sugar-beet, partly because of its uncompetitiveness compared to sugar-cane, and partly because governments stopped providing price support for the industry in the last few years. Sown areas between 1985 and 2008 have shrunk to 25 per cent. The situation has improved in the first half of the 2000s, although sugar-beet production has been constantly decreasing since 2006. This plant production sector has lost its global position the most. While sugar-beet output did not change significantly in the United States, Russia or Germany (thanks to enormous government and community subsidies there was even a small increase) in Ukraine – like in Hungary – production has decreased to 25-30 per cent of the levels in the first half of the 1990s. Ukraine has gradually lost its first place in global pro-

duction, falling back to the 5-6th place since 2000 (*Table 9*). Ukrainian rural areas have been hard hit socially and economically by the collapse of the traditional sugar industry. The industry has been so much of a dominant sector in rural economic life that the region of Vinnitsa has been called the “sugar Donbas”. Although 5-7 per cent of the global production still comes from Ukraine (*Table 8*), an OECD study from 2004 states that since 2001 Ukraine has become a net importer of sugar. It is worth noting, however, that the data of the Ukrainian State Committee of Statistics between 2005 and 2009 does not support this claim (*Table 13*). There were over 100 sugar factories operational in 2000 with a total capacity of 50 million tons (OECD 2004). Most of the plants were founded in the 19th century and many of them are still operating with century-old machinery. The international trade of sugar-beet is insignificant because of technological barriers. Sugar-beet loses most of its sugar content right after harvesting and therefore needs to be processed immediately. Ukrainian sugar exports lost its main markets by the end of the 2000s, falling back to 10 per cent of its former levels. Ukraine is not among the top 10 biggest exporters in Europe any longer. The export of sugar, confectionery and chocolate altogether has helped maintain its positions and has been able to grow since 2005 because of significant modernization in the processing industry (*Table 7 and 13*). This sector has given birth to companies like Roshen, which was named after its oligarch owner Petro Poroshenko, who is the main supplier of confectioneries to the Eastern European market.

Table 8
Ratio of Ukraine in global agrarian output
(percentage)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Sown area of wheat	2.4	3.2	3.2	1.2	2.6	3.0	2.6	2.8	3.2
Production of wheat	1.7	3.6	3.6	0.6	2.8	3.0	2.3	2.3	3.8
Sown area of sunflower	13.5	13.5	14.0	16.3	16.0	16.0	16.4	16.1	17.1
Production of sunflower	13.1	11.0	13.3	15.5	11.7	15.4	17.0	16.0	18.3
Sown area of sugar-beet	12.4	14.2	12.6	11.7	12.7	11.5	14.5	11.2	8.6
Production of sugar-beet	5.3	6.8	5.6	5.8	6.7	6.1	9.0	6.9	5.9
Production of meat	0.7	0.6	0.7	0.7	0.6	0.6	0.6	0.7	0.7
Production of milk	2.2	2.3	2.3	2.2	2.2	2.1	2.0	1.8	1.7

Source: FAOSTAT, <http://faostat.fao.org/>

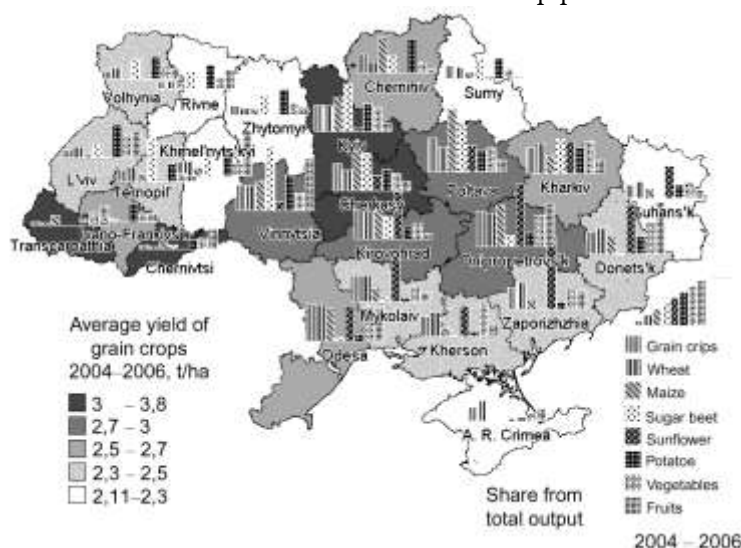
Table 9
Ukraine's ranking in global agrarian output

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Ukraine is the									
...biggest wheat producer	13.	8.	7.	24.	11.	11.	13.	13.	8.
...biggest sunflower producer	3.	3.	3.	2.	3.	2.	2.	2.	2.
...biggest sugar-beet producer	6.	4.	6.	5.	5.	5.	4.	5.	6.
...biggest meat producer	26.	29.	29.	28.	27.	29.	29.	27.	28.
...biggest milk producer	10.	10.	10.	11.	11.	11.	11.	12.	14.

Source: FAOSTAT data and own calculations.

Animal feed has lost ground even more spectacularly than sugar-beet. This phenomenon is closely related to the dramatic decrease in livestock production. During the transition period the economy gradually shifted away from the non-competitive forage production and forage import – which was unprofitable due to climatic conditions – to meat imports. In the late 1980s one third of the ploughed area was used for animal feed production, making it the second biggest plant group after grain crops. By 2008 their share decreased to 20 per cent. Within this group of plants, the production of maize for silage has shrunk to 10 per cent, fodder-beet has decreased threefold. Because forage is linked to livestock production, its share in ploughland is highest in the West. Around the Carpathian Mountains animal feed still prevails on cultivated lands.

Figure 10
Standard and structure of Ukraine's crop production



Source: State Statistical Committee of Ukraine (Derzhkomstat) agricultural statistical yearbooks

5.4. There is always domestic demand for potatoes, fruits and vegetables

The sown area for potatoes has constantly been around 1.5 million hectares. Output volumes did not change significantly, but global production – due to India and China – has increased significantly in the past few years. Therefore Ukraine's share in the world's production has fallen. Vegetable production has been very stable with no serious setbacks, mainly because they are produced most intensively. Output levels have barely changed since the 1960s. According to an OECD study (2004), 98 per cent of potato production and 80 per cent of vegetable production came from small farms in 2000, although household plots were responsible for a considerable share of the output even after 2005. Potatoes and vegetables are mostly grown for family or personal uses: only the surplus is sold on the local market. A considerable share of potatoes, fruits and vegetables are sold on wholesale markets spontaneously created along busy highways. Significant vegetable exports are directed almost exclusively to the Baltic states and Belarus (*Table 10*), where ecological conditions are less favourable for growing tomatoes, eggplants or cucumbers, for example. These vegetables also play a traditional role in the national cuisines as appetizers.

