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SUSTAINABILITY AND COMPETITIVENESS PRINCIPLES OF AGRO-FOOD CHAINS IN UKRAINE

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Abstract - This article gives the first summary of peculiarities of agro-food chains formation in Ukraine and their typing according different classification characteristics. The study systemizes distinctive features of agro-food chains functioning from agro-holding to small producers and across some products. The quiz of agro-food chains actors, namely in agriculture and processing industry allowed to define the binding factors of their development and to justify measures for their overcoming. It is proved that a low level of management systems at agricultural and processing enterprises is one of binding factors for agro-food chains sustainability in Ukraine. Though it requires the activation of measures aimed to Implementation of European standards at all administrative levels. The driving forces for agro-food chains sustainability are discovered as well, they are fair distribution of added value, implementation of innovations, reducing of negative impact on the environment etc. On the base of this analysis a set of recommendations destined to favor the sustainability of agro-food chains was developed. They can help the government to develop strategic programs of agrarian sector development and also they can help chains actors.

Keywords – agricultural and food processing enterprises, agro-food chains, sustainable development, value added chains

1. INTRODUCTION

Market transformations in the agro-food sector of Ukraine's economy, as well as globalization processes and European orientation of the country, bring about the necessity for search for directions of formation of competitive agro-food chains. It is obvious that ensuring profitability of agrarian enterprises in a competitive environment is achieved mainly through cost management and formation of added value of products in agro-food chains. Under current conditions, full value functioning of agro-food chains, which create high indices of added value, is provided by vertically-integrated structures.(Hutorov A., 2011) However, the issue of increasing value added by small commodity producers, in particular through the involvement of the latter in integration associations, as well as provision of high quality and safety of agricultural products and foodstuffs, as well as improvement of relations between participants in chains based on the principles of long-term partnership and transparency, remain unresolved (Ferto I., 2017).

Studying the peculiarities of functioning of agro-food chains is vital for Ukraine and allows to evaluate relations between all

actors within them, and helps to understand economic and social benefits and losses in these relations for all participants. On the other hand, the analysis of the agro-food chain shows where the largest added value is formed, accumulated and realized, and gives the opportunity to establish relative importance of different actors in this process, both inside and outside the chain. This approach includes analysis of the institutional environment that promotes the development of key actors in the chain and allows to substantiate the directions of achieving rural development goals when agricultural producers are involved in the process of obtaining their part of added value.

The main objective of the article is the generalization and elaboration of conceptual bases for the chain approach in the study of agro-food chains formation and functioning; the justification of measures for the orientation of their development to the sustainability principles. So, the objective of the article is to clarify the following problems:

a. systematization of scientific and methodological approaches and principles to the definition, creation and construction of agro-food chains;

b. typing of agro-food chains according to the main classification features;

c. generalization of foreign experience in the assessment of functioning efficiency and enhancing of the sustainability of agro-food chains in actual conditions;

d. justification of the proposals aimed to removing obstacles in the development of agro-food chains and to their sustainability.

2. DATA AND METHODS

The theory of a chain approach is a rather young branch of scientific knowledge. The fundamental concepts of the chain approach are developed by well-known Western scientists Porter (2006), Gereffi (1994), Morris (2003) and R. Kaplinsky, (2003). It is also based on the evaluation and analytical works, on the generalization of expert and practitioners' ideas in Ukraine's agro-food sector. The research includes the analysis of modern trends and institutional environment in agriculture, processing industry and trade, peculiarities of agro-food chains formation. We have used scientific works of key foreign and national scientists, research results of state research and statistical institutions related to production, processing, commercialization and consumption of agricultural products and foodstuffs. The additional information was received from regional agricultural authorities, technical assistance projects, associations and international donor organizations, operating on the territory of Ukraine. All these data allowed carrying out empirical research on the functioning practice of added value chains in some agro-food sectors.

Data collection about of specific features agro-food chains was based on the interviewing samples of agriculture producers through the sharing of questionnaires. The samples ranging were done based on the size of agriculture enterpriser regard to using arable land. There are five samples were proposed: less than 50 ha; from 100 to 500 ha; from 501 to 2000 ha; from 2001 to 5000 ha; and upper 5 thousands. ha. Each group includes 200 enterprisers exclude for last one. Farms which process more than 5 thousand ha were represented by 12 companies focused on the poultry, dairy, livestock, and pig and grain production. The questions were a target for the estimation of efficiency of quality managing systems implementation.

