

COOPERATIVE FORMATIONS IN THE SYSTEM OF REGIONAL PROVIDING LOGISTICS OF AGRIBUSINESS

UDC 65.012.34

O. Velychko

The terms "specialized agrilogistics cooperative society" and "cooperative society with attendant agrilogistics activity" have been introduced and defined. The particular features of regional development of cooperative logistics in agribusiness of Ukraine and Dnipropetrovsk region have been studied. The forming factors of the cooperative model of providing agrilogistics in the system of stockpiling and distribution of primary milk products have been defined by the example of a particular region and classified by means of the SWOT-model. Priority directions of developing agribusiness logistics providing in a region through the system of serving cooperation have been generalized. The strategy of fiscal stimulation of development in alternative export-oriented cooperative logistics in agriculture of Ukrainian regions has been suggested.

Keywords: cooperative societies, logistics, agribusiness, region, SWOT-factors, development, priorities, corporations, alternative.

КООПЕРАТИВНІ УТВОРЕННЯ В СИСТЕМІ РЕГІОНАЛЬНОЇ ЗАБЕЗПЕЧУВАЛЬНОЇ ЛОГІСТИКИ АГРОБІЗНЕСУ

УДК 65.012.34

Величко О. П.

Введено поняття "спеціалізований агрологістичний кооператив" і "кооператив із супутньою агрологістичною діяльністю" та визначено їх сутність. Досліджено окремі особливості регіонального розвитку кооперативної логістики агробізнесу в Україні та Дніпропетровській області. Чинники формування кооперативної моделі забезпечувальної агрологістики в системі заготівлі і збуту молочної сировини визначено на прикладі окремого регіону та класифіковано їх за SWOT-моделлю. Узагальнено пріоритетні напрями розвитку логістичного забезпечення агробізнесу регіону через систему обслуговуючої кооперації. Запропоновано стратегію фіскального стимулювання розвитку альтернативної експортно-орієнтованої кооперативної логістики в АПК регіонів України.

Ключові слова: кооперативи, логістика, агробізнес, регіон, SWOT-чинники, розвиток, пріоритети, корпорації, альтернатива.

КООПЕРАТИВНЫЕ ОБРАЗОВАНИЯ В СИСТЕМЕ РЕГИОНАЛЬНОЙ ОБЕСПЕЧИТЕЛЬНОЙ ЛОГИСТИКИ АГРОБИЗНЕСА

УДК 65.012.34

Величко А. П.

Введены понятия "специализированный агрологистический кооператив" и "кооператив с сопутствующей агрологистической деятельностью", а также определена их сущность. Исследованы отдельные особенности регионального развития

кооперативной логистики агробизнеса в Украине и Днепропетровской области. Факторы формирования кооперативной модели обеспечительной агрологистики в системе заготовки и сбыта молочного сырья определены на примере отдельного региона и классифицированы по SWOT-модели. Обобщены приоритетные направления развития логистического обеспечения агробизнеса региона через систему обслуживающей кооперации. Предложена стратегия фискального стимулирования развития альтернативной экспортно-ориентированной кооперативной логистики в АПК регионов Украины.

Ключевые слова: кооперативы, логистика, агробизнес, регион, SWOT-факторы, развитие, приоритеты, корпорации, альтернатива.

Agrarian logistics as well as all other types of business logistics may have rationalistic and providing character or their integrated manifestations [1]. Providing agrilogistics is directly focused on the study of different logistical formations (organizations, objects, canals, chains, networks and so on), connected with certain logistical operations (processes), which form the necessary conditions for running main directions of business at agrarian enterprises (meet the demand through production agricultural produce).

In the whole world the most widespread forms of performing agrarian activity are private-cooperative and farm-cooperative ones.

Two main models of logistical organization of agrarian business are based on them – corporative and cooperative. Meanwhile, corporative agrilogistics including consecutive stages of supply, provision and distribution are under control of one or several people, and in cooperative one they are controlled through democratic management and multi-personal equal co-ownership preferably on non-profit base. The purpose of the former is to maximize corporative financial results, the purpose of the latter is to minimize logistical expenses and to increase the profit for owners (members) of the cooperative society [2].