Table 10
Monopoly of countries in Ukrainian exports
(percentage)

Export product	destination	2004	2005
Fibre of flax	Lithuania (EU/FSU)	-	53
Green beans	Bulgaria (EU)	90	-
Cabbages	Belarus (CIS/FSU)	63	47
Cauliflower and broccoli	Belarus (CIS/FSU)	86	-
Eggplant	Latvia (EU/FSU)	72	85
Cucumber	Estonia (EU/FSU)	-	29
Berries	Poland (EU)	61	-
Blueberry	Poland (EU)	46	63
Tomato Juice	Belarus (CIS/FSU)	38	54
Bread	Moldavia (CIS/FSU)	64	83
Chicken	Belarus (CIS/FSU)	88	-
Cow milk	Azerbaijan (CIS/FSU)	48	46
Cigarettes	Armenia (CIS/FSU)	22	22

Source: FAOSTAT, <http://faostat.fao.org/>

Fruit, grape and wine production levels have significantly dropped since the transition: their volumes are only 50 per cent of the 1980s levels. Ukraine's fruit production is not significant by European standards, although it exceeds the volume of vegetable exports. Berries grown in the forest belt are worth noticing: their main export market is Poland. Apple, peach and cherry exports are almost exclusively directed towards Russia. Wines and sparkling wines, such as the Crimean Koktebel, Masandra, Zolotaya Balka and the Frantsuzsky Bulvar from Odessa, cognacs named after local regions, such as Ai-Petri, Tavriya and Desna, became popular in Eastern Europe. Vodka production is linked to potatoes and grain crops and has significant traditions in Ukraine. The Nemiroff is the most successful enterprise of the Ukrainian food industry: the brand is well-known even in the West. Alcoholic beverages and wines have a 5-8 percent share in total agricultural and food exports, much of which is directed towards Russia (*Table 11*). Dependence on Russia for agricultural exports is most obvious in the beverage industry, which is used as a tool for political leverage, not just against Ukraine, but Georgia and Moldavia too.

Table 11
Extreme monopoly of the Russian Federation
in the agrarian exports of Ukraine
(percentage)

	2004	2005
Alcoholic beverages	81	88
Wine	76	72
Juice of grapes	-	100
Tobacco	73	79
Beef	100	100
Pork	100	75
Mutton	100	100
Chicken	-	100
Salami, Sausages	87	75
Butter	81	85
Cheese	98	97
Eggs	-	80
Apple	68	79
Apricot	94	100
Cherry	76	88
Green Beans	-	84
Cauliflower And Broccoli	-	100
Ice Cream	49	71
Frozen Vegetables	-	70

Source: FAOSTAT, <http://faostat.fao.org/>

5.5. Animal husbandry: growing competitive disadvantages?

Livestock production has been hard hit by the transition, only to regain some momentum in the 2000s from a low of 40 per cent of 1990's level. In years of droughts (2003 and 2007) livestock output also decreased, although by 2008 it stabilized at around 50 per cent of 1990's level. Despite the temporary growth experienced in the 2000s, livestock levels have significantly decreased and are still lagging behind Soviet-era levels.

The controversial situation of animal husbandry is best demonstrated by regional differences. While livestock density and livestock volumes are highest in the west, despite less favourable climatic conditions for animal feed, standards of livestock production based on milk yields are best in the eastern regions (*Figure 11*). Animal husbandry is most prevalent in the mid-western and western parts of the country, but there is a sizeable amount of livestock in the Donetsk basin, around Kharkiv and Odessa. While household plots are dominant in the mid-western regions, big livestock farms retained their importance in the east. Animal husbandry is milk-oriented in the west, while meat production bears a greater importance in the Steppe. Ukraine is not among the 25 biggest meat producers in the world. Production levels are somewhere between Poland's and Hungary's. By the end of the 1990s, output had dropped to 50 per cent and stabilized around that level. Small farms are responsible for one third of meat volumes. Animal products such as meat, milk, cheese, butter or egg exports are almost exclusively directed towards Russia (Table 11), although Ukraine also imports significant volumes of meat, which cannot be compensated by its considerable milk product exports since 2006 (*Table 13*).

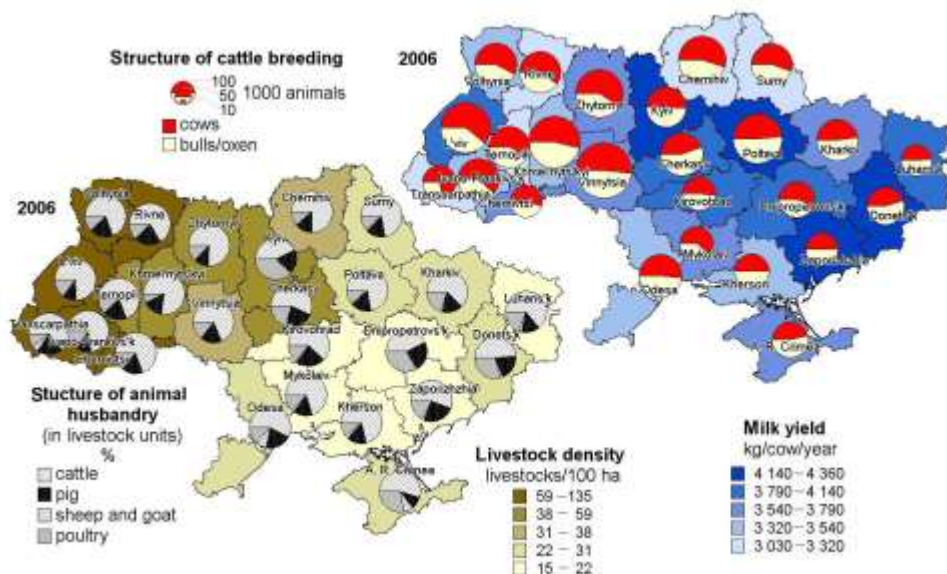
5.6. Cattle: improving standards, decreasing stocks

Cattle stocks have decreased the most during the transition period, although in 2006, with the exception of the Kiev region, cattle was the most important animal, playing an almost exclusive role in the west. Cattle stocks were halved in the 1990s and halved again in the 2000s. Most animals were butchered between 1995 and 1997. The selling of 800 million tons of meat temporarily led to significant export revenues. The stock of 7 million, which was about 0.5 per cent of the world's cattle stock, had dropped to 5 million by 2009. In the 1980s Ukraine's cattle stocks represented 2 per cent of the world's and 10 per cent of Europe's stocks.

Ukraine, Belarus and Russia together had a 10 percent share in global stocks. The United States had the same share at that time.

The less dramatic decrease in the number of cows compared to the total cattle stock has brought about the growing dominance of milk-oriented animal husbandry. Cattle stocks have been subject to an accelerated decline in the 2000s. By the end of the 1980s lactation capacities were only half of the Western average, and even this low level was halved again in the 1990s. Milk yields started to improve after 2000 and even exceeded Soviet levels by 2002. This was mainly due to the fact that animals with lower lactation capacities had been butchered. Milk output, therefore, was “only” halved. Because of growing global production, Ukraine’s share in global milk production has rapidly decreased. As a result, since 2002 Ukraine is no longer among the 10 biggest producers. Milk products were responsible for 15 per cent of the country’s agricultural exports in 2001 (OECD 2004), but this share has continuously decreased since then (Table 7). Ukraine's most serious competitor in milk and milk products exports to Russia is Belarus, although Ukraine was ousted from the Russian market because of political reasons. While the milk processing industry has collapsed, domestic processing was a success story in the 1990s (Van Zon, H. 2001).