Quantities methods were applied to determine labor market potential in the field of livestock production. Also, highly nutrition feeding patterns were calculated through the balance methods application.

3. RESULTS

Organizational-economic transformations in the agrarian sector of Ukraine under the

present conditions are aimed at transforming production into a virtually new system, which will be primarily targeted at the consumer, - an indicatively regulated system.

Such a production system, firstly, should be orientated at and take into account, as far as possible, the results of population's customization, that is, to be targeted at needs, tastes and preferences according to the demands of different groups of consumers and their consumption budgets. And secondly, in the process of functioning, should demonstrate and strengthen sustainability of its development, which does not only exclude, but also involves insignificant changes in its organizational and legal forms and territorial structure in order to achieve an optimal state and ensure sustainable development.

As known, the sustainable development includes three components: economic development, social progress and environmental stability, that is, preservation and improvement of the natural environment as a defining condition for current and future stability of the biosphere [Vergun O., Tarasenko O., 2014]. This is a maximum task, and therefore the advancement to such a model of production system was accompanied by appearance of a number of transitional forms of territorial and production associations, the majority of which are based on network production structures.

Foreign scientists define agro-food supply chains as «a set of interconnected companies that work closely together in order to target the flow of goods and services across the entire value added chain of agricultural and food products, which will bring this flow to consumers at the lowest possible cost» [Beske P., 2014], or as «activity that covers the stages from production to distribution, which ensures bringing products to final consumers» [Aramyan C., 2006].

We believe that the most complete definition of agro-food chains is proposed by FAO (United Nations Food and Agriculture Organization): it is a set of agricultural producers and organizations (or actors) that consistently coordinate creation of added value for the production of certain types of cultural products and their processing for the purpose of obtaining food products sold to the final consumer and after consumption are sent to waste, ensuring profitability at every stage, creating wider benefits for the society without permanent depletion of natural resources (FAO, 2014).

At the same time, O. Borodina defines agro-food chains as not only interrelated links of one process (including six stages: from producers of raw materials to consumers of final food products), but also (and above all) mutually beneficial relations between groups of producers, sellers, processors and service companies that unite together to increase productivity and create added value based on understanding common benefits and fair distribution of the achieved result. Implementation of the concept of the formation of the agro-food chain as can positively influence the earnings and employment in the agro-food sector, ensuring market access to small farmers and networking of small and medium processors [Borodina O., 2014].

Consequently, the agro-food chain is an economic system consisting of different chain operators represented by suppliers of raw materials, providers of services, agricultural producers, processing organizations, distribution logistics organizations, marketing firms that promote delivery of products to the final consumer on the basis of providing additional services.

The above mentioned definitions of agro-food chains allow us to distinguish the following key components in them: raw materials production, products supply, transportation logistics, economic feasibility, value added forming, sustainability of operation. Foreign researchers' attention is focused on the efficiency of supply and sustainability of agricultural food chains, which, in our

opinion, is mainly due to their transnational character. However, national researchers focus on attracting small producers to agrobusiness chains and to added value forming. This is perceived as an adequate response to domestic realities: it takes into account current peculiarities of agricultural production in Ukraine, as well as agro-food structures functioning, mainly at a regional and interregional level.

But in implementation of basic fundamentals of the Association Agreement (AA) between Ukraine and the European Union (of 16.09.2014), the focus of problems in agro-food chains is shifted to its lower link - relationships between producers of food raw materials and their processors. One of the key dominants of the AA is the provision\ set of regulations on creation of appropriate conditions for gradual integration of the national economy into the EU internal market. For the agrarian sector, it is food production, which will meet EU requirements for similar products, and therefore will have the right to export without hindrance to European markets. In this regard, the problems of safety and quality of food raw materials and food products move to the level of their producers. Therefore, it is advisable to thoroughly analyze the situation in the primary segment of agro-food chains.

In Ukrainians practices important to determine the dimension and extent, as well as the minimum and maximum parameters of agro-food chains, in particular:

a) the simplest (or primary segment) chain involves two participants: production of food raw materials and their processing, output and direct sale of food products;

b) a full chain - at least five to six participants: production - transportation - processing - storage - transportation - sales. With regard to this chain, we can carry out various optimization options, namely: consolidation, isolation, division [Dankevych A., 2011]. This is about operations on agro-food chains within agroholdings, but they are completely related to the primary segment - its actors. However, current practice allows for optimization not only through physical separation or association, but also by other methods: a) outsourcing - transfer of some functions, tasks, business processes to contractors or individual workers who can perform them better (for example, procurement of dairy products raw materials from the population, their accumulation in refrigerated tanks for transfer to processing capacity, provision of services for storage and transportation of raw materials and finished products, their realization); b) out staffing - directing employees most often from processing and food enterprises, to firms engaged in the sale of food products for a certain period, etc.