Research of the process of formation and development of cooperative logistics in agrarian sector of Ukrainian economy is an extremely actual and important scientific problem nowadays.

Studying different branch types of logistics is the subject of many researches carried out by foreign and domestic scientists. The development of this field is represented in the works by A. Gadzhinskiy [3], J. S. Johnson, Y. Krikavskiy, M. Christopher, R. Larina, T. Lepeyko, M. Ocklahander, V. Ponomarenko, V. Sergejev, K. Tankov, O. Trydid, A. Harrison, N. Chukhray and others.

The particular problems of rationalistic or provisional agrarian logistics were studied by such scientists as A. Biere [4], A. Kelemis [5], T. Kosareva, I. Manikas [5], I. Smirnov, D. Folinas [5] and others.

The features of organization and development of cooperative establishments in agribusiness were the focus of publications by V. Zinovchuk [6], N. Zinovchuk [6], M. Kisil, P. Makarenko, M. Malik, L. Moldovan, A. Panteleimonenko, P. Sabluk, I. Svynous [7], Y. Ushkarenko and others.

However, the studies which represent features and trends in development of logistics in the system of agrarian providing cooperation are scanty. Besides, the issue of defining and generalization of strengths and weaknesses, opportunities and threats in the spread of cooperative agrilogistics is insuffi-

ciently studied and systematized. Special attention should be paid to the search of sources for supporting development of this alternative logistical direction in contemporary Ukrainian agribusiness. Hence there is a real need for profound study of this problem.

The main purpose of the research is to specify the category apparatus in the system of cooperative agrilogistics and to systematize the factors of its formation, and to study the directions of development at the regional level.

The process of manufacturing (technological operations) and support of manufacturing (logistical operations) are fundamentally different business processes.

Technological operations are operations which contribute to qualitative transformation of labor subject. Logistical operations are operations which provide the availability of necessary subjects of labor in a certain amount, in a certain place and at a necessary time. Thus logistical operations are any operations which are performed by using material subjects and labor outputs in the sphere of manufacturing and circulation except for technological operation of producing material goods [3]. Main logistical processes are supply, stockpiling, provision of manufacturing and physical distribution.

Agriculture serving cooperative societies (ASCS) can be considered as a group of agricultural manufacturers with their own farms which decided to act together in areas where they cannot succeed working separately [6].

Hence the activity of agrimanufacturing and agriprocessing serving cooperative societies is directly connected with technological processes, providing, stockpiling-distributing, transportation and some other service cooperative societies in the system of supporting cooperation specialize in certain services of logistical provision of agribusiness, its members and subjects.

Multifunctional cooperative societies may be simultaneously connected with both technological and different logistical operations in agriculture [7].

It enables us to differentiate between the terms "specialized agrilogistical cooperative society" and "a cooperative society with attendant agrilogistical activity".

A specialized agrilogistical cooperative is an agricultural serving cooperative society with main tasks of providing separate logistical process (processes) in activity of its members or other subjects of business activity.

A cooperative society with attendant agrilogistical activity is an agricultural serving or manufacturing cooperative society with one of the tasks of providing separate logistical process (processes) in activity of its members or other subjects of business activity.

In Ukraine nowadays the agricultural lands are owned by those people who gained the ownership as members of collective agricultural enterprises and social workers of villages or heirs to owners of shares. Their total number is almost 7 million people [8]. Among them only 21.5 thousand landowners, that is only 0.3 % are the members of serving cooperative societies. Meanwhile in most economically developed countries cooperative model of running a business is dominant.

The profit received from activity in agriculture is considered to be an important source of existence by only 12 % of villagers. The exception is only AR Crimea where this index is almost two times higher [9]. To a certain extent such exception is connected with the rural cooperative movement. Thus calculations based on the data by Agrarian Ministry [10] testify that the volume of share fund in the Crimean serving cooperative societies is 77 % of its total number in Ukraine. Besides compared with general Ukrainian indices ASCS of the AR Crimea takes the first place by the amount of stockpiled and sold fruit-vegetable production (25.4 %) and the number of occupied workers (16.7 %), and the second place by its share of basic assets (9.5 %).