Figure 11
Standard and structure of Ukraine’s animal husbandry



Source: State Statistical Committee of Ukraine (Derzhkomstat) agricultural statistical yearbooks and own calculations.

Table 12
Number of selected livestock in Ukraine
(thousand heads)

	Cattle		Pigs	Sheep And Goats	Poultry*
	Cows	All			
1984	9 000	26 669	20 880	9 297	2 461
1985	8 851	26 633	20 088	9 222	2 443
1986	8 712	26 725	20 138	9 375	2 513
1987	8 605	25 969	19 313	9 307	2 526
1988	8 567	25 621	19 471	9 243	2 514
1989	8 528	25 195	19 947	9 003	2 474
1990	8 378	24 623	19 427	8 419	2 545
1991	8 263	23 728	17 839	7 829	2 551
1992	8 057	22 457	16 175	7 237	2 461
1993	8 078	21 607	15 298	6 863	2 431
1994	7 818	19 624	13 946	5 575	2 146
1995	7 531	17 557	13 144	4 099	1 905
1996	6 972	15 313	11 236	3 047	1 649
1997	6 265	12 759	9 479	2 362	1 497
1998	5 841	11 722	10 083	2 026	1 294
1999	5 431	10 626	10 073	1 885	1 233
2000	4 958	9 424	7 652	1 875	1 180
2001	4 918	9 421	8 370	1 965	1 300
2002	4 716	9 108	9 204	1 984	1 460
2003	4 292	7 746	7 366	1 865	1 424
2004	3 926	6 903	6 466	1 755	1 528
2005	3 635	6 514	7 053	1 630	1 620
2006	3 347	6 175	8 055	1 617	1 665
2007	3 223	6 057	7 852	1 785	1 820
2008	2 990	5 505	6 862	1 805	1 890
2009	2 805	5 259	7 448	1 875	2 013

*100 thousand stocks

Source: State Statistical Committee of Ukraine (Derzhkomstat) agricultural statistical yearbooks.

5.7. Pigs without new export markets

Pig stocks are the second most important animals within animal husbandry. Pig-farming is traditionally linked to maize-producing territories such as the Cherkassy, Kirovohrad regions, and highly urbanized areas, such as the Kiev, Dnipropetrovs'k, Zaporizhyhya and the Odessa regions. The drop in pig stocks was slightly less than that of cattle, and stabilized around the volumes seen in 2000. The volume of pig stocks greatly depended on the harvest results of the given year, especially on maize yields. Therefore, there was a significant drop in pig stocks after 2003 and 2007, which resulted in a further decrease of 2-3 per cent since 2000. After gaining independence, Ukraine had a 7 percent share in European stocks. This share decreased to 4 per cent by 2000. Ukraine's share in European and global stocks is smaller in pigs than in cattles.

5.8. Horses, sheep and poultry – the curiosities of animal husbandry

Household poultry stocks suffered the least significant decline during the transition. These stocks are gradually increasing by 5-7 per cent annually since 2004. The significance of poultry is greatest in the supply areas of big cities such as Kiev, Dnipropetrovs'k, Donetsk, Luhansk. Ukrainian poultry stocks are quite small in international comparison, and chicken exports, like other meat products, are almost exclusively oriented towards Russia and Belarus, while American, Hungarian or Polish competitors have appeared on domestic markets.

The economic weight of sheep and goat farming is much lower compared to cattle and pigs. In addition, their grazing land is very specific, mostly concentrated on the dry steppe around Odessa (Budzhak), in Crimea and in the Carpathian mountains. After the dramatic decrease in the 1990s, goat and sheep stock levels have stabilized at a low level in the 2000s, with a slight growth in the past few years. The only exceptions to the general rule of falling stocks in the 1990s are horses. Land has been distributed among peasants due to privatization, but they have lacked the proper machinery or the fuel necessary to operate these machines. As a result, the importance of plough-horses has grown rapidly. Horse stocks culminated in the mid-1990s, since then it has started decreasing again.

Table 13
Balance of foreign agrarian trade of Ukraine
(1000 USD)

	2005	2006	2007	2008	2009
<i>Total foreign trade</i>	-1 854 347	-6 666 787	-11 421 859	-18 580 927	-4 256 037
<i>Total foreign agrarian trade</i>	1 622 923	1 546 904	2 136 712	4 368 145	3 605 567
<i>I. Live animals and livestock products</i>	232 584	-252 575	-24 254	-918 612	-586 535
01 live animals	-40 011	-33 658	-47 802	-77 630	-57 294
02 meat and meat preparations	-12 017	-128 179	-58 760	-768 750	-433 803
03 fish and crustacean	-212 001	-355 458	-438 774	-613 293	-343 424
04 milk and milk products; eggs; honey	492 332	264 334	522 905	548 753	253 936
05 other animal products	4 280	385	-1 824	-7 692	-5 949
<i>II. Plant products</i>	1 170 360	1 279 460	865 860	4 114 900	3 014 910
06 seedings and other trees	-33 462	-47 664	-62 183	-98 310	-52 696
07 vegetables, root crops	27 521	60 284	42 962	-9 204	85 990
08 eatable fruits and nuts, citrus plants	-91 524	-116 380	-152 279	-409 902	-322 711
09 coffee, tea, spices	-106 825	-119 641	-153 673	-207 573	-148 470
10 cereals	1 326 556	1 294 763	677 145	3 557 270	2 761 643
11 flour-grinding products	4 213	5 165	2 670	131 435	58 834
12 oil seeds and fruits	61 604	221 636	534 034	1 192 254	661 704
13 varnishes, resin (pitch)	-19 897	-21 116	-24 616	-43 407	-31 838
14 plant materials	2 174	2 412	1 801	2 337	2 456

	2005	2006	2007	2008	2009
<i>III.15. Animal or plant fats and oils</i>	<i>383 195</i>	<i>780 313</i>	<i>1 329 805</i>	<i>1 332 877</i>	<i>1 149 801</i>
<i>IV. Finished food industry products</i>	<i>-163 217</i>	<i>-260 294</i>	<i>-34 698</i>	<i>-161 020</i>	<i>27 391</i>
16 preparations from meat, fish	-74 903	-95 745	-88 201	-129 339	-28 626
17 sugar and sugar confectionery	31 218	83 443	122 946	97 144	85 816
18 cocoa and cocoa preparations	12 626	36 989	83 195	144 104	109 870
19 preparations from cereals	44 994	39 931	56 949	92 179	89 991
20 products of fruits, vegetables processing	8 594	-58 177	784	-119 783	-40 887
21 other mixed foodstuffs	-250 153	-286 634	-356 647	-476 310	-263 390
22 alcoholic and non- alcoholic beverages	303 814	227 786	238 822	224 333	216 130
23 remains and wastes	28 073	14 577	160 999	241 665	89 094
24 tobacco	-267 478	-222 464	-253 545	-235 014	-230 608

