

## STRUCTURAL CHANGES OF AGRO-INDUSTRIAL PRODUCTION IN UKRAINE: THE IMPACT OF EXTERNAL EFFECTS

Agro-industry is an important part of the economy. Its progress directly affects the level of national welfare and food security. At the present stage of Ukrainian economy development agro-industry is exposed to many external effects, often adverse, and in consequences it could change its structure. External effects or externalities are so called external effects of unregulated markets, which have an influence on the economic entity as a result of activity or transactions where this entity opt out. The main tenets of the theory of externalities were formed in the works of foreign scientists such as R. Koas, A. Pigou, P. Samuelson, J. Stiglitz, A.I. Borodin, O.F. Balatsky, A. Golub, A.A. Gusev, M.L. Kozeltseva, etc. These effects can both possess positive and negative character [4]. One can single out more than one major negative externalities, which can undergo agro-industry: 1) the negative impact of one part of agricultural production on another part of it; 2) the negative impact of agricultural production on another sector of the economy; 3) activities in non-agricultural sector could have a negative impact on agricultural sector.

The dynamics of changes in the structure of

agricultural production in Ukraine under the influence of external effects can be traced through individual components of its structure. One of the major components of the agricultural structure is the human factor, as it plays a decisive role in the development of economic activity, improving of its organization and management. According to a statistical digest of Ukraine agriculture on the number of employed agriculture ranks third place (16% of total employment) after the trade, hotel and restaurant sector (23%) and industry (18%) (fig. 1).

The high share of employment accounts for by the fact that agriculture is one of the most important sectors of the economy of any state. However, despite this, the number of employed population in agriculture does not increase, but from year to year declines, while total employment grows (fig. 2).

One can observe the trend of increasing the number of people employed in construction, services (trade, repair of motor vehicles, household appliances and personal goods, the activities of hotels and restaurants (fast pace), transport and communications, financial services, real estate, rentals, services to individuals ) and social (education, health, social

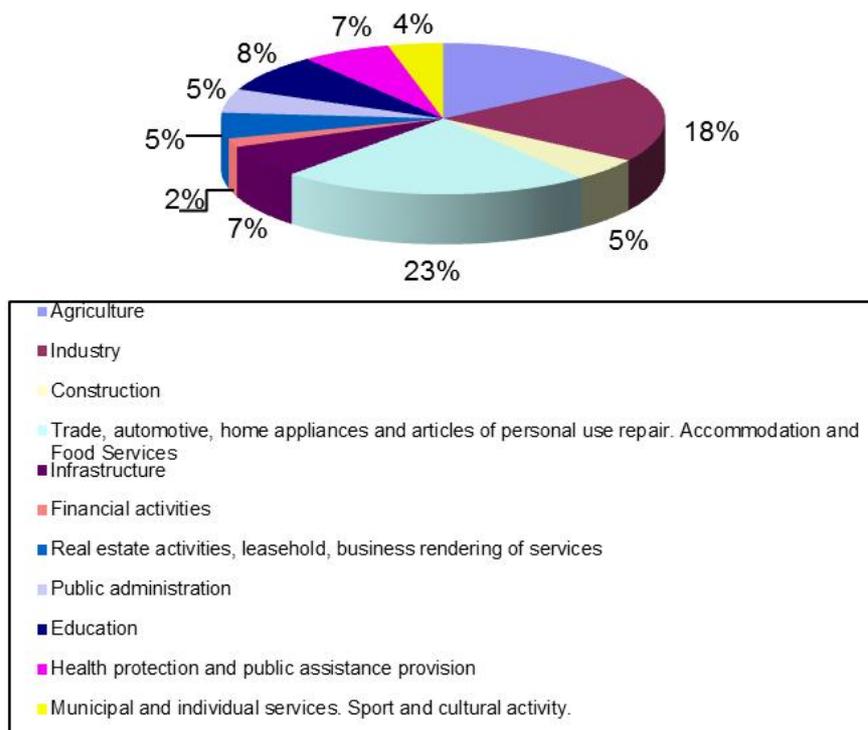
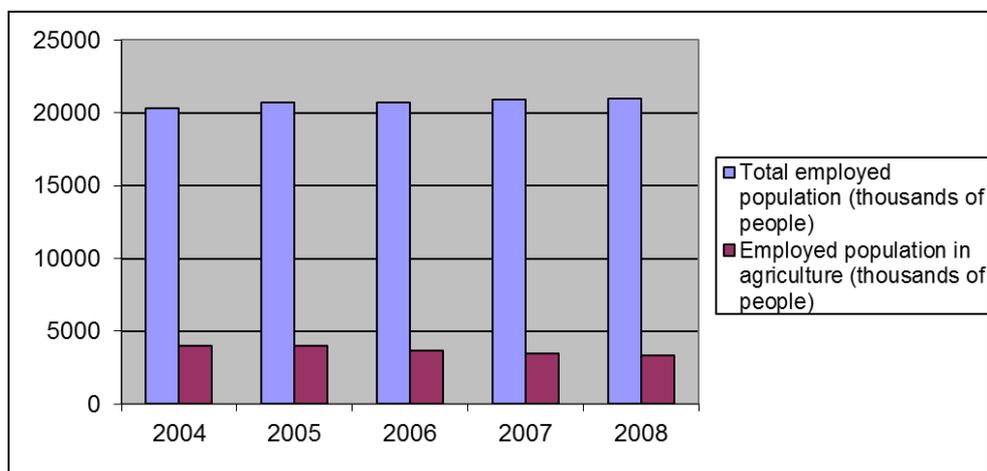
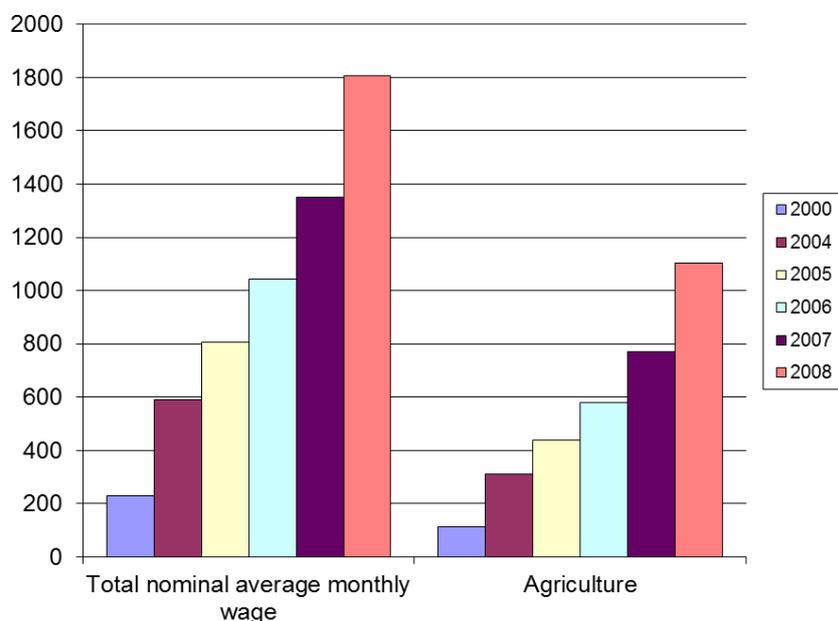