Agro-food chains have a different territorial structure and organizational-legal forms, but to ensure sustainable and continuous functioning are based on a single system of principles (Table 1).

Significant interest is caused by agro-food chains typification, the key classification parameters of which are various features:

- technological: horizontally integrated, in which the output of finished products is carried out in ACEs or agricultural service cooperatives (ASCs), which maintain food-processing capacity; vertically integrated, in which participants take part in various stages of creating a final food product; diversified - may be related, non-related, conglomerate (I e production of a new, linked or unrelated to the principal product, primary or final product);

- territorial: the production and network structure which may cover different administrative-territorial enterprises: local (within a territorial community), regional (within several districts), interregional (within several regions), transnational (within two or three countries; for example, production process of processing of domestic semi-finished products ends abroad, for instance, processing of raw oil from Ukraine and turning it into the final product - oil for consumer purposes);

- branch: dairy products (raw milk - processed milk and dairy products of industrial production); oil products (seeds of oil crops (sunflower, flax, rape, mustard, soya, corn) - vegetable oil); meat products (pig farms and poultry farms with a closed cycle of production: reproduction of young animals - production of forages - fattening of industrial herds - industrial processing of pigs and poultry - meat and meat products); grain products (grain - flour - bread); forages (grain (waste from food processing production) - mineral and organic additives - feed and feed additives (premixes); fruit and vegetable products (fruit and vegetables - essential ingredients and consumables - canned fruit and vegetable products), etc.;

- organizational: small format (created with the participation of farms and PPFs, small and medium ACEs and ASCs, where food processing facilities are operating); medium format (created with the participation of farms and PPFs, small and medium ACEs and food processing facilities); large-scale (created with the participation of farms and PPFs, small, medium and large ACEs and food processing facilities, research institutions, design and development organizations, enterprises for production of technological equipment for national agrobusiness, bank and parabank structures, etc.);

- organizational and legal: "mild" - actors of agro-food chains carry out joint activities while maintaining full legal and economic independence; "firm" - chain actors in the organization or in the process of operation lost completely or to a greater extent legal and economic independence;

- spatial-temporal: permanent functioning (raw materials are supplied daily: raw milk, eggs, fattened poultry and pigs); seasonal functioning (raw material are supplied seasonally: fruit, vegetables, potatoes); episodic functioning (repair young animals, fodder), etc.

It should be noted that foreign researchers, depending on the specifics of primary and final actors, as well as the scale of the served food market, distinguish the following types of agro-food chains: traditional, consisting, as a rule, of small farmers, who directly sell products produced at their own households to consumers, mainly in local markets; modern, covering national and transnational agro-food enterprises that deliver and sell food (agricultural, that is, unprocessed or fresh (green) products from producers to the networks of powerful supermarkets; modern-traditional, which include national and transnational agro-food enterprises, which sell their own food products through a network of traditional sellers and retailers; traditionally modern, covering the supply of food products from small farmers and agro-food enterprises to small traders and modern supermarkets [Gómez M. (2013)].

The issue of ensuring the quality and safety of products for today is the unresolved issue for Ukrainian commodity producers. According to expert estimates [Burjak R. (2013)], in Ukraine, most agrarian enterprises do not have a systematic approach to quality management, and introduction of systematic safety methods is practically in their infancy - only 3% of agricultural producers have introduced them [Krysanov D. (2016].

According to the provisions of the framework law of Ukraine on food safety [Law, 2014], one of the obstacles hindering the integration of the agro-food sector into the EU internal market, is compliance with the requirement for the mandatory introduction of HACCP on food production facilities. Consequently, this is the key issue, whose successful and comprehensive solution will have an impact on sustainable and efficient functioning of agro-food chains.

