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## **Structural changes in agriculture of Ukraine: results and perspectives**

**Abstract.** The paper examines structural changes in the Ukrainian agriculture during the reform period. The tendencies in the agricultural sector and directions of its transformations are considered. It has been concluded that the multifunctional model of agriculture should be implemented in Ukraine, because it can create good opportunities for an increase in the competitiveness of the agricultural sector, a solution of socio-economic issues of the rural areas and a provision of an integrated development of rural areas in the long-term perspective.

**Key words:** agriculture, agricultural reforms, Ukraine.

### **Introduction**

The transition from a command and control to a market economy led to significant structural changes in the agriculture of Ukraine. The agricultural reforms were aimed at the creation of new organizational and legal forms which could operate effectively under the existing economic system. The reforms had an impact on both agricultural production and the economic efficiency of the sector. For a long time, agriculture has operated under the socialist economic model. Accordingly, the majority of decisions regarding the production activities of agricultural enterprises were taken centrally. In contrast, in a market economy, they have to make decisions by themselves. So, the main task for agricultural producers is to adapt to these economic conditions. It is a well known fact that Ukraine has a high agricultural potential. Though, it is not fully used. In this context, it is important to review reform processes and to identify perspectives of the agricultural sector in the country.

The aim of this paper is to describe the main tendencies in agriculture of Ukraine, to analyze structural changes in the agricultural sector, and to define directions for its long-term development. The paper is based on data from the State Committee of Ukraine for Statistics. The descriptive analysis is used to identify main tendencies and perspectives of agriculture in Ukraine.

### **Main tendencies in agricultural production**

Agriculture remains one of the major branches in the economy of Ukraine, although it has undergone the most significant reduction as compared with other economic branches. While in 1990 the portion of agriculture in the country's gross value added was 25.5%, in 2010, it went down to 8.2% [Statistical... 2011].

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In 1990-2010, the gross agricultural output (in fixed prices of 2005) was reduced from 145.9 billion hryvnya (UAH) to 100.5 billion hryvnya. This fall in output was caused by a significant decrease of the share of livestock production: from 54.4% in 1990 to 41.6% in 2010. That is why crop production became predominant in the structure of gross agricultural output and its portion amounted to 58.4% in 2010. In 2008-2010, as compared with 1990-1992, the largest growth in the volumes of production took place for sunflower seeds and vegetables. They rose by 180.6% and 36.4% respectively (Table 1). To a lesser extent, the production volumes went up for potatoes (by 12.3%) and grain and leguminous crops (by 8.1%). Actually, the above mentioned increase was caused by the growing demand for these crops. The opposite tendency was observed for sugar beet production which decreased drastically for the same period: from 36.4 million tonne to 12.4 million tonne. This was due to the decline in the domestic demand for sugar, high cost nature of sugar beet production, inefficient processing facilities, as well as increased competition from imports [Achieving... 2003].

Table 1. The gross yield of main agricultural crops (all types of farms), thousand tonne

Crop	Period							2008-2010 as % of 1990-1992
	1990- 1992	1993- 1995	1996- 1998	1999- 2001	2002- 2004	2005- 2007	2008- 2010	
Grain and leguminous crops	42740	38872	28838	29582	33616	33856	46196	108.1
Sugar beet (factory gate)	36405	30502	18732	14279	14815	18289	12418	34.1
Sunflower seeds	2336	2168	2232	2834	3525	4735	6554	280.6
Potatoes	17186	17280	16839	16635	18609	19344	19305	112.3
Vegetables	5969	5692	5243	5684	6443	7396	8143	136.4

Source: [Agriculture... 2011].

These tendencies in crop production were linked with changes in the structure of sown area of agricultural crops. Between 1990 and 2010, the total sown area shrank from 32.4 million ha to 27.0 million ha. The highest share in the planted area was occupied by grain and leguminous crops (45.0% in 1990, 56.0% in 2010). For 1990-2010, the largest growth of crop land was observed for soya (from 93 thousand ha to 1076 thousand ha) and rapeseed (from 90 thousand ha to 907 thousand ha). Also, the planted area increased significantly for winter barley (by 180.5%), sunflower (by 179.5%), and corn for grain (by 119.5%). At the same time, the greatest decline occurred in the sown area of fodder crops, sugar beet, and winter wheat: by 78.3%, 68.8% and 18.9% correspondingly.