Fig. 1. Number of employed population by economic activity



**Fig. 2. Dynamics of the employed population in agriculture sector relative to total employment**



**Fig. 3. Nominal average monthly wages of agricultural workers in comparison with the level of wages in general in all sectors (UAH)**

care, community and personal services, the sphere of culture and sports — a little slower), but the number of people employed in industry and agriculture is declining. This dynamics can be attributed to the general trend of population urbanization. Urban enterprises and service facilities are more competitive than agricultural enterprises. Possibility of better living conditions, better wages in town (the average wage of agricultural workers in comparison with the average salary in general in all sectors of the economy is growing disproportionately — every year the gap between these rates increases (fig. 3)) and the prestige of urban life creates an external effect by urban enterprises and facilities services for agricultural enterprises, as it diverts a lot of labor force from them.

Agricultural enterprises are in need of formation of

the agrarian labor market, which would provide the companies with key workers of mass occupations [1], as well as to balance supply and demand of manpower resources, to improve working conditions and quality of life in rural areas, to form a more prestigious image of agricultural labor.

Another important component of the agricultural structure is land and land relations. In Ukraine, the agricultural lands account for 71% of the total land area of the country (data at the end of 2008). Structural changes in property relations at the expense of the permanent assets of agricultural production, land use and land relations, forms of management are also involve changes in the structure of agricultural production.

Reforming of the collective agricultural enterprises

Table 1

## Area of agricultural land by categories of landowners and land tenants (thousands ha)

	1990	1995	2000	2004	2005	2006	2007	2008
Agricultural enterprises, including:	38 705,4	35 184,0	29 878,0	23 502,4	22 116,7	21 199,1	21 047,0	21 019,3
— non-state	28 778,0	28 068,2	28 030,1	22 213,7	20 886,5	20 22,1	19 941,4	19 954,4
— state e	9 927,4	7 115,8	1 847,9	1 288,7	1 230,2	1 177,0	1 105,6	1 064,9
Citizens	2 669,0	5 588,6	8 543,4	13 819,3	14 922,7	15 602,4	15 707,7	15 584,5
Total	41 374,4	40 772,6	38 421,4	37 321,7	37 039,4	36 801,5	36 754,7	36 603,8

and privatization of state enterprises on the basis of private property in the village offers a choice of economic activity forms and the formation of a private owners' class. It also solves the problem of land ownership and its implementation in the system of industrial relations of the agricultural sector [3]. Despite the fact that agriculture is one of the most important sectors of the economy and agricultural lands occupy most of the entire country, the total area of agricultural lands of both enterprises and citizens have been decreasing since 1990 (tab. 1).