On the 1st of January, 2013 in Ukraine there were only 885 agrarian serving cooperative societies [11]. Meanwhile, the

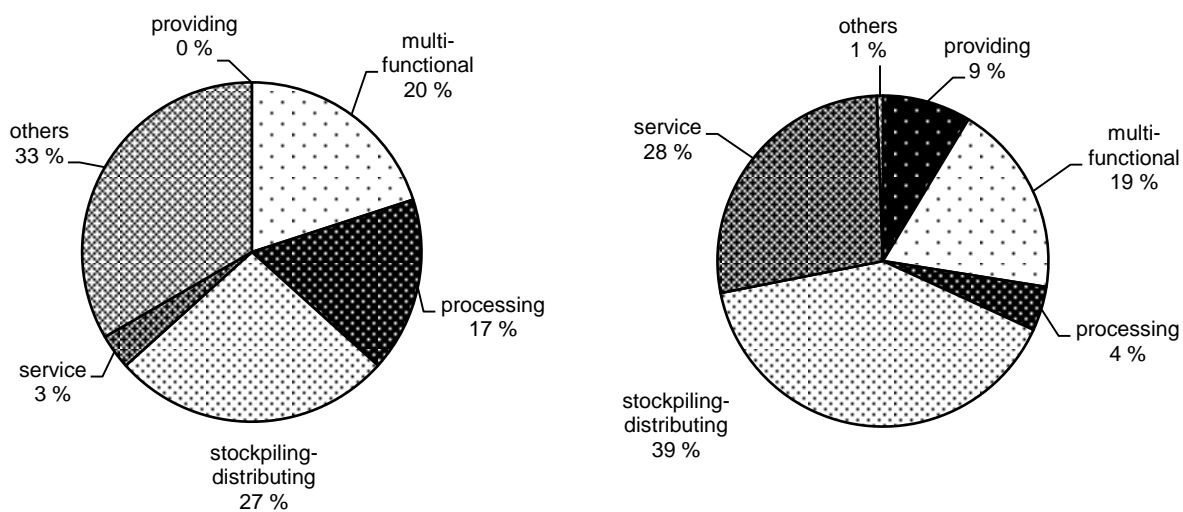
development of a cooperative movement in Ukrainian village remains problematic that implies the presence of a major share of economically inactive ASCS.

The most dynamic type concerning cooperation societies is dairy agrilogistics. Cooperative societies with such specialization exist in almost all regions of Ukraine. Moreover in one third of regions the cooperative rural movement is connected with exclusively dairy business. In 48 % regions cooperative societies are also involved in logistics of gathering and distribution of grains, and in 36 % in fruit-vegetable production.

The research shows that the important place in strengthening the economy of ASCS is occupied by a number the members which use its services. Hence, in Ukraine on average in case of increasing of share fund of agricultural serving cooperative society by 1.0 UAH the amount of logistics services increases only by 25.3 UAH, but with the usage of additional member of cooperative society this index increases by 2,074.0 UAH.

The development of logistics within the system of serving cooperation in Dnipropetrovsk region has certain features.

The sphere of the working cooperative agrilogistics here is mainly represented by specialized logistical cooperative societies (stockpiling-distributing, separate multifunctional and service and other cooperative societies) (Fig. 1).



Factual on 01 Jan 2013

Desirable according to results of survey in rural and village councils

Fig. 1. Structure of number of agricultural serving cooperative societies in Dnipropetrovsk (author's calculations according to the data of the Steppe Survey of the Scientific Research Center of productivity in agrarian complex)

Specific weight of such cooperative societies among ASCS is about 80 %. Meanwhile the survey of 323 heads of rural and village councils in the region in 2012 (generalized by the Steppe Survey of the Scientific Research Center of productivity in agrarian complex) testified the prospect of development exactly in the agricultural serving cooperative societies with specialized or attendant logistical activity. In the studied by the leaders of local communities the desired number of serving cooperative societies the share reaches over 90 %. Meantime there is the significant increase in specialized logistical cooperative societies (suppliers – from 0 up to 9 % and stockpiling-distribution – from 27 up to 39 %).