It should be noted that tendencies in yields were almost identical for agricultural crops (Figure 1). Between 1990-1992 and 1996-1998 (or 1999-2001), all crop yields dropped essentially. Later, yields gradually increased and, in 2008-2010, exceeded those in 1990-1992. During the period, the biggest growth occurred for sugar beet, from 23.5 tonne per hectare to 31.7 tonne per hectare and vegetables, from 12.9 tonne per hectare to 17.7 tonne per hectare.

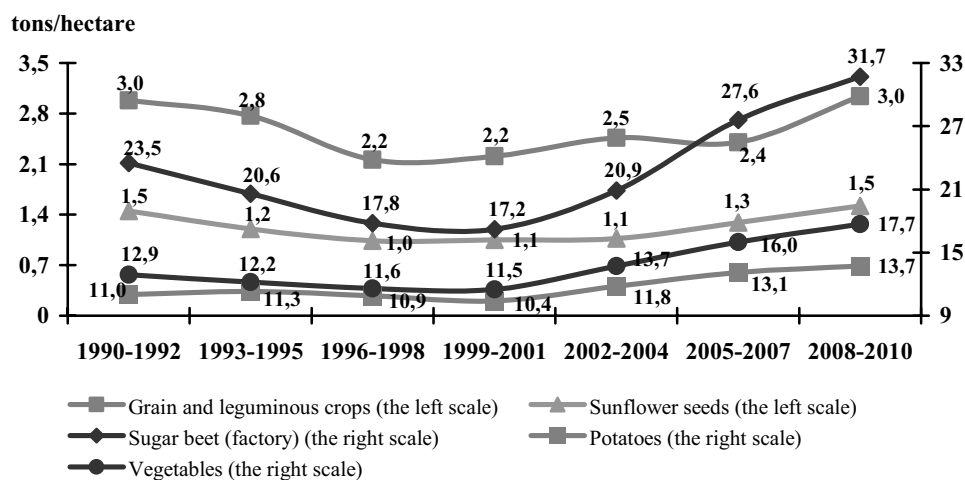


Fig. 1. Yield of main agricultural crops (all types of farms), tonne per hectare of the harvested area  
Source: [Agriculture... 2011].

In 1990-2010, the production of livestock products went down significantly: for beef and veal by 80.0%, for pork by 62.5% and milk by 54.3% (Table 2). The main reason for this change was the sharp decline in demand for animal products precipitated by a significant drop in real per capita income in Ukraine [Achieving... 2003]. The only exception was poultry, for which an increase in the volume of production was observed for the period 1990-2010: for poultry meat from 0.7 million tonne to 1.0 million tonne (or by 42.9%) and for eggs from 16.3 billion pieces to 17.1 billion pieces (or by 4.9%). This is because poultry is characterized by faster capital turnover. Also, the demand for poultry meat grew essentially due to its lower price as compared to other types of meat.

Table 2. Production of main livestock products (all types of farms)

Product	Year									
	1990	1995	2000	2005	2006	2007	2008	2009	2010	2010 as % of 1990
Meat - total (in slaughter weight), mil. tonne	4.4	2.3	1.7	1.6	1.7	1.9	1.9	1.9	2.1	47.7
including:										
- beef and veal	2.0	1.2	0.8	0.6	0.6	0.5	0.5	0.5	0.4	20.0
- pork	1.6	0.8	0.7	0.5	0.6	0.6	0.6	0.5	0.6	37.5
- poultry meat	0.7	0.2	0.2	0.5	0.6	0.7	0.8	0.9	1.0	142.9
Milk, mil. tonne	24.5	17.3	12.7	13.7	13.3	12.3	11.8	11.6	11.2	45.7
Eggs, billion pieces	16.3	9.4	8.8	13.0	14.2	14.1	15.0	15.9	17.1	104.9

Source: [Agriculture... 2011].