Reduction rate of agricultural lands was increasing till 2000 (reduction from 1990 to 1995 was 601.8 thousand ha, and from 1995 to 2000. — 2351.2 thousand ha), and then began to decrease (from 2000 up to 2005 — 1382 thousand ha, since 2005 until 2008 — 435.6 thousand ha). A similar trend was to be observed in the structure of sown areas of crops (from 1990 to 1995 sown areas decreased by 1443 thousand ha, from 1995 to 2000 — by 3790 thousand ha, from 2000 to 2005 — by 1129 thousand ha and since 2006 a growth trend is observed). This can be explained by the transition to the crop production in agriculture, creating of institutional and legal framework of agricultural production and positive changes in it in the early 2000's. Several legislative acts were adopted during 2000-2002 concerning the functioning improvement of food markets, the prohibition of administrative interference in the interregional movement of agricultural products, building of marketing infrastructure and organization of agricultural service cooperatives [3].

If to consider the structure of agricultural land by categories of landowners, one may note that the share of agricultural enterprises (both state and private) in total area of agricultural lands is decreasing, while the percentage of civil landowners and land users is growing. Most of them occupy the commodity production and private farming.

In a market economy, land is a commodity which is constantly increasing in price that is one reason for increased cost of agricultural output and inflation at the consumer market. In all countries land as natural resource is public property regardless of their ownership. The state conducts environmental activities, provides funds for maintenance of soil fertility. In order to solve the growing environmental problems in the agricultural policy of

developed countries an independent branch was formed — sustainable development of rural areas. Organization of land administration system under circumstances of private property requires higher transaction costs than under the state ownership of land. However, despite improvements in the legal framework regarding private land ownership, agricultural market participants feel the incomplete process of the legal and institutional framework formation, especially concerning the protection of private property rights, access to objective information on market prices, antimonopoly regulation and unnecessary transaction costs [3], which are caused by external effects in activities of agricultural enterprises.

Material and technical basis, as a structural part of agricultural sector, takes into account the availability and adaptability of production space, age of the equipment, and compliance of available material resources with production program. Qualitative composition of manufacturing facilities and its provision of agricultural enterprises have a direct impact on the structure of agriculture itself. Objective evaluation of their formation process creates prerequisites for the intensification of production, the sustainable development of the enterprises, the living standards improving of rural population. The problem of the formation and usage of fixed assets acquired special importance in connection with the acceleration of scientific and technological progress, increased competition, the influence of external effects and changes in the market of raw materials and finished products of companies in agricultural sector and related industries.

The cost of fixed assets has been declining until 2008, while the total value of all assets in the overall economy grows (fig. 4). This can be explained by the strong physical and moral deterioration of the material and technical agricultural base, lack of production facilities, buildings, machinery, equipment, etc., as well as inadequate investment in the agricultural sector. Only since 2008 one can observe a tendency of the fixed assets increasing in the agricultural sector.

However, the cost of the fixed assets in agriculture in 2008 occupies only 3% of the total assets value in the economy (fig. 5). Its share in total value of fixed assets in economics since 2001 has decreased by 7.2%.

An actual problem of the agricultural sector

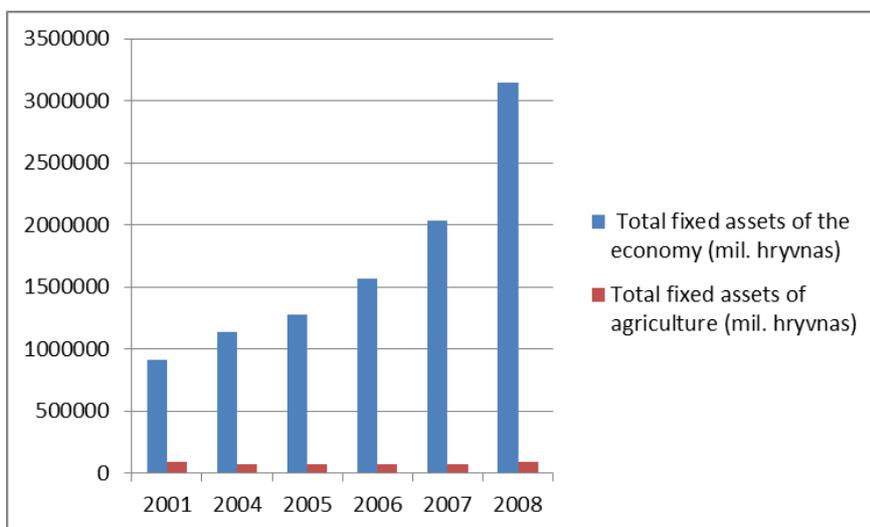


Fig. 4. Dynamics of the total fixed assets value in the economy relative to fixed assets in agriculture