Source: State Statistical Committee of Ukraine (Derzhkomstat) www.ukrstat.gov.ua

6) Losing Russian and winning Arab markets: food for thought

Russia is and has always been Ukraine's main agricultural export market, although food exports have dropped by 50 per cent between 1996 and 2001. The two countries bear similar characteristics and product profiles, therefore in the long run Russia will become more of a competitor than a good export market for Ukraine. So far Russia realizes enormous profits from oil and natural gas exports, therefore there is no need to incite agricultural production as long as agricultural products can be obtained at much lower prices, compared to the costs of domestic production. As for Ukraine, energy imports coming from Russia are needed to be compensated partially by agricultural products. The best prospects for Ukraine are the Middle Eastern countries with great oil reserves but insignificant agricultural sectors. The political leverage of these countries is also incomparable with Russia's influence. The problem is that energy transport systems are less developed in that direction and transport distances are greater for agricultural products, although the possibility of cheap maritime transport might seriously improve the positions of agricultural areas located near ports. Middle Eastern export shares in plants have increased significantly in the past few years. The increased exports of raw materials for biodiesel production since 2006 to the European Union can also be considered promising. Russian export dependence on alcoholic beverages, meat and milk products (Table 11) is still remarkable. Figuratively speaking, the Muslim Middle East will never be an alternative for Ukrainian vodka (*horilka*) and bacon (*ukrainski сало*).

Apart from productivity (sugar and meat industry) and export demands (sunflower, rape, wheat, maize), the changes in domestic demands play an important role in the restructuring of agricultural profiles. As the solvency of the population has worsened, the consumption of butter, cheese, eggs and meat products have also dropped by the end of the 1990s, while the importance of vegetables, potato and milk in the nation's food intake has grown significantly. These structures have remained prevalent until now. Potato consumption as the main source of sustenance is not only visible in the western agricultural areas, but also in the industrial Eastern Ukrainian regions. This is directly linked to the local population's solvency and economic situation (*Figure 12*).

Figure 12
Changing of potato supply per capita, 1990–2006



Source: State Statistical Committee of Ukraine (Derzhkomstat) agricultural statistical yearbooks.

In the Soviet planned economy, the products of agricultural enterprises were transferred directly to the processing plants. This cooperation was replaced by informal capitalist structures after the transition, which are still dominant for vegetables (*Table 14*). Half of cereals and a considerable share of oil seeds and cotton were traded on local markets or sold directly from the producers to residential customers. In the case of milk, dairy products and sugar-beet direct procurement remained the main way of buying up goods, therefore the situation of these sectors is directly linked to the situation of processing industries. Since processing plants in the 1990s were having serious liquidity problems, they could not pay for raw materials. The speculative tolling became widespread at that time (OECD 2004). Under a tolling contract Western companies of solid capital have bought up raw materials from the producers and sold it to the local processing plants on credit, which only virtually increased foreign trade turnover without actual movement of goods. Processing plants in the 1990s were privatised and, unlike in Hungary, given to the producers for free or at very low prices. Production and processing were not unbundled and attracting foreign investments became extremely difficult because of the complicated ownership structures involved (Vass 1997).

Table 14
Channels of sale of agricultural products in Ukraine
(percentage)

Product	Channel of sale	1990	2000	2006
Grain Crops	To processing enterprises	80.4	4.0	4.6
	At local market	3.2	34.8	9.9
	Directly to the population	13.2	20.6	3.7
	Other channels	3.2	40.6	81.8
Oil crops	To processing enterprises	98.9	2.4	4.0
	At local market	0.3	46.4	9.1
	Other channels	0.0	41.1	86.2
Sugar-beet	To processing enterprises	100.0	93.0	91.0
Potato	To processing enterprises	85.1	16.9	11.0
	At local market	9.4	44.8	18.4
	Directly to the population	5.2	20.4	2.7
	Other channels 1	0.3	17.9	67.9
Vegetables	To processing enterprises	89.4	13.3	15.6
	At local market	8.0	47.0	27.3
	Directly to the population	2.6	21.1	2.2
	Other channels	0.0	18.6	54.9
Livestock and poultry	To processing enterprises	94.8	21.6	35.2
	At local market	1.8	38.4	9.1
	Directly to the population	3.3	31.9	3.0
	Other channels	0.1	8.1	52.7
Milk and milk products	To processing enterprises	99.1	66.3	88.3
Eggs	To processing enterprises	98.1	20.0	0.3
	At local market	1.3	66.2	27.0
	Directly to the population	0.4	5.9	1.2
	Other channels	0.2	7.9	71.5
Wool	To processing enterprises	100.0	28.7	43.5
	At local market	0.0	51.1	8.4
	Directly to the population	0.0	13.5	0.3
	Other channels	0.0	6.7	47.8

Source: State Statistical Committee of Ukraine (Derzhkomstat) agricultural statistical yearbooks.

According to official statistics, the Ukrainian agriculture and food industry has attracted insignificant volumes of foreign direct investment (FDI) in 2008. The share of the agriculture, food and tobacco industry in total foreign direct investments was 2.2 per cent (USD 803 million) and 4.6 per cent (USD 1655 million), respectively. The share of the agriculture and food industry in FDI is much lower than their real weight in the economy. The share of these two industries in total capital exports was the same as for metallurgy: 0.2 per cent. Taking the Hungarian capital investments of the Donbas group into account, the credibility of these data can be questioned.²

In reality the importance of foreign capital in the Ukrainian agriculture and food industry is a lot higher than official data would suggest. The presence of illegal or semi-legal foreign investments is best reflected in the rapid growth of oil seed, especially sunflower and rape production. The European biodiesel lobby is well represented in Ukraine, influencing the Hungarian oil seed sector as well. A good example of this is the significance of Ukrainian rape seed exports to Hungary, or the disassembling of the vegetable-oil factory in Nyírbátor and its relocation to Dnipropetrovs'k. Bunge has quickly adapted to the new market conditions by reopening one of the biggest vegetable-oil plants in Central and Eastern Europe in Martfű in 2008 for rape-seed processing. The importance of rape-seed re-export to Germany cannot be questioned, although evidence for these transactions can only be found in the trading books of multinational companies.

The share of tenured and cultivated land by foreigners is quite remarkable, although land cannot be legally purchased by foreign nationals. In Ukraine there is trading moratorium for the land market, in general. The difference between land prices in Ukraine and in the European Union can be twentyfold, therefore it is necessary to protect strategically important arable land by legal means. Foreign land ownership is in line with global tendencies and has two main purposes. On the one hand, EU member states, especially Germany, lease land for growing raw materials for biodiesel production. On the other hand, oil-producing countries located in desert areas are trying to put their hands on land in order to secure their food supply for their growing population. With renting over 250 000 hectares of arable land, Libya is one of the biggest leaseholder in Ukraine. Israeli capital is traditionally present in Ukrainian agriculture, because of strong cultural ties between the two countries. The grain crops boom or the boom of the sugar industry in the 19th century was initiated by Jewish capital investments. The-long term land rent for non-utilisation purposes

² Nota bene, 86 per cent of Ukrainian foreign capital investments was related to real estate in 2008, 83 per cent came from the Donets region and was directed to Cyprus. In 2009, 20 per cent of foreign capital came from Cyprus thanks to round-tripping, meaning that investors themselves from tax havens are actually Ukrainians or Russians.

by multinational companies is also important, as they are speculating on rising land prices, because of globally increased food demands.