Between 1990 and 2010, the number of cattle was reduced from 24.6 million heads to 4.5 million heads and pigs from 19.4 million heads to 8.0 million heads. So, in 2010, number of cattle and pigs contracted to 18.3% and 41.2% in comparison with 1990. For 1990-2000, the number of poultry decreased from 246.1 million heads to 123.7 million heads. Though, since 2005, it has had a clear upward tendency and reached 203.8 million heads in 2010 (or 82.8% of its level in 1990).

Considering the level of productivity of livestock and poultry, it should be noted that in 1990-1995 there was a significant drop in the relevant indicators, including the average daily weight gains of growing and fattening cattle (from 431 grams to 259 grams) and pigs (from 229 grams to 117 grams), the average annual milk yield per cow (from 28.6 centners to 22.0 centners) and the average annual eggs laying per hen (from 214 pieces to 171 pieces). Later, the situation has improved. In 2010, all above mentioned indicators exceeded their levels in 1990: average daily weight gains of growing and fattening cattle and pigs by 7.0% and 63.8% and the average annual milk yield per cow and the average annual eggs laying per hen by 42.7% and 31.3% respectively. Despite these positive changes, in absolute terms, however, the level of these indicators was quite low. This could be confirmed, for example, by comparing Ukraine and countries of the European Union [Bański 2008].

It is worth to note that an opposite processes took place in agricultural enterprises and household plots with respect to agricultural output production (Figure 2). In agricultural enterprises, it declined sharply: from 101.3 billion UAH in 1990 to 45.1 billion UAH in 2010 (or by 55%).

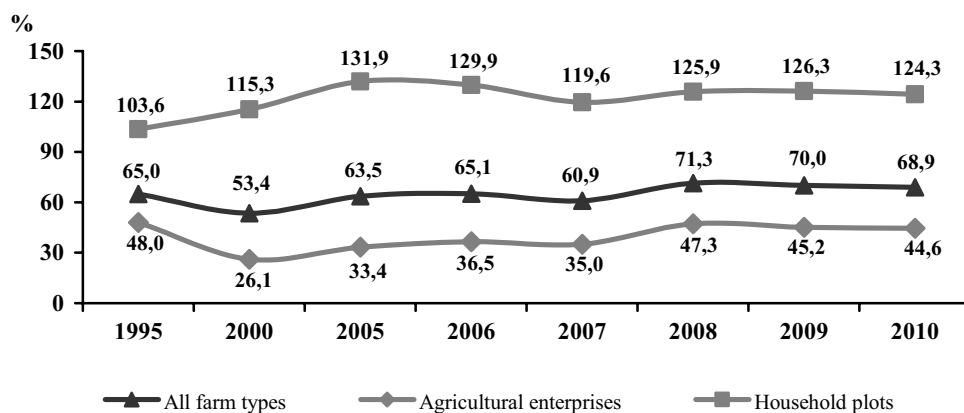


Fig. 2. Dynamics of gross agricultural output, by farm type, 2005 fixed prices, 1990 = 100%

Source: [Agriculture... 2011].

In contrast to agricultural enterprises, this indicator for household agricultural plots increased substantially. Its maximum rate was in 2005 (by 31.9% more than in 1990). After that, there was a slight decrease in agricultural output production in the household plots sector. Though, in 2006-2010, the indicator continued to surpass its level in 1990. As a result, the shares of agricultural enterprises and household plots in gross agricultural output changed significantly: from 69.4% and 30.6% in 1990 to 44.9% and 55.1% in 2010.

From our point of view, two approaches to development of Ukrainian agriculture could be identified. The first approach is related to agricultural enterprises. In general, compared with 1990, their share in production of main agricultural products decreased (Figure 3). Actually, they switched mainly to agricultural products which are in steady demand, are the most profitable and require relatively low capital costs (grain and leguminous crops, sunflower, etc.). The second approach is observed in household plots. They are chiefly focused on agricultural products which are characterized by a significantly lower level of profitability and high manual labor costs. The low level of production efficiency of such products in farm enterprises is connected with the use of old production technologies, the lack of modern storage facilities and the underdeveloped market infrastructure. Thus, for instance in 2010, the share of household plots in production of potatoes, vegetables, fruit and berries amounted to 97.4%, 88.1% and 83.6% respectively. Households also produced a large proportion of livestock products, especially milk (80.3%) and meat (44.9%). This approach should be considered as a means of survival of rural residents that have limited employment and income earning opportunities. It allows households to meet their basic needs in food products and get some cash income through the partial sale of own agricultural products on the market. This redistribution of agricultural production toward the household plots is not efficient because they are primarily based on manual labor. Consequently, it does not provide possibilities for the full use of the existing agricultural potential of Ukraine.