Furthermore, the pace of development in the regional cooperative movement is connected with the fact that economically active ASCS remains only in Pokrovskiy and Apostolivskiy regions, in 10 more regions logistical cooperative societies are registered but in fact they don't work, in the other 10 regions they are completely absent.

The contemporary logistical activity of serving cooperative societies in Dnipropetrovsk region is mainly connected with stockpiling and distribution of initial dairy materials.

The research defined and classified the main SWOT factors in development of cooperative dairy logistics which are the most developed in the region (Fig. 2).

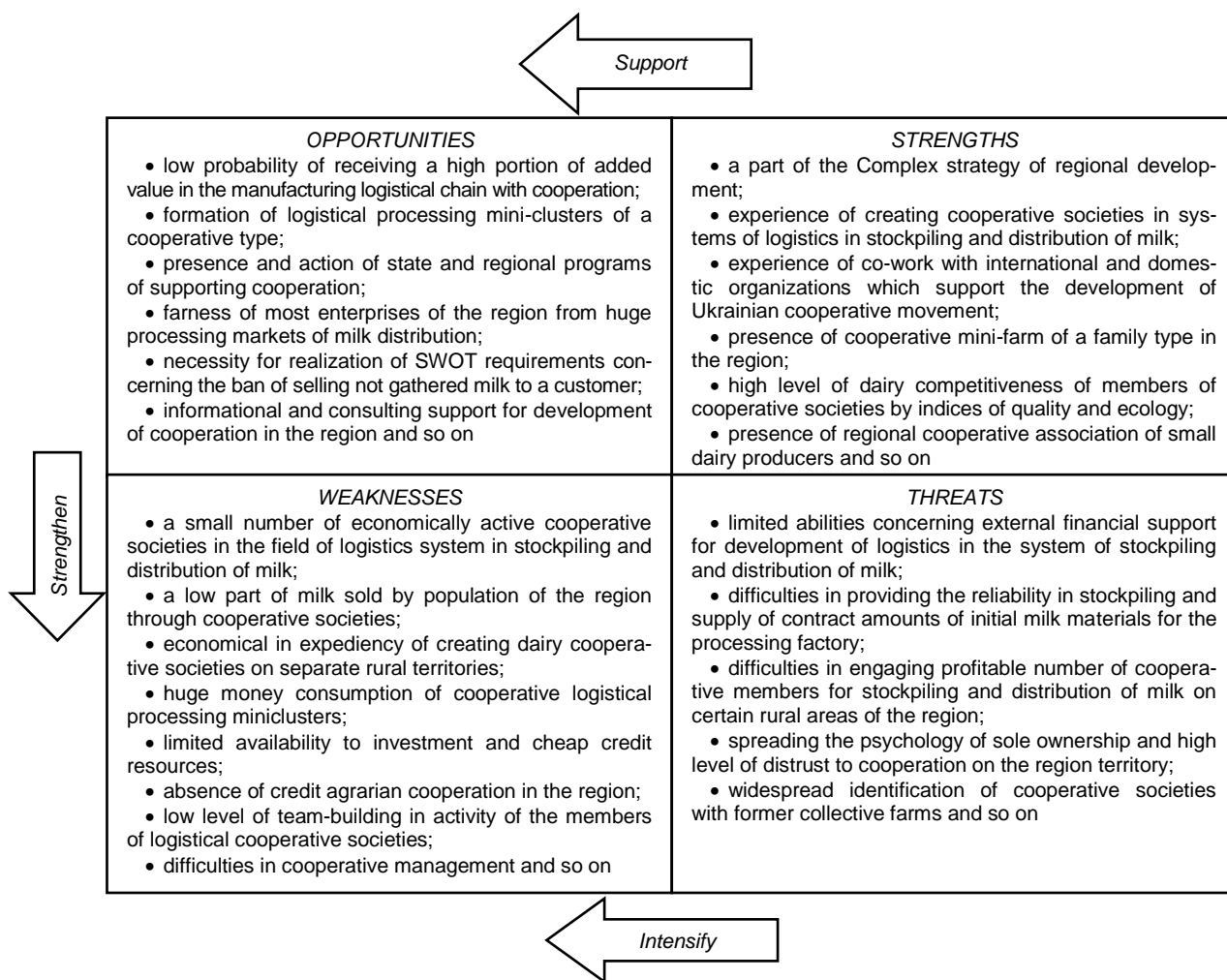


Fig. 2. Analytical SWOT-model of the regional development in cooperative logistics in the system of stockpiling and distribution of initial milk materials (by the example of Dnipropetrovsk region) (author's development)