One of the indicators for solving this problem is availability of functional MSs (safety and quality) at food industry enterprises, as well as introduction of other systemic safety methods by primary production entities. It should be noted that as of 01.01.2017 in accordance with the requirements of international standards in

food industry there were functional MSs: ISO Series 9000: there were certified 403 units of Quality Management Systems, in the stage of development and implementation there were 46 units; ISO series 14000: there were certified 43 units of Environmental Management Systems, under development and implementation there were 14 units; HACCP: there were certified 342 units of Food Safety Management Systems, under development and implementation there were 150 units; DSTU ISO 22000: there were certified 552 units of Food Safety Management Systems. Requirements to any organization of the food chain, at the stage of development and implementation there were 128 units.

In general, 1340 MSs were certified in food industry, and there are 338 functional systems under development and implementation at 979 enterprises out of 1118 (ie 87.5%) that are subject to the relevant ministry. The total number of enterprises is 5,5 thousand, including more than 4.4 thousand of small ones. Thus, more than one hundred medium-sized enterprises are waiting for the implementation of HACCP. As for small enterprises (SEs) in food industry, there is no statistical information, and therefore it would be advisable to conduct a survey and find an answer to the key question: what type of possible systemic safety methods is appropriate for them. Its main variants are as follows:

a) introduction of HACCP (or DSTU ISO 22000:2007 provided that SEs are a link of a functioning agro-food chain);

b) auditing for the conformity of production with minimum requirements of basic programs (ISO / TS 22002-1: 2009 Program of mandatory preliminary measures for the safety of food products - Part 1: Production of food products) in order to further eliminate identified nonconformities (i.e. being not ready to meet these requirements);

c) introduction of flexible or simplified procedures based on the principles and approaches of the HACCP, taking into account the level of product safety.

In primary production (agriculture, forestry and fishery), there are 77,400 business entities. In particular, among agricultural producers, according to expert estimates, there are approximately 1.1-1.5 thousand agricultural enterprises, where such procedures are permanent, namely:

a) implemented Safety Systems (HACCP or DSTU ISO 22000:2007) as an integral part of agro-food chains;

b) independently conducted an audit for production compliance with the minimum requirements of the basic programs (ISO / TS 22002-3: 2011 Program of mandatory preliminary measures for the safety of food products, Part 3. Production of agricultural products);

c) conducted a similar audit within the framework of agro-food chains to which they were included. Such practice is realized both in integrated formations, and by independent entrepreneurial structures, connected by technological ties (raw materials - processing).

In the structure of primary production, according to the framework law of Ukraine on food safety it is necessary to select a group of producers of meat, dairy products and fish raw materials that will be aimed at processing raw materials into final food products, after the cultivation process is completed. Fixed terms (to 20.09.2017) for introducing systemic safety methods have been set up. Statistics points out three subgroups: animal husbandry - 2426 enterprises and 87.9 thousand employees (on average 36 employees per livestock farm); mixed agriculture - 1028 enterprises and 4.7 thousand employees (on average 4 employees per one farm); fish farming - 881 enterprises and 5.5 thousand employees (on average 6 employees per one fish farm).

The rest of agrarian enterprises mainly produce the products of plant origin, among them there are three main subgroups: cultivation of annual and

biennial crops - 38856 enterprises and 409,6 thousand employees (on average 10 employees per one farm); growing of perennial crops -1121 enterprises and 15.4 thousand people employed (on average 14 workers per farm); plant reproduction -159 enterprises and 5.5 thousand employees (an average of 11 employees per farm).

Introduction of systemic safety methods at agricultural enterprises for cultivation of products of plant origin will depend to a large extent not only on the level of compliance with the minimum requirements of the basic programs, but also on the interest of food processing enterprises in obtaining safe and quality raw materials. Under current conditions, creation of agro-food chains takes place without a clear identification and appropriate fixing of specific commitments in Agreements, taking into account specifics of economic relations and technological requirements on both sides in order to bring products and food processing production to regulatory parameters.

The economic activity of Ukrainian agroholdings should be assessed as well. In 2012 there were 129 agroholdings functioning in the Ukrainian agriculture [Lupenko Ju., 2013]. In our opinion, the results of operation of chains are contradictory and asymmetric, in particular: the economic development has a positive trend, but in the same time we should highlight the welfare worsening of rural areas that became a territorial-production base for holdings; the social progress takes place in the groups of actors, but declines in the social sphere and rural territories degrade; the fertility becomes lower and agricultural land degrade, etc.