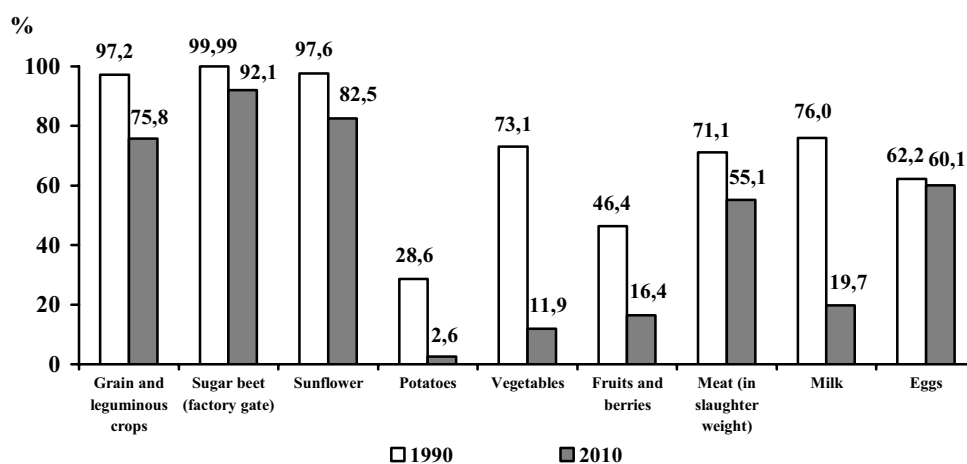


Fig. 3. Share of agricultural enterprises in production of main agricultural products, %

Source: [Agriculture... 2011].

### The peculiarities of reform processes in the agricultural enterprises

The main goal of agricultural reforms is creation of a competitive agricultural sector, capable of operating effectively in a market economy. The reform processes have had different impacts on the agricultural sector. First, they led to a large diversity in organizational and legal forms of agricultural enterprises and to a substantial growth in their

number. According to the State Committee of Ukraine for Statistics [Agriculture... 2011], 73.8% of agricultural producers were in 2010 individual farmers, 13.8% partnerships, 7.5% private enterprises and 1.7% cooperatives.

Second, the land ownership structure has changed significantly as well (Table 3). In 1990-2010, the area of agricultural lands owned by agricultural enterprises decreased by 46.8%. As a result, the share of these enterprises in the total agricultural land area dropped from 92.1% in 1990 to 49.5% in 2010. In 1990, the portion of state agricultural enterprises in the area of agricultural lands was 23.6%, while in 2010 it went down to 2.4%. During the same period, agricultural lands owned by individuals increased from 2.7 million hectares to 15.9 million hectares (5.9 times).

Table 3. Structure of agricultural lands, by farm type (at the end of year)

Land property	Year										2010 as % of 1990
	1990		1995		2000		2005		2010		
	mil. ha	%	mil. ha	%	mil. ha	%	mil. ha	%	mil. ha	%	
Agricultural lands - total	42.0	100,0	41.9	100,0	41.9	100,0	41.8	100,0	41.6	100,0	99.0
Agricultural enterprises	38.7	92.1	35.2	84.0	29.9	71.4	22.1	52.9	20.6	49.5	53.2
in that:											
- state	9.9	23.6	7.1	16.9	1.8	4.3	1.2	2.9	1.0	2.4	10.1
- non-state	28.8	68.6	28.1	67.1	28.0	66.8	20.9	50.0	19.6	47.1	68.1
Individuals	2.7	6.4	5.6	13.4	8.5	20.3	14.9	35.6	15.9	38.2	590
in that:											
household plots	2.5	6.0	3.9	9.3	4.3	10.3	4.7	11.2	4.9	11.8	196.0

Source: [Agriculture... 2011].