7) Global economic crisis – shaping the future of an agrarian country?

Agricultural production is essential regardless of economic crises, because there is always a more stable and secure demand for food than for industrial products or real estate. The effects of the global economic crisis on Ukrainian agriculture cannot be stipulated precisely, because detailed data is not yet available. We will be able to calculate the actual damage when detailed information will be produced on agricultural production and employment. Nevertheless, some very basic conclusions can be drawn from data already published, which I will try to summarize below.

The share of agriculture in GDP has significantly increased in 2009, because this was the only sector in Ukraine which was able to grow in this period. Compared to a 30 per cent decrease in industrial production and a 50 percent drop in the construction industry, agricultural growth was almost 9 per cent in Q3. Agriculture has unquestionably become the main driving economic force of the Ukrainian economy in 2009.

Although there were no serious setbacks in agricultural production, export volumes were deeply affected by the crisis. This relatively good position is partly due to a calm before the storm: the ripple effect as a result of financing and credit sources running dry in 2009 and the social crisis unfolding in 2010 has not reached agriculture yet. Agricultural output in 2010 will surely be affected by the setback in agrarian export revenues and the shortage of capital in 2009, resulting in cancelled investments (fertilizers, seeds, etc.). As opposed to the 1990s, this setback will be caused by factors coming from the global market and not from domestic structural problems: these problems have only been amplified by the global economic crisis. When the world economy resumes growth Ukrainian agriculture will have the opportunity to grow as well, since it has mostly adjusted to market conditions during the time of the transition period. Investors seem to share this opinion as agriculture is seen nowadays as one of the most attractive sectors for investments in Ukraine.

Export markets have declined in 2009 because of the fall in the world economy. Total Ukrainian gross exports have dropped by 50 per cent on 2008 levels. The food sector has stabilized its position. As a result, its share of total exports has doubled within a short period of time. In 2009 the agriculture and food industry accounted for 25 per cent of gross exports. Despite this advantageous position, net export revenues in agriculture and the food industry have decreased by 18 per cent compared to

2008. The 31 percent fall in gross food exports was not followed by a bigger net decrease only because gross imports also dropped by 40 per cent. The setback was most striking in the import of processed and meat products (*Table 15*).

Agriculture already had a 16 percent share in exports by 2008, but this was mainly due to the abundant yields that year. Grain crops yields exceeded 50 million tons: this output is unparalleled since the end of the Soviet era. Grain exports was therefore five times greater, oil crops exports was twice as big as in 2007, and the sunflower yield also registered a record volume. Except for sugar-beet and all plant exports have increased significantly in 2008. The processing industry also experienced a boom in 2008: the exports of sugar, confectionery, milk and alcoholic beverages has reached new heights. The 31 percent fall in agricultural and food exports cannot be explained fully the economic crisis: the other reason is that the exceptionally good yield of 2008 was followed by an average output in 2009.

There were no structural changes in agricultural exports in 2009, since all sectors have experienced a decrease in exports due to various reasons. Among agricultural products the most profitable ones suffered the highest losses. Exports of oil crops was down by 45 per cent, vegetable oils and animal fats by 27 per cent, grain crops by 23 per cent. This was also caused by bad weather conditions in that year. These products are responsible for the 60 percent fall in agricultural and food exports in 2009. Processed food products, on the other hand, experienced a 35 percent slide, beverage exports fell by 35 per cent and milk products and egg exports fell by 46 per cent in 2009. Since these products are not directly linked to weather conditions, this regression was mainly caused by the economic crisis. Milk and alcoholic-beverage exports were below the 2005 levels. These sectors are closely linked to Russian exports, but Russia experienced serious financial problems in 2009 as well. Since only 36 per cent of the total decline was due to these sectors, the conclusion can be drawn that gross agricultural exports would have fallen by 20 per cent even if there was no economic crisis. The aggregated decrease caused by the crisis was approximately 10 per cent.

Agricultural output did not decline compared to 2008 because household plots were able to compensate for losses due to the crisis, and for the relatively bad yields of agricultural enterprises caused by bad weather. Although yields were worse in 2009 than in 2008, there were no significant extremities (a drought for instance) in 2009, and as a result the output was relatively a good one. However, certain changes in the production structure indicate the effects of the crisis. The output of self-sufficient household plots increased by almost 0.5 per cent, while the production of agricultural enterprises decreased. This phenomenon is unprecedented since the grain crisis of 2003 and the transition period. This can only partially be explained by the fact, that the production levels of agricultural enterprises usually increases significantly immediately after years of

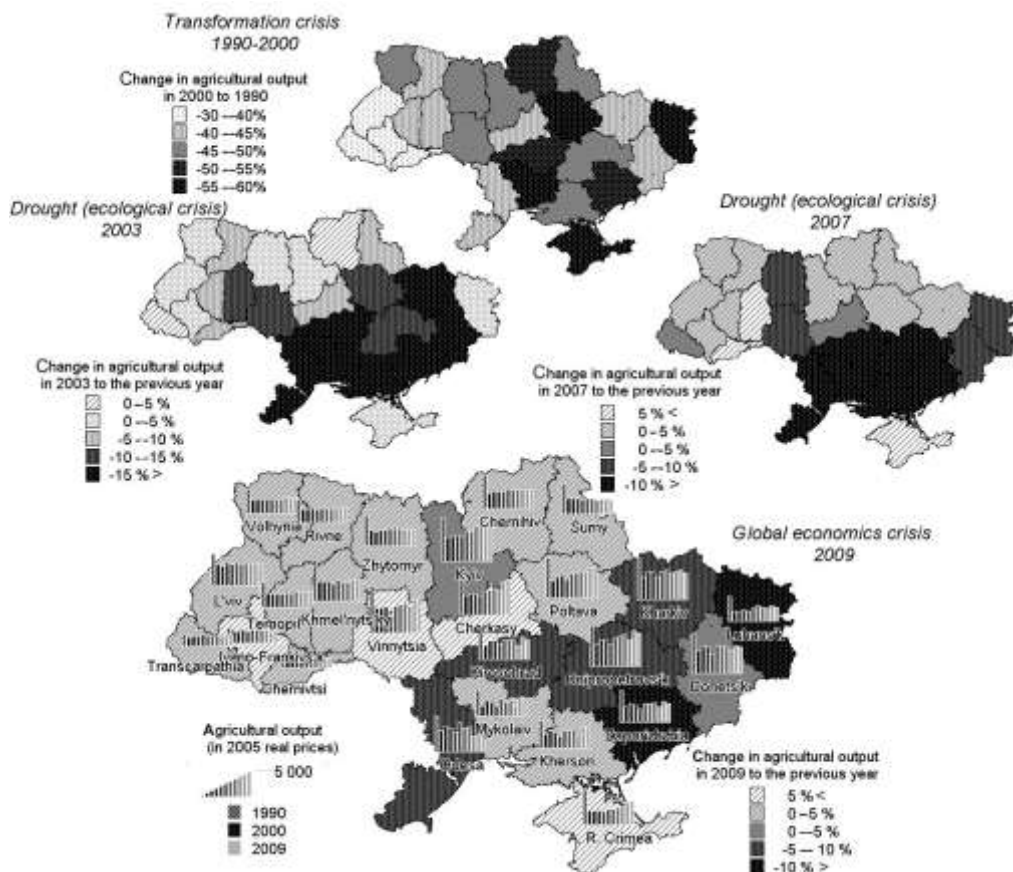
droughts (2003, 2007), but in the following years (2004 or 2009) output falls back to normal levels (*Figure 13*). Agricultural enterprises are more affected both by market challenges and bad weather conditions than household plots.