In particular, foreign researchers believe that main challenges for agro-food chains in modern conditions are seasonal nature of production, losses from damage, absence of necessary market infrastructure in certain regions, weak market relations at the level of farmers, and the strengthening of the requirements for the quality and safety of food raw materials and finished products [Canavari M., 2002]. At the same time, other researchers point out that the process of commodity flow management is central to the supply chains, where the market and regulatory decisions of the state interact through decisions of the government, private players and the rural community to achieve efficiency and responsibility [Chandrasekaranand N., 2014]. For us, it is important to exchange the latest knowledge at all stages of agro-food chains to ensure their sustainability. This will be critical for maintaining quality and safety of products, extending expiry dates while storing perishable food products.

One of the essential indicators of the efficiency of agro-food chains functioning is the level of satisfaction of final consumers with food products [Fischerand C., 2010]. This requires establishment of systematic quality control and product safety at all stages of commodity movement, which will foster the confidence of consumers in these products. Changing consumer preferences and the environment plays a decisive role in ensuring sustainability and efficiency of agro-food chains, as the quality and volumes of agricultural products depend heavily on weather conditions. The best international practice has convincingly proved that increasing the efficiency of agro-food chains functioning is possible when following key principles such as: high transparency, hygienic safety, clear traceability and quality of food products.

Foreign scientists who conducted research under the auspices of FAO adhere to the view that the concept of sustainable functioning of agro-food chains is based on the following three important provisions:

a) agro-food chains are dynamic market systems, where the main element of the association is vertical management;

b) concepts of sustainable agro-food chains cover different scales (region, industry, country);

c) added value and sustainability are precise and multidimensional indicators of the efficiency of functioning of agro-food chains in the integrated (complex) value (FAO, 2014).

We have calculated the effect of increase of value added on the basis of comparing the effectiveness of existing and potential uses of crop products produced in Ukraine on the example of grain and soybeans in terms of finding options for increasing value added inside the country (Bodnar&Shpichak, 2013; Bodnar&Pedorchenko, 2015).

As the experience of the leading countries of the world convinces us, there is an economic expediency to diversify the use of grain produced, which ensures a higher competitiveness of the country in different conditions of the world market. Thus, global producers and exporters of grain, at full satisfaction of domestic needs in grain and livestock products, export not only grain crops, but also supply to the world market dairy and meat products, bioethanol, for which grain is used, and by doing this they occupy their niche in the world's distribution of labor. For example, in France, 1094 kg of grain is produced per person, which is 14% lower than the best Ukrainian indicators, the share of grain exports in production is 51%. The level of meat consumption in this country is 86.7 kg, milk consumption is 246.6 kg, which is correspondingly 70 and 17% more than in Ukraine. At the same time, France exports livestock products 24.3 kg of meat and 165.5 kg of milk per 1 person.

A similar situation in Ukraine took place in 1990, in particular, it produced 981 kg of grain per capita, with its export of only 3 million tons, while the amount of feed stock was 28 million tons. With the provision of domestic consumption of meat at the level of 68 kg and milk at the level of 373 kg, 5.2 and 2.2 times more of these products were exported outside the country. Currently, the capacity of the domestic grain market in Ukraine is limited due to the low purchasing power of the population.

It is obvious that the increase in the purchasing power of the population will determine the need to expand the use of grain: to meet domestic needs at the level of rational norms, including livestock products, grain and livestock exports, and the use of cereals to produce bioethanol. This will result in manufacturing products with significantly higher value added. Ukraine already has the experience of reorientation from export of raw materials, in particular sunflower seeds, to export of sunflower oil, a product with higher added value (Table 2).

The next direction in ensuring increase in value added of agro-food chains is involvement of small commodity producers of agricultural products into competitive integration chains. It is known that in Ukraine a large part of the individual sector is included in agricultural activity and a large part of rural population exists due to family farming (although it is not officially called so). Thus, it cannot be assumed that 2.6 million rural residents at the age of being economically active, who currently produce agricultural products on private farms, will potentially be included in chains. In particular, 40% of rural households with insignificant resources that produce foodstuff for their own consumption (self-sufficiency) can potentially not be included in supply chains. We believe that in order to create conditions for attracting private peasant farms to competitive agricultural chains, it is necessary to introduce wide-ranging measures of rural development, including creation of non-rural workplaces in rural areas.