Third, after the completion of land sharing, a significant number of small agricultural enterprises was created (Figure 4). In 2010, the largest shares in agricultural lands had enterprises with the following agricultural land areas: 24.3% of land belongs to farms of acreage between 20.1 and 50.0 ha, 12.7% to those between 100.1-500.0 ha and 10.2% to having less than 5.0 ha. In total, the portion of land belonging to agricultural enterprises with the land area below 100.0 ha was 58.9%, while for enterprises with the land area more than 1000 ha it was only 10.1%. Of course, the existence of a large number of small land plots limits the possibilities for an effective use of agricultural lands.

Fourth, as it has been mentioned before, the volume of agricultural production decreased substantially, and its redistribution toward the household plots sector occurred during the reform period in Ukraine. What does it mean? It means that only the formal reorganization occurred in a substantial portion of agricultural enterprises. Farm restructuring was not fully implemented in these enterprises. Their organizational structures remained mostly at the same level, as they were in collective and state agricultural enterprises. Actually, the result of this process was only 'changing the sign on the door'.

Because these agricultural enterprises did not operate profitably, the above-mentioned redistribution in agricultural production occurred. So, these tendencies could be regarded as an insufficient adaptation of a significant share of agricultural enterprises to conditions of the market economy.

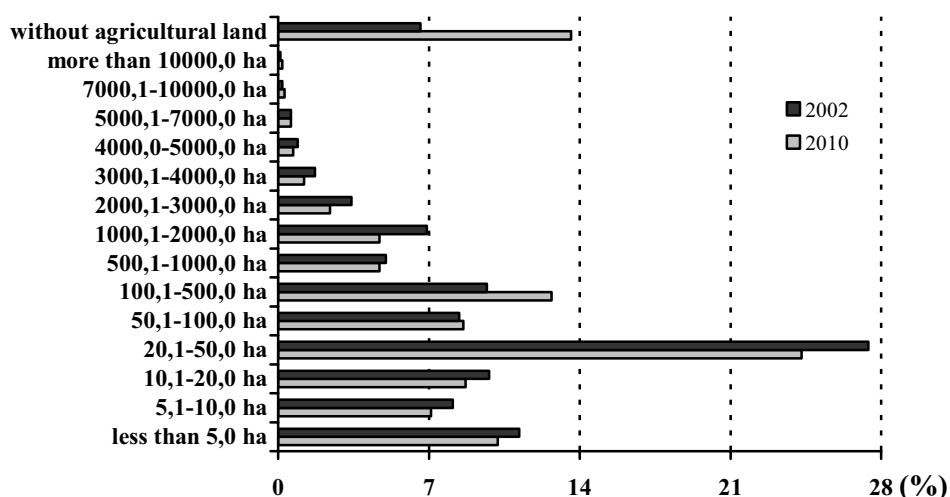


Fig. 4. Distribution of agricultural enterprises, by agricultural land's size

Source: [Agriculture... 2011].

A large part of farm enterprises had not only a small land area, but also other indicators which confirm limited opportunities for an effective farming. In 2010, an average statistical agricultural enterprise had 80 heads of cattle (including 47 heads of cows) and 141 heads of pigs (or 27.4, 15.9 and 12.3 times less than in 1990). A substantial decline happened with respect to the provision of farm enterprises with agricultural machinery and equipment. While in 1990 an average statistical agricultural enterprise had 44 tractors, 10 combine harvesters and 26 trucks, in 2010, it had only 3 tractors, 1 combine harvester and 2 trucks. The situation with the technical resources is also complicated by the fact that the level of their deterioration in the agricultural enterprises is between 55% and 90% [Betliy et al. 2006].

In 1990, the profitability rate of crop production was 98.3% (Figure 5). Later, this indicator decreased substantially, reaching its lowest level (7.9%) in 2005. After that, it has grown again, but its rate has not been stable. The economic situation in the livestock sector was more complicated. During 1990-1995, its profitability rate dropped from 22.2% to -16.5%. For a long time, livestock production has been unprofitable. Only since 2008, it has become profitable again. In 2010, this indicator was equal to 7.8%.