Table 15
Decline of agrarian foreign trade of Ukraine in 2009
(percentage)

	Exports in 2009 to the previ- ous year	Imports in 2009 to the previ- ous year	Exports in 2009 to 2005	Imports in 2009 to 2005
<i>Total foreign trade</i>	47	42	92	99
<i>Total agrarian foreign trade</i>	69	61	174	146
<i>I. Live animals and livestock products</i>	59	62	63	210
01 live animals	79	74	184	146
02 meat and meat preparations	83	59	40	298
03 fish and crustacea	397	58	151	162
04 milk and milk products; eggs; honey	54	85	68	195
05 other animal products	59	68	41	147
<i>II. Plant products</i>	71	66	235	185
06 seedings and other trees	61	54	269	159
07 vegetables, root crops	181	68	376	525
08 eatable fruits and nuts, citrus plants	69	76	116	228
09 coffee, tea, spices	86	72	268	142
10 cereals	77	61	206	155
11 flour-grinding products	42	36	261	70
12 oil seeds and fruits	55	51	576	160
13 varnishes, resin (pitch)	139	74	207	161
14 plant materials	83	37	112	108
<i>III. 15. Animal or plant fats and oils</i>	73	45	243	135
<i>IV. Finished food industry products</i>	65	60	127	111
16 preparations from meat, fish	77	35	114	58
17 sugar and sugar confectionery	82	73	122	62
18 cocoa and cocoa preparations	68	64	142	102
19 preparations from cereals	68	50	170	145
20 products of fruits, vegetables processing	60	50	98	143
21 other mixed foodstuffs	69	58	144	112
22 alcoholic and non- alcoholic beverages	65	44	87	128
23 remains and wastes	52	67	180	146
24 tobacco	74	86	183	111

Source: State Statistical Committee of Ukraine (Derzhkomstat) www.ukrstat.gov.ua and own calculations.

Figure 13
Dynamics of agricultural output in the crisis period



Source: State Statistical Committee of Ukraine (Derzhkomstat) www.ukrstat.gov.ua agricultural statistical yearbooks and own calculations.

Urbanized areas around Kiev and in the eastern regions were the most affected by the drop in agricultural production. Agricultural enterprises in these areas had a relatively advantageous position because their market outlets rapidly expanded during the post-2000 boom. However, western and mid-western regions experienced significant growth in 2009. For instance, agricultural production exceeded 1990's levels by 4 per cent in the Cherkassy region, but this also shows that Cherkassy was the only region which was able to overcome the devastating effects of the transition period only by 2009. The picture is more heterogeneous in the south. While Kirovohrad and Odessa oblasts were hard hit by the economic depression, Crimea, Mikolayiv and Kherson regions were able to grow, mainly because of the relatively good grain yields. The drought of 2007 caused serious trouble for grain crops and sunflowers, which are the

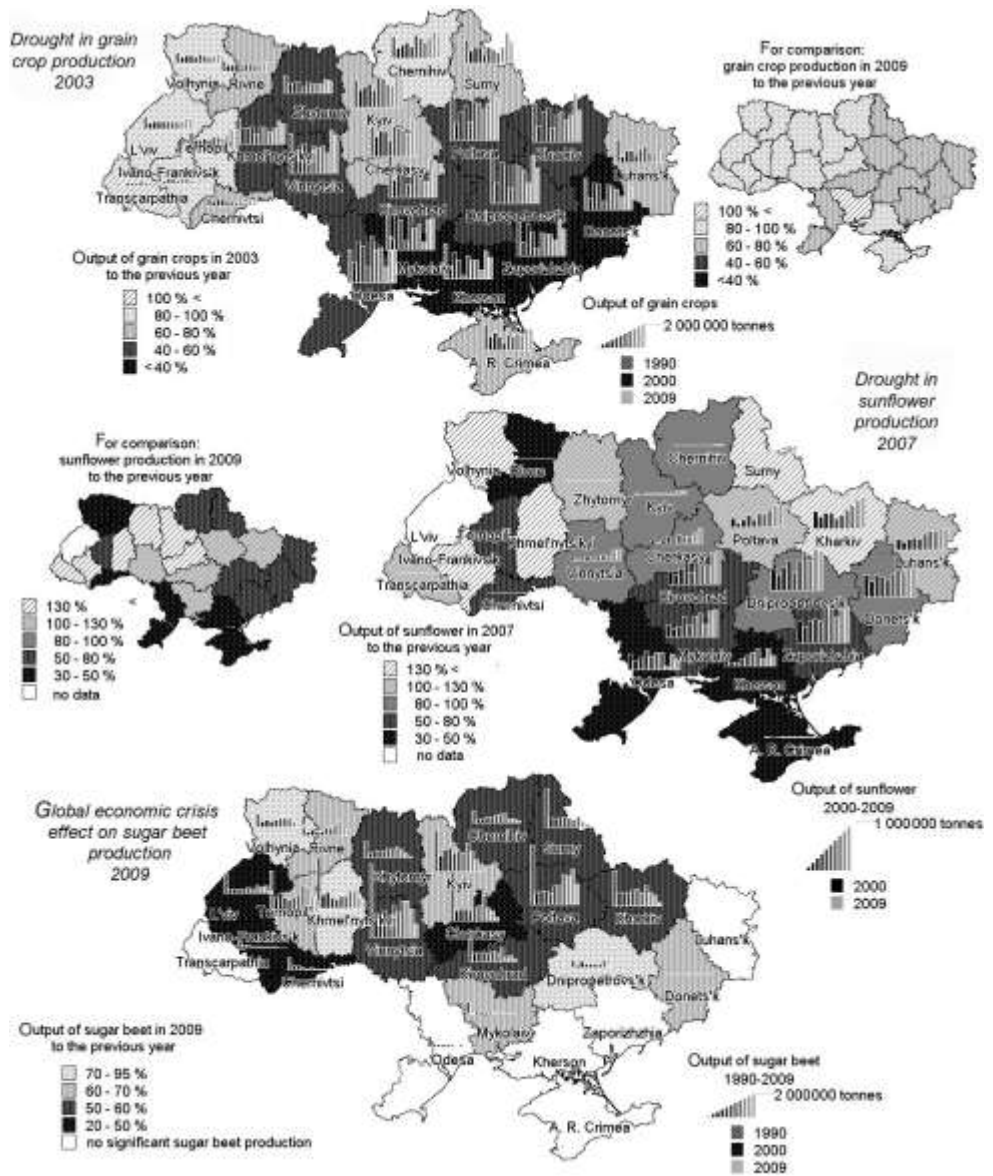
main products of the steppe regions. This bad year was followed by remarkably good yields in 2008. The results of 2009 were below 2008 levels, causing a setback in agricultural production in the steppe. Bad weather conditions in the steppe regions and the effects of the economic crisis on urbanized areas both influenced East Ukraine in 2009. As a result, agricultural production in Luhansk and Zaporizhyhya regions fell back to dramatically low levels; something unprecedented in years with average weather conditions since 2000. Since this fall was a result of economic and environmental factors, the affected zones are not as clear cut, as they were in the years of drought in 2003 and 2007 (Figure 13).