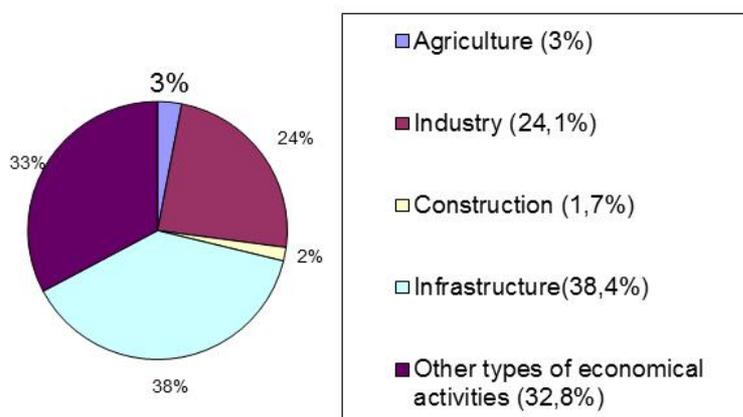


Fig. 5. Fixed assets in the economy by types of economic activity

development is to provide the mechanized production for competitive agricultural products that is sufficient scientifically-based composition of the machine-tractor fleet. Available machine-tractor fleet does not meet modern requirements of agricultural production. The agricultural sector is provided with the main types of farming equipment only at 48-66% [3]. The number of all types of agricultural machinery is gradually decreasing. In addition, the lack of funds for the purchase of spare parts does not allow performing a sufficient volume of repair works, so the preparedness of agricultural equipment to the appropriate season is reducing, and part of the machinery is not used because of technical malfunctions. There is also not enough new equipment to replace the decommissioned one. As a result of the low purchasing power, Ukrainian agricultural enterprises are forced to buy foreign-made equipment that was already in use for 3-8 years and by this token technique of domestic production often have lower specifications. Due to the reduction of quantitative equipment composition and decreasing its level of preparedness for work, the load

on one unit of equipment is increasing, which leads to violations of the farming requirements, time magnifying for the execution of work and loss of crops. It is therefore necessary to take urgent measures for improving of the technical capacity of the agricultural sector and more efficient use of its potential.

Low share of fixed assets of agriculture in the structure of fixed assets of the economy in general depend on low investment in agriculture compared with other economic sectors (fig. 6).

For the full reproduction of the material and technical base of agriculture there is high need to renew and buy annually new equipment, machinery, spare parts and repair materials. Investment policy plays an important role in shaping of the technical staff of the fixed assets in agriculture and agro-industrial complex as a whole. As it can be seen from fig.6 investment in fixed capital relative to other agricultural sectors of the economy is much smaller. According to the 2008 they occupied only 7.2% of the total fixed capital investment in all economic sectors.

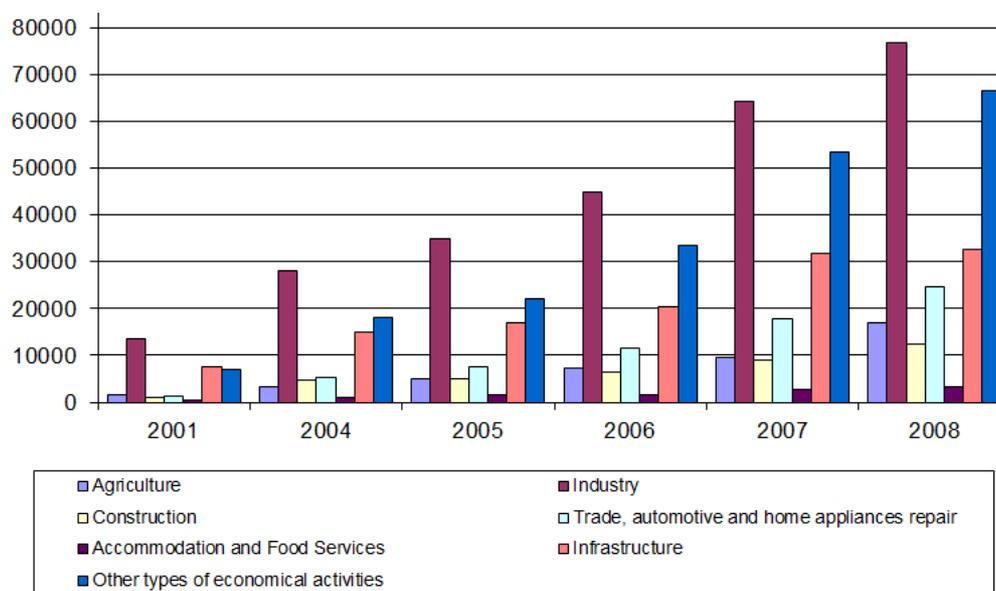


Fig. 6. Investments in fixed assets by economic activities (mil. hryvnas)

There is a significant reduction of investment in agricultural machinery, agricultural equipment and manufacturing industries. This can be explained by the fact that at the present stage of development agriculture is not a profitable industry, so it's less risky and more profitable for investors to enter into agreements with more profitable nonagricultural enterprises. In this situation one can speak about the negative externalities which affect the agricultural enterprises, because enterprises in other, more profitable industries which operate in the market, is diverting investment resources away from them. A lack of getting funds adversely affects the structure of the fixed assets of material and technical base of agriculture.