The profitability rate of agricultural production went down from 42.6% in 1990 to -1.0% in 2000. After that, it increased substantially and reached 21.1% in 2010. On the whole, this was a positive sign. At the same time, during 1995-2010, there was a significant share of unprofitable agricultural enterprises. For instance, it was 30.7% in 2010. In our opinion, this confirms that the restructuring program has not been completed in the substantial part of farm enterprises, for which it was only a change of the legal form. It also

shows that, with respect to economic indicators, there was a large gap between fully and partially reformed agricultural enterprises.

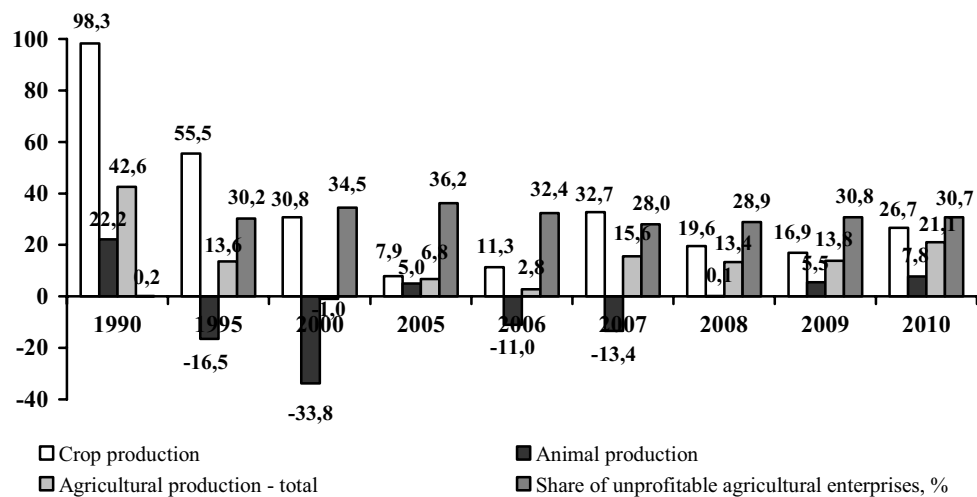


Fig. 5. Profitability rate of agricultural production in agricultural enterprises, %

Source: [Agriculture... 2011].

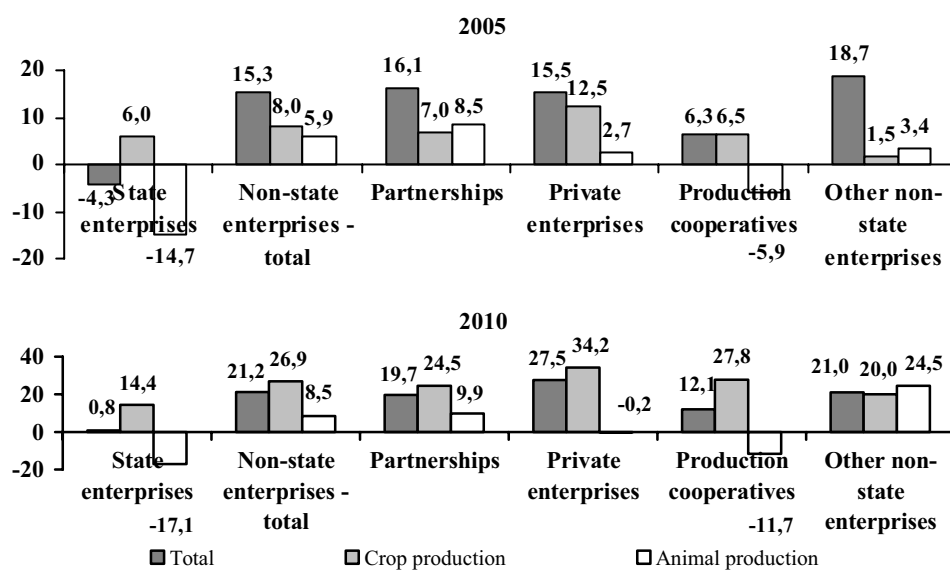


Fig. 6. Profitability rate of agricultural enterprises, by organizational and legal form, %

Source: [Agriculture... 2011].