Cereal and sunflower production is highly affected by the global crisis, as most of the production is being exported. 2010 will probably be a hard year for producers because their export revenues have significantly decreased in 2009. However, the long and mid-term prospects for cereal and sunflower production are very good. Regardless of economic and weather conditions, the output of non-exported potatoes and vegetables (mostly produced by small farms) was stable in 2009. Sugar-beet production, however, suffered a drastic setback in 2009. The world economic crisis will probably be the *coup de grâce* for the sugar industry. Small factories using outdated technologies were shut down countrywide. There is a high chance that the sugar industry will not recover even after the crisis (Figure 14).

Although animal husbandry was among the main losers of transition, the economic crisis of 2009 did not seriously affect this sector as tendencies from previous years remained in place: growing sub-sectors continued to grow, while shrinking ones continued to shrink at a relatively slow pace (Figure 15).

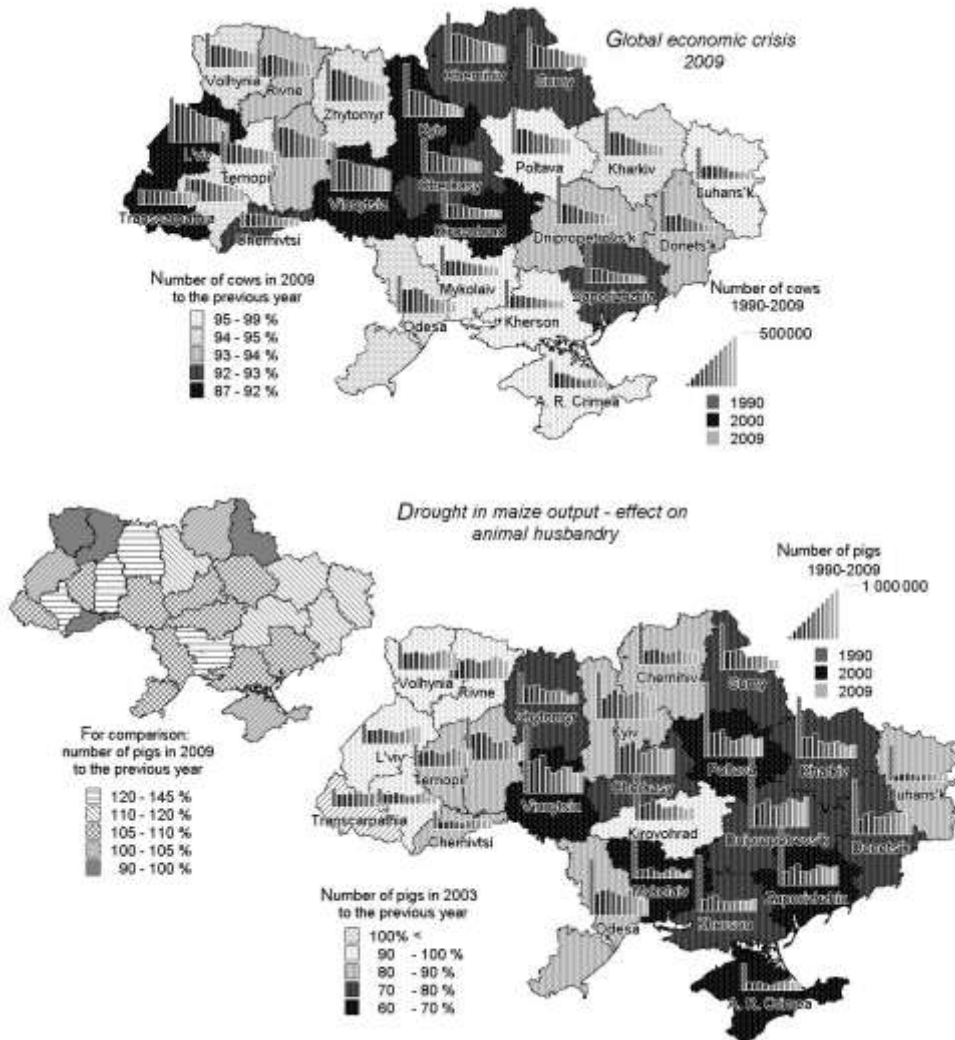
As animal food and sugar industries (beetroot slice is a by-product of sugar processing and one of the most important fodders of cattle) declined, the gradual decrease of cattle stock continued in 2009. Despite the fact that milk production volumes did not change from 2008 to 2009, cattle stocks decreased by 6 per cent. The cattle stock is decreasing by 5-10 per cent per annum, but in medium-terms domestic demand should put a stop to this decline. In some regions there was even a temporary growth in cattle stocks in 2001 and 2007, although this only slowed down the pace of the decline. Pig stocks increased by 9 per cent in 2009. While pig stocks in regions with considerable stocks such as Vinnitsa, Cherkassy, Kiev, Odessa and Dnipropetrovs'k usually decreased in years of bad weather, there was no such decline in 2009 (Figure 15). Regardless of the economic crisis and in line with previous trends, goat, sheep and poultry stocks have continued growing in 2009.

Figure 14
Dynamics of crop production in the crisis period



Source: State Statistical Committee of Ukraine (Derzhkomstat) www.ukrstat.gov.ua agricultural statistical yearbooks, statistical yearbooks and own calculations.

Figure 15
Dynamics of animal husbandry in the crisis period



Source: State Statistical Committee of Ukraine (Derzhkomstat) www.ukrstat.gov.ua agricultural statistical yearbooks, statistical yearbooks and own calculations.

Trends of agricultural output clearly show the resistance of agrarian sector to the effects of the 2009 economic crisis, but also indicate its sensitivity to weather conditions. The transition crisis of the 1990s caused the Ukrainian agriculture sector to decline to a very low level, reaching the bottom one year after the Russian financial crisis of 1998. The sector started its rapid growth from 2000 when setbacks caused by bad weather resulted in a much worse decline than the one caused by the economic crisis in 2009. Export revenues, however, have decreased sharply. As a

result, the effects of capital shortages might have a delayed impact on agriculture. Nonetheless, the Ukrainian economy is already showing signs of recovery.