Financing sources for the acquisition of agricultural machinery is also profits and depreciation. However, the profits of agricultural enterprises are falling, and thus the depreciation contribution of agricultural producers is reducing. This is because prices of industrial products used in agriculture, grow more rapidly than the prices of agricultural products, as well as increased costs for repair of obsolete equipment. All this can create negative externalities for the agricultural enterprises from the part of manufacturers of engineering products and machine building plants that benefit from the higher demand to specialize in the manufacture of machines for other industries. Since these producers do not specialize in manufacturing technology and machinery for agriculture, so they do not tend to improve the quality of agricultural technology and innovation in this field. This externality will adversely affect the structure of logistics, engineering and technological support for agricultural production. It is also necessary to develop the domestic automobile and engineering industry by improving product quality and innovation, because the appearance of strong competitors in the person of Russia

and Belarus, in turn, is a demonstration of the external effect for the Ukrainian manufacturers.

If one considers the dynamics of change in sectors of agriculture and the results of their activities, it may be noted that in 1990-2000 the production of the gross agricultural production decreased. In 2000-2005 it begins to increase and stabilize, until 2007 is lowering, and in 2008 there is again increasing (fig. 7).

Agriculture is a part of agro-industrial complex and includes two main sectors — crop and livestock production. In the production of major crops according to croppage index of 2008 an overall increase is to be observed in gross output of crops (notably — on indicators of cereals, legumes and sunflower gross harvest the remaining crop is relatively stable, except for sugar beet, the collection of which decreases (fig. 8)).

It can be explained by the fact that in recent years, yields of all crops has increased, and then there is a shift in the direction of crop development in agriculture alongside with the increase of the sown areas. The same trend is observed for the production of basic crop products per 1 person and for the the gross collection — by 2008 there is growth in performance of cereals, legumes and sunflower. The production of other crops per 1 person is relatively stable except for sugar beet which production is reducing.

In the structure of animal breeding until 2000 there was a decrease in livestock, except for hog breeding and poultry keeping where livestock population, on the contrary, is growing. Since 2000 due to the implementation of measures for suspension of the recession in agriculture and improving of industry's efficiency [3], one can notice the slow growth of livestock, whereas generally poultry keeping is growing, though the cattle population is

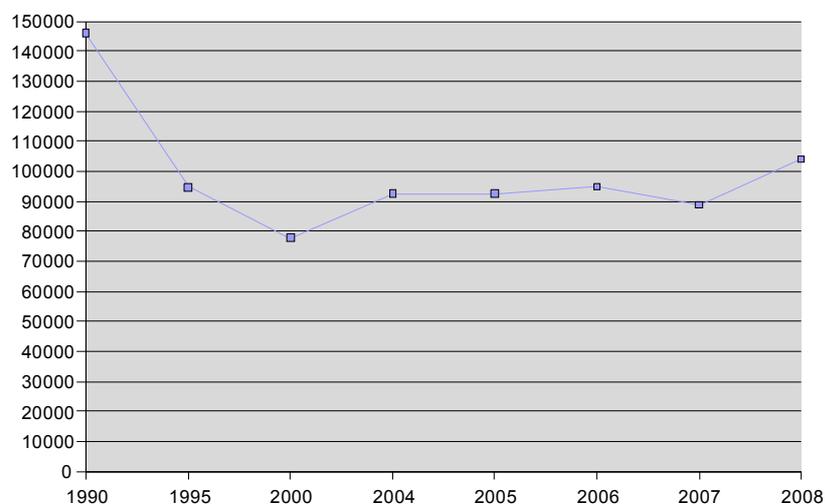


Fig. 7. Dynamics of gross agricultural output (mil. hryvnas)

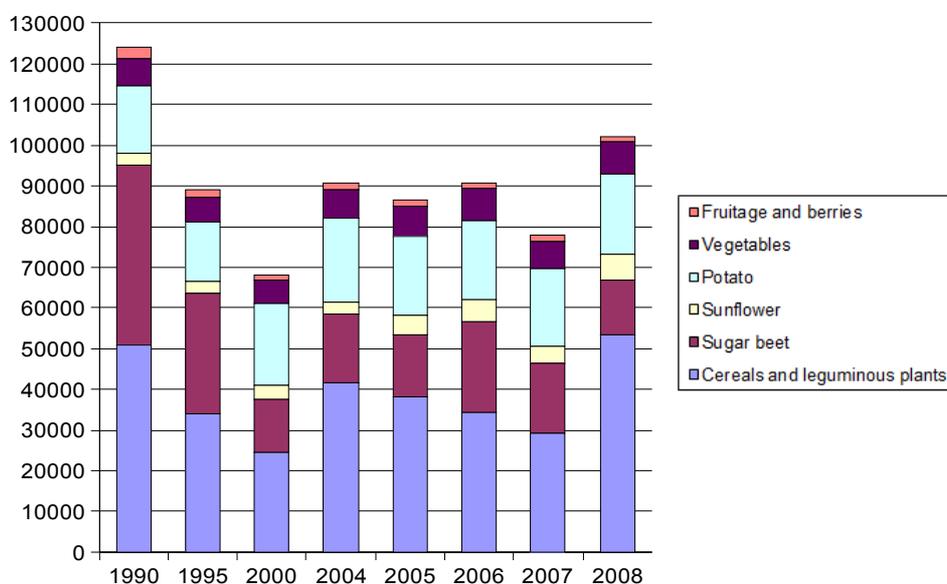


Fig. 8. Gross yield of major agricultural crops (thousands tons)

decreasing. If we compare the structure of livestock and poultry keeping by farm categories, we can note that for 2008 a large proportion percentage wise for all types of livestock and poultry keeping belongs to the population enterprises, rather than agricultural one.