It is also important to compare state and non-state agricultural enterprises with regard to the level of profitability. In 2010, this indicator for crop and livestock production in state



agricultural enterprises amounted to 14.4% and -17.1% respectively, while the corresponding figures in non-state agricultural enterprises were 26.9% and 8.5% (Figure 6).

In 2010, the profitability rate of agricultural production in state and non-state farms was 0.8% and 21.2% respectively. On the ground of these data, it can be concluded that the orientation of reform processes towards private ownership had a positive impact on the agricultural sector. However, the objectives of the agrarian reform were not fully achieved.

### **The role of agriculture in employment and incomes of the population**

The number of people employed in agriculture declined essentially during the reform period: from 5.0 million workers in 1990 to 3.1 million workers in 2010. This tendency occurred because of a significant reduction in number of farm enterprises, as well as of number of people working in restructured enterprises as compared with the pre-reform period. An attention should be paid to the fact that in Ukraine the employed population also includes people who are engaged in cultivation of household plots. The share of persons who have formal employment positions in the total number of employed in the agricultural sector is much smaller. For instance, it was only 25.8% in 2010.

Also, it is worth to note that the average wage in agriculture is one of the lowest among the branches of economy of Ukraine. Between 1990 and 2000, the ratio of salary in agriculture to salary in all economic sectors decreased on average from 104.5% to 49.6%. While in 2005-2010 this index gradually increased, it remained at a quite low level. In 2010, the ratio amounted to 65.5%.

Agricultural production is still one of the most important income sources for the rural households. In 2010, income from sales of agricultural products accounted for 10.9% of their total incomes. The share of consumed own products, which were produced on the household plots, was 12.9%. At the same time, the role of agriculture in this context has been gradually reduced (for example, in 2000, the above-mentioned indicators were 13.4% and 34.9% correspondingly).

It is a well-known fact that the role of agriculture in the rural economy and the rural employment declined significantly not only in Ukraine, but also in other countries [The new... 2006]. Though, in Ukraine in contrast to developed countries, employment and income-earning opportunities are very limited in rural regions. For the vast majority of former agricultural workers who lost their jobs due to farm restructuring, the only employment possibility is to work on household plots.

To a significant extent, these factors resulted in the growth of employment of rural residents in the informal sector. This sector includes all people employed in unregistered individual enterprises, which correspond to the following criteria:

- market orientation of economic activity
- limited number of workers
- absence of state registration of entrepreneurial activity.

Taking into account peculiarities concerning the spreading of informal labor relations in Ukraine, the criteria for determination of the number of inhabitants engaged in this sector were extended due to the inclusion of people working in the official sector under a verbal agreement with an employer, namely without a conclusion of the labour contract. At present, agricultural production is the predominant type of activity in the informal sector. The share of people engaged in the informal sector is 65.2% (or 74.1% of dwellers

employed in agriculture) [Statistical... 2011]. The concentration of employment in this sector testifies to a low level of labour productivity, an ineffective use of the rural labour potential and an exclusion from the sphere of action of labour legislation (in particular, with regard to the duration of working hours and leisure) and the almost complete social vulnerability of the majority of rural workers [Population... 2007].

In 2010, a large proportion of rural inhabitants (28.6%) had an average per capita monthly income below the minimum subsistence income. The low income level of rural households is also confirmed by the ratio of the actual consumption of basic foodstuffs to the recommended rate (Figure 7). In 1990-2010, this ratio decreased drastically on meat and meat products (by 22.4%), milk and milk products (by 36.9%), eggs (by 20.8%), and fruit, berries, and nuts (by 18.6%). This shows that the rural inhabitants are mainly oriented to the consumption of cheap food products (for example, bread and bread products, potatoes, vegetable oil, etc.). So, the significant portion of foodstuffs is not available for the rural population due to the high prices. Consequently, this tendency has a negative impact on the health of rural people and the employment potential of rural territories.