4. CONCLUSIONS

One of the directions for increasing value added of agro-food chains is the diversification of the use of agricultural products in compliance with alternative options for increasing value added within the country. In particular, it is proved on the example of grain that when it is grown and processed for production of milk or

pork, aggregate added value is created, which is, correspondingly, 1.94 and 2.20 times higher than the aggregate value added created while only producing and exporting grain. In addition, with the use of 100 thousand tons of grain for production of pork, creation of 400 additional jobs is provided and for production of milk 900 additional jobs. Moreover, under domestic conditions, the possibility of increasing value added created by small forms of agro-business is not used, which, through the development of agricultural co-operation and integration with large commodity producers, can increase the economic strength in the market of agro-foodstuffs and promote rural development.

Integration of Ukraine into the European Union increases the need to address the issue of compliance to regulatory parameters of quality and safety of food raw materials by agricultural producers, where there are no functional management systems. The gradual adaptation of the agrarian sector of Ukraine to European requirements regarding safety and quality of food products is a prerequisite for development of regional and national agro-food chains to a transnational level, which will facilitate a rapid access of food products to European markets, and creation of added value and new opportunities for small producers to have an access to these markets.

The following areas of study of the problem of value added in agro-food chains should be the study of practice and justification of introduction of a closed technological cycle of non-waste production of quality and safe agro-foodstuffs on the basis of innovations, for which it is expedient to use production and technology modules of a closed cycle developed by world-wide practice that allow introduction of PLM system (product lifecycle management). This is confirmed, for example, by the fact that in Ukraine only 30% of the by-product of crop production is used and contributes to formation of value added.

Research outcomes might be used as a background of the strategy for grain-food chains development and livestock production both on the local and country level. The suggestions about development of short chain formed by small producers were obtained in the result of study. They can be applied with the purpose of increasing market competitiveness of small farmers on the local level.

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Table 1 Basic principles underlying creation, functioning and development of agro-food chains (AFC)

Principles	Key Characteristics
1 System	Use of a systematic approach in case of a natural occurrence or organized creation of an AFC as an organic whole
2 Voluntaryism	Establishment of the AFC is carried out on a voluntary basis for the purpose of joint activity on the basis of commercial calculation and self-financing
3 Complexity	Cooperation of business entities (actors of AFC) on the inter-branch basis "raw materials - processing - finished products - realization"
4 Purposefulness	Vision of the common mission and the sole purpose of meeting the needs, demands and preferences of consumers for safe and quality food products
5 Unity of interests	Achievement of higher efficiency, productivity and profitability of agro-food production
6 Fairness	Objective consideration of production costs and fair distribution of income and / or profits received by AFC actors
7 Constancy	a) maintaining the internal organization of the AFC with respect to external influences; b) promoting economic development and social progress and eliminating dangerous environmental impacts
8 Collectivity	Conscious of the activities of all groups and employees of entrepreneurial structures included in AFCs as a necessary condition for survival, conservation and sustainable development in a changing economic environment
9 Innovation	Orientation to the involvement of social, environmental, organizational, marketing, logistic, information and computing and technological innovations, production of innovative types of food products and provision of innovative services

Sources: [FAO (2014), Borodina O. (2014), Krysanov D. (2016)]

Table 2 Calculation of variants for formation of incremental value added (on the example of grain)*

Indicators	Cereal total	Wheat	Barley	Corn
Grain production				
Amount of product, thousand tons	100	23	11	66
Sales price, UAH for 1ton including VAT	X	3367	3195	3581
Share of value added in production, %**		50,5	45,5	46,5
Added value created while producing grain, UAH million	164,9	39,1	16,0	109,8
Grain export				
Price FOB, UAH per 1 ton	X	3550	3825	3755
Share of value added in export logistics, %	48			
Added value created when exporting grain, UAH million	32,2	4,0	7,3	20,9
Total value added when producing and exporting grain, UAH million	198,4			
Alternative variants of grain use in livestock production	Milk production		Meat production (pork)	
The amount of product that can be obtained when using 100 thousand tons of grain, thousand tons	258,4		18,6	
Sales price of livestock product, UAH for 1 ton including VAT	5336		29617	
Share of value added in production, %**	48,7		38,1	
Added value created while using grain in livestock, UAH million	219,5		270,8	
Total value added when producing and processing grain for livestock product, UAH million	384,3		436,2	
Increase in aggregate value added created while producing and processing grain for livestock product in comparison with export, times	1,94		2,20	
Increase of value added while processing already harvested grain for livestock product	6,80		8,40	

in comparison with export, times		
The number of additionally created jobs	900	400

Source: calculated according to the State Statistics Service of Ukraine

* on the example of 100 thousand tons of grain and in the conditions of the year 2015

** the indicator adjusted in compliance with the production structure according to categories of farms