8) Long term perspectives – after economic crisis, before ecological crisis

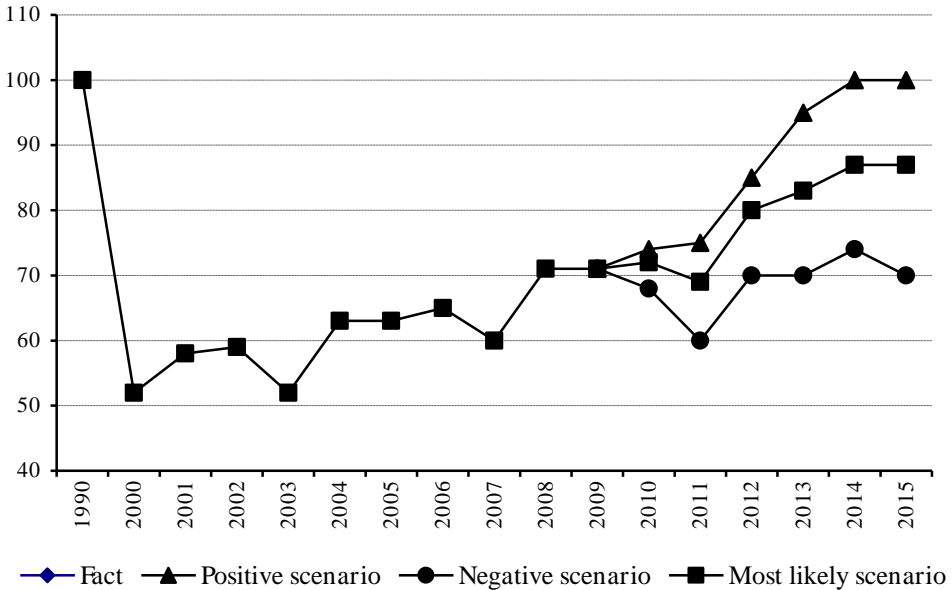
Agricultural output is expected to grow significantly only from 2011 because of arrears of revenues and sources of credit drying up in 2009. The sector's future is strongly dependent on the weather conditions, since another year of drought can easily cause serious trouble for the agriculture industry already weakened by the economic crisis. On the other hand, crop failures caused by unfavourable weather conditions can drive up prices while destroying producers or giving some of them advantages, but also improving the liquidity states of Ukrainian agriculture. Smaller agricultural enterprises and farms might be bought up by bigger ones, increasing land structure concentration.

Agriculture's share in employment will continue to decrease. Temporarily increased unemployment caused by economic problems is eased by the primary sector, just like in the 1990s. The increased share of household plots in agriculture fully supports this thesis. These processes can be understood by knowing the social and economic effects of previous crises.

The negative effects of the economic crisis can only determine Ukrainian agriculture's position for 2-3 years at most. Ukraine's position on the global agricultural market will not be questioned in the long run because of its excellent agro-ecological conditions, especially its great share in good quality soils. Taking into account the aftermaths of the global economic crisis, the probability of extreme weather conditions occurring every 3-4 years and the increasing global demand on food, my estimate is that Ukrainian production can reach the 1990's levels in 4-5 years or, at worst, remain at current levels until 2015. The most likely scenario is that output will continue to grow, but in five years it will still lag 10 per cent below 1990's levels (*Figure 16*). The share of cultivation will grow in production profiles and becomes the main driver of growth in agriculture. Responding to growing demands, the structure of cultivation will continue to become simpler, with a growing share of grain and oil crops (sunflower, rape). Export markets can change quickly, therefore product profiles also must change in the most flexible way. A good example for this is the rapid boom of rape-seed production, in reaction to growing Hungarian demands in the past few years. Market transactions are barely transparent because significant shares of trades are considered to be intercompany deals, only visible within the books of multinational companies.

There is no further decrease expected in animal production, moreover, pig, goat, poultry and sheep farming are in a position of possible growth. This can also trigger an increase in production.

Figure16
Scenarios for agrarian output until 2015



Source: State Statistical Committee of Ukraine (Derzhkomstat) www.ukrstat.gov.ua agricultural statistical yearbooks, statistical yearbooks and own calculations.

The agricultural sector will not be affected in the long term by economic factors, rather more by the change in environmental conditions, intensified desertification and extreme weather conditions caused by global warming. What we saw of these devastating factors in the 2000s was only the tip of the iceberg. The consequences of future ecological crises are completely unforeseeable as they will not be limited to agricultural production levels, but will also harshly affect the social setup of the population and migration processes.

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Appendix 1
Land use in Ukraine
(million ha)

	Total agricultural land																					
	Hay fields	Pastures	Fruit gardens	Vine yard	Arable land																	
					Arable land	Fallow and Sown area - Harvested area	Harvested area	Grain crops					Industrial crops					Vegetables and potatoe	Fodder crops			
								Grain crops	Winter crops	Wheat	Summer crops	Barley	Maize	Industrial crops	Sugar-beet	Sunflower	Rape			Soya	Flax	
1985	42,4	-	-	0,92	0,20	-	-	32,7	16,1	7,6	6,7	8,5	2,8	2,5	3,7	1,6	1,5	-	0,07	0,21	2,2	10,7
1990	42,0	-	-	0,85	0,18	33,4	1,0	32,4	14,6	8,6	7,6	6,0	2,2	1,2	3,8	1,6	1,6	0,09	0,09	0,17	2,1	12,0
1995	41,9	-	-	0,79	0,16	-	-	31,0	14,2	6,3	5,3	7,8	4,1	1,2	3,7	1,5	2,0	0,05	0,03	0,10	2,2	10,9
2000	41,8	-	-	0,43	0,11	31,4	4,2	27,2	13,6	6,3	5,3	7,3	3,6	1,4	4,2	0,9	2,9	0,21	0,07	0,02	2,3	7,1
2001	-	-	-	0,40	0,10	31,4	3,4	27,9	15,6	8,3	6,8	7,3	3,6	1,3	3,8	1,0	2,5	0,12	0,08	0,03	2,2	6,4
2002	41,8	2,4	5,5	0,37	0,10	31,3	3,8	27,5	15,4	8,2	6,8	7,3	4,0	1,3	4,1	0,9	2,8	0,08	0,11	0,03	2,2	5,9
2003	41,8	-	-	0,34	0,10	31,2	6,1	25,1	12,5	2,9	2,4	9,6	5,1	2,2	5,4	0,8	4,0	0,07	0,21	0,03	2,2	5,1
2004	-	-	-	0,32	0,10	31,0	4,3	26,8	15,4	6,4	5,1	9,0	4,2	2,5	5,0	0,7	3,5	0,12	0,27	0,04	2,1	4,2
2005	-	-	-	0,30	0,10	30,9	4,8	26,0	15,0	7,3	6,2	7,7	4,0	1,7	5,3	0,7	3,7	0,21	0,44	0,03	2,0	3,7
2006	-	-	-	0,28	0,09	30,8	4,9	25,9	14,5	5,9	5,1	8,6	4,9	1,8	6,1	0,8	4,0	0,41	0,75	0,01	2,0	3,3