Production of major livestock products until 2000 has been declining, but then since 2000 up to 2006 it has been steadily increasing (fig. 9), and the major share of livestock manufacture is made up from the production of honey, eggs and milk, while wool and meat production is in relatively very small proportion. For the production of major livestock output per 1 person, the same trends are naturally determined as for livestock products in general. The main commodities are milk and eggs.

Gross agricultural output in all categories of farms in 2008 accounts 103,977.9 mil. hryvnas: 62% (64,889.1

mil.) and 38% (39,078.8 mil.) for crop and livestock production, accordingly. It should be noted that most of the gross output collection belongs to population farms — 56112.5 mil. hryvnas (54%), while the share of agricultural enterprises — 4786.4 mil. hryvnas. (46%) of them are state-owned enterprises — 1448.8 mil. hryvnas (1,4%) and non-public entities — 46416.6 mil. hryvnas (44,6%).

The reduction of livestock population and the transition to crop development direction create negative externalities for the agricultural enterprises that specialized in the production (growth) of feed crops, the construction of barns and ancillary buildings for cattle. Moreover it would lead to the increase of demand for fertilizers, engineering products. So, it's, as mentioned above, not always advantageous for enterprises to specialize exactly in the production of agricultural equipment and machinery.

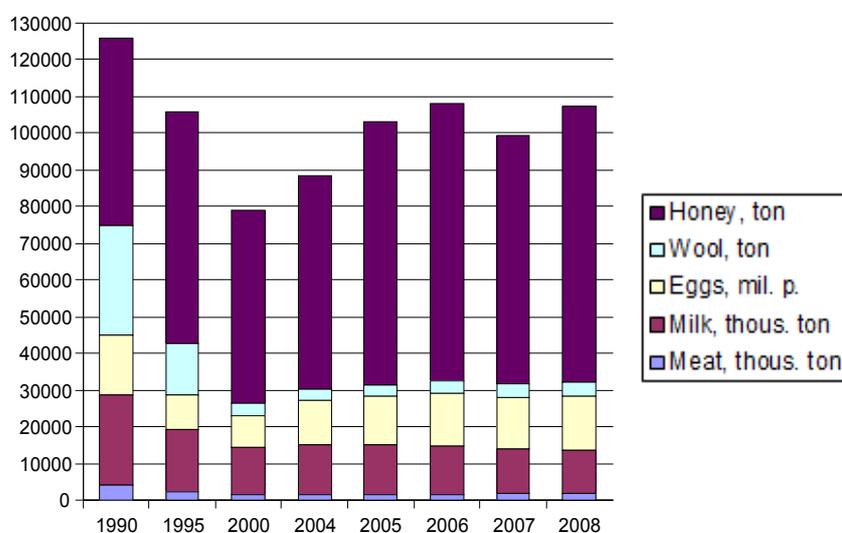


Fig. 9. Production of major livestock products

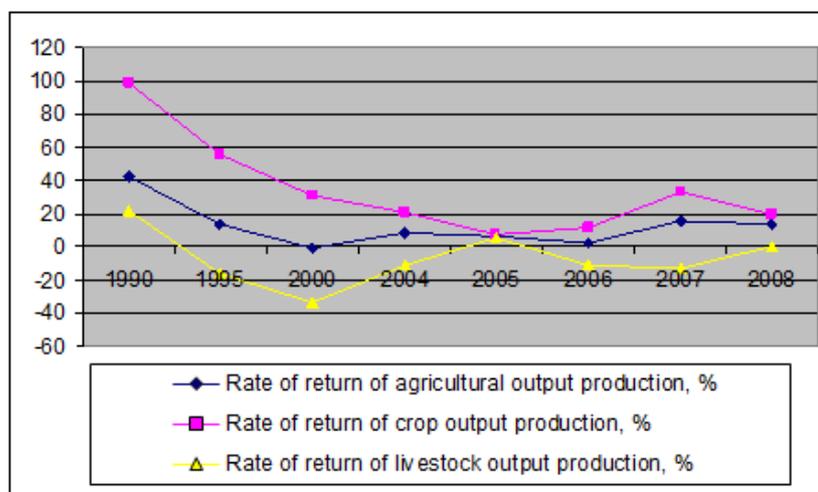


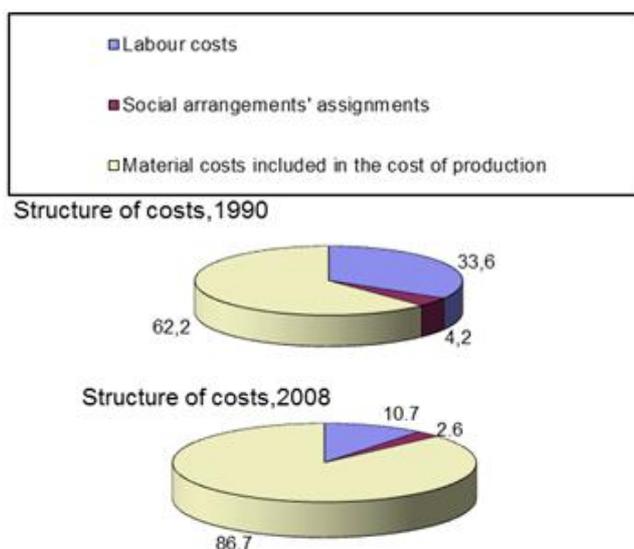
Fig. 10. Changes in rate of return of agricultural production (%)

The current problem of agricultural production at present is the problem of further improving of the industry's efficiency, i.e. its effectiveness. Summary measure of economic efficiency of agricultural production is an indicator of profitability. Basing on the analysis of average levels of profitability one can determine which products and which business units provide greater profitability. It becomes especially important in today's market conditions, where the financial sustainability of the enterprise depends on specialization and concentration of production.

Production efficiency of agricultural enterprises in Ukraine is not stable. Livestock industry was unprofitable (in 1995-2004 as well as in 2006-2007) and their level of profitability during these periods was negative, and in 2008 it was equal only 0.1% (fig. 10). In crop production, a positive profit and positive rate of return is to be observed (the lowest one in 2005 — 7.9%, the profit amounted to 900.2 mil.). The most profitable products for 2008 were