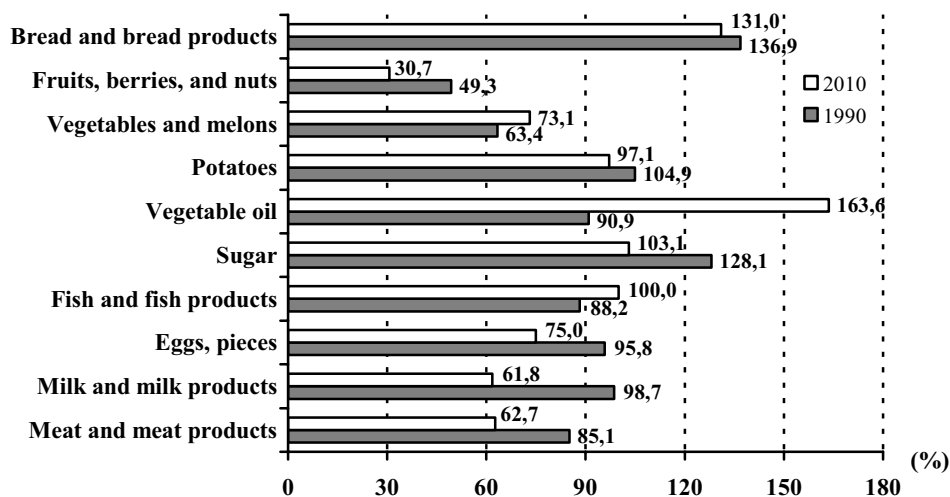


Fig. 7. Consumption of foodstuffs in rural households, % of recommended rate<sup>2\*</sup>

Source: [Statistical... 2011].

## Directions of the Ukrainian agricultural sector development in the long-term perspective

The above-mentioned production and economic indicators confirm that the Ukrainian agriculture has a significant potential that is not fully used. The current model of agriculture is focused primarily on agricultural production. In author's opinion, this model has limited opportunities to promote a stable growth of the agricultural sector in the long-term

<sup>2</sup> According to the Ukrainian Scientific Research Institute of Nutrition.

perspective, if we take into account the needs of rural population and the unfavourable social, economic and other tendencies in the country. In order to improve the existing situation in the agricultural sector, its new long-term goals should be identified.

First, it is necessary to move to the model of multifunctional agriculture which has been implemented in the EU countries [Romstad et al. 2000, van Huylenbroeck et al. 2007]. Under this new model, the traditional direction of agricultural development which is linked to production of agricultural products should be supplemented by the following directions:

- increase of the viability of the rural areas
- improvement of employment and income opportunities for rural residents based on the development of both traditional production activities (e.g. the processing of agricultural products) and relatively new activities related to agriculture (agro-tourism, organic farming, bioenergy, etc.)

- preservation of cultural heritage
- protection of environment and maintenance of natural landscapes.

From author's point of view, one of the first steps which should be taken to implement the model of multifunctional agriculture, is to provide rural regions with qualified specialists who have necessary skills to create new businesses. Though, these people should have interest to reside in the countryside. This will be possible only if these specialists will have attractive living conditions, which are particularly related to housing and a developed social infrastructure. Besides, to promote the creation of new businesses, it is important to build a good rural physical infrastructure, especially roads.

Second, appropriate measures should be introduced to enhance the competitiveness of Ukrainian agriculture and to increase the quality level of agricultural products. In this context, an urgent problem is the agricultural modernization. The problem could be solved basing on the use of advanced production technologies and the renovation of material and technical base of agricultural enterprises. However, to do that, significant investments are needed. Thus, a particular attention should be paid to the integration and cooperation between agricultural enterprises, as well as to the creation of new business entities with a participation of enterprises from other economic branches. In addition, it is important to elaborate economic mechanisms which would stimulate agricultural enterprises to spend money on modernization of production.

Third, it is necessary to work out an agricultural policy which would establish well-defined and transparent 'rules of the game' for all participants of the agricultural market. Also, measures regarding agriculture and rural areas should be grouped around objectives ('axes'), as it takes place in the EU countries [The EU... 2008].

## **Conclusions**

So, one can guess that the existing potential of Ukrainian agriculture could be used in full under the model of multifunctional agriculture. Based on this model, it is possible not only to increase the efficiency of agricultural production, but also to solve important socio-economic issues in rural areas, including the increase of the viability of rural regions, the improvement of employment and income opportunities for rural dwellers, and the promotion of development of the countryside in the long-term perspective.

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