grapes (58,8%), sunflower (18.4%), grains and legumes (16.4%), while products of the livestock industry generally have a negative rate of return, except for milk, dairy products (4.1%) and eggs (13%). The rate of return such as cattle brought in up to 24.1%. The lowest rate of return was -74.7% (wool).

If we consider the structure of agricultural enterprises' production costs compared with 1990, one can note the upward trend in material costs which were included in production costs — the cost of feed, seeds and planting materials, fertilizers, electricity, petroleum products, fuel, spare parts and building materials, depreciation, etc. (in 2008 they were 86,7% of total expenditure on agricultural production, although the depreciation cost of fixed assets has decreased), and reduce of labor costs (10,7%). Also there is decrease of the costs of social events (fig. 11). It had a negative impact on employment in agriculture.



**Fig. 11. Cost structure of agricultural output production on farms**

*To improve the efficiency of agricultural production one should not only increase the output of products, but also efficiently use it in economy and distribute marketing channels. Agricultural enterprises are interested in rapid implementation of its products as it directly affects the financial condition of the economy, contributes to its strengthening. Agricultural products can be sold to processing companies, population, market and other areas. Directly to the public, it is implemented in very small quantities, as the key realization areas are processing plants.*

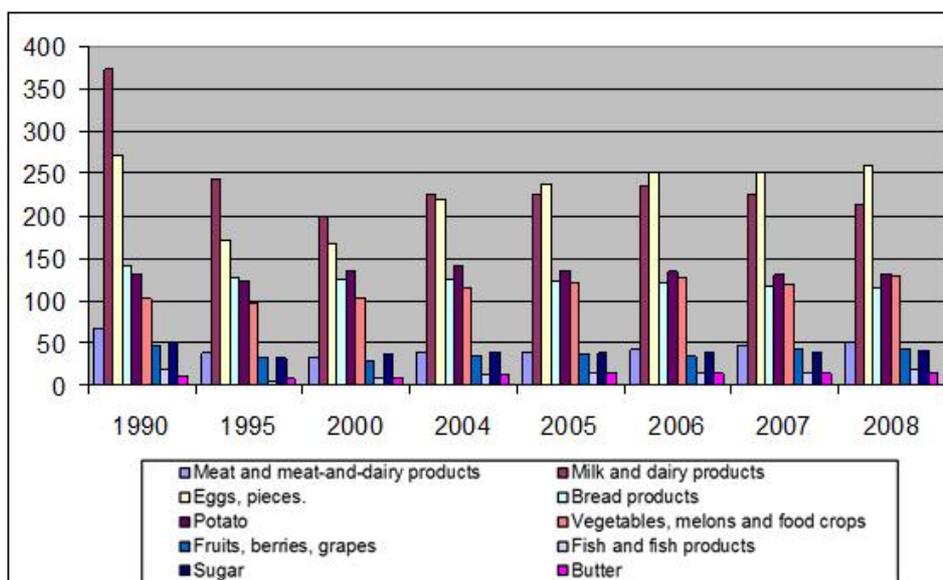
*In the sales structure a crop production is sold in Ukraine more than livestock. Throughout 1990-2000 selling of crop production has been decreasing, but then*

*since 2000 it had an unstable tendency to increase, and up to 2008 reached a larger volume than in 1990. Most of the selling structure took grains and legumes. With regard to livestock production, its selling during 1990-2000 has been decreasing rapidly, and since 2000 it slowly began to grow. In its structure the most part took eggs, milk and dairy products.*

The ultimate goal of agricultural production is to meet the food needs of the population, so it is important to consider the consumption structure of food products (fig. 12).

As it can be seen from Figure 12 the basic food products for Ukrainians are milk and dairy products, eggs, grain products, potatoes and vegetables. Consumption of meat, fish, livestock, dairy and fish products, fruits occupy a smaller proportion in dietary intake of Ukrainian citizens because of their higher price. However, not all nutrients contained in these products can be fully replaced by other cheaper food products. Rational nutrition, full and balanced dietary intake are very important for human health, so the structure of the average daily consumption of basic micro and macro elements in the food products has a direct impact on its health, and it must meet the standards defined by the Ministry of health protection of Ukraine. Thus there is a negative externality for consumers due to the deformation of the interindustry proportions in agriculture and its crop branch of development. As most of the major micro- and macro elements are consumed with crop sector products, and, accordingly, the share of crop sector in total croppage and sale of products is greater than in cattle sector, it will affect the price of the final output and consumer choice.

Agro-industry is a vital sector of the economy, which determines the level of peoples' welfare. Food independence of the country is depending on it. The results of the agricultural production are largely dependent on the state



**Fig. 12. Consumption of food products (for 1 person, per year, kg)**

and structure of its resource potential. Resource potential of the agrarian sector is formed by the interaction of climatic conditions and basic factors of production agriculture: the quantity and quality of agricultural lands, the state of logistics, and availability of labor force employed in agriculture. The main goal of producers is the profit, the mass of which would enable to ensure the implementation of expanded reproduction. Improving of the economic efficiency of agricultural production is intended to solve another problem — to ensure the sustainable development of the agricultural sector in the country and its regions, its way out of the systemic crisis, and solving of the pressing social problems of the village.

Innovation measures are very important for the competitiveness improvement of domestic agricultural enterprises that require appropriate investment. However, taking into account the increasing of production's deformation and destructiveness, the uncertainty of the environment, the influence of external effects, as well as the emergence of new risks in a production environment, it is not enough for agro-enterprises just to take certain innovation measures. Structural changes are taking place in Ukraine under conditions of technologically backward economy with low competitiveness and susceptibility to a set of externalities. In order structural changes were a progressive trend in the development, there is a need to assess the prevailing proportions, determine the factors influencing them, reveal the relationship of structural changes and efficiency of economic growth and development of high-tech industry [1]. In determining their strategy domestic companies should consider the impact of various external effects, determine and identify the direction of their actions and take measures to prevent negative externalities and to overcome their negative effects. Taken together, this will form the structure of the national economy, stable to negative influences of external effects.

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### Omelchenko O. Y. Structural changes of agro-industrial production in Ukraine: The impact of external effects

In the article influence of external effects is examined on the agroindustrial production of Ukraine. It shows the dynamics of structural changes of agroindustrial production of Ukraine concerning its separate elements, which serves as investigation of external effects. It states in the article, that for providing of the positive structural changes of agroindustrial production the exposure of interconnection of structural changes and efficiency of the economic growth are needed. It is recommended for domestic enterprises during process of strategy determination to take into account influence of different external effects.

*Key words:* external effects, agroindustrial production of Ukraine, a structure of production, structural changes.

### Омельченко О. Ю. Зміни структури агропромислового виробництва України: вплив зовнішніх ефектів

У статті розглядається вплив зовнішніх ефектів на агропромислове виробництво України. Показана динаміка структурних змін агропромислового виробництва України по її окремим складовим, яка є наслідком зовнішніх ефектів. В статті наголошується, що для забезпечення позитивних структурних змін агропромислового виробництва необхідно виявлення взаємозв'язку структурних змін і ефективності економічного росту. Вітчизняним підприємствам пропонується при визначенні своєї стратегії враховувати вплив різних зовнішніх ефектів.

*Ключові слова:* зовнішні ефекти, агропромислове виробництво України, структура виробництва, структурні зміни.

### Омельченко О. Ю. Изменения структуры агропромышленного производства Украины: влияние внешних эффектов

В статье рассматривается влияние внешних эффектов на агропромышленное производство Украины. Показана динамика структурных изменений агропромышленного производства Украины по ее отдельным составляющим, которая является следствием внешних эффектов. В статье отмечается, что для обеспечения положительных структурных изменений агропромышленного производства необходимо выявление взаимосвязи структурных изменений и эффективности экономического роста. Отечественным предприятиям рекомендуется при определении своей стратегии учитывать влияние различных внешних эффектов.

*Ключевые слова:* внешние эффекты, агропромышленное производство Украины, структура производства, структурные изменения.

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