To a large extent the development of dairy cooperative societies in Pokrovskiyi and Apostolivskiyi regions was supported by a certain financial assistance from international donor organizations and funds of state and regional budgets.

The factor is surely important hence the results of survey identify the main limitation factor of development of cooperation in the region as lack of funds for creating and activity of cooperative societies, especially for purchasing of equipment and techniques as well as imperfect credit-fiscal politics towards ASCS. But an important problem in this case is absence of effective leaders and information about the advantages of cooperative activity.

Moreover, one of the important causing factors in development of dairy cooperation in rural areas in Pokrovskiyi and Apostolivskiyi regions is uncomfortable logistics due to large remoteness from big processing markets of milk distribution compared to many other suburban areas of the region.

Nowadays retail markets of big cities provide the most favorable price conditions for selling dairy produce. Along with that Ukraine undertook a responsibility till 2015 before World Trade Organization concerning the ban to household beef cattle and sale of not gathered dairy products to customer

and so on. Hence, in the near future this factor can stimulate active development of dairy and other cooperation and suburban areas of Dnipropetrovsk region.

Moreover the demand for initial dairy produce which is distributed through cooperative societies begins to increase also among processing factories of the region. Due to the features of forage base of rural enterprises their milk is more competitive by ecological indices than many big agricultural enterprises' one. All these factors as well as local surveys state the grounding of formation of local regional strategy in priority development of cooperative societies in the system of logistical stockpiling and distribution of initial dairy materials (Fig. 3).

The first steps in this direction are being made now. In such a way in 2012 in Pokrovskiyi area of Dnipropetrovsk region the opening of the first in Ukraine Cooperative Educational Farm in the context of the project "Cooperative Educational Farm and Services" took place.

It is also prospective to form logistical processing mini-clusters of a cooperative type in dairy cattle breeding. Furthermore, real preconditions for it are formed in neighboring Apostolivskiyi and Kryvorizkiy areas.

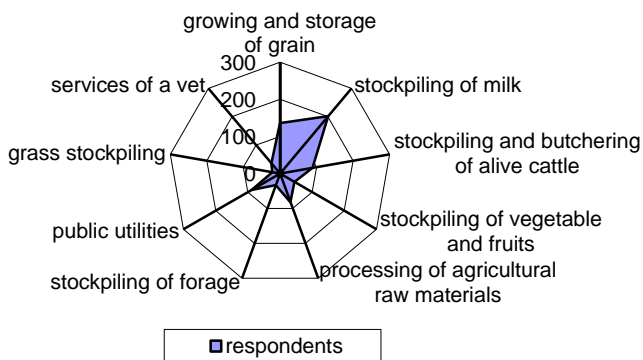


Fig. 3. Priority directions in activity of ASCS in Dnipropetrovsk region (author's calculations according to the data from the Steppe Zonal Scientific Research Center of productivity in agrarian complex)

Prospective development of corporate food agrilogistics in the region requires government support in building and transformation through operative or financial leasing of cooperative logistical fruit-vegetable powers.

Nowadays Dnipropetrovsk region has the largest number of logistical elevator objects in the Steppe zone (2 – 3 elevators in each rural area) [12]. At the same time the development of cooperative establishments within the system of export-focused logistics of stockpiling and distribution of grains, due to shortage of powerful investment and limitation of the government support and high competitiveness of the private-corporate sector is still difficult though it is a rather prospective way of forming a cooperative-logistical model of agribusiness in the region.

The widespread interregional corporative establishments in the contemporary agricultural complex are agriholdings. In these organizations powerful massive agricultural production takes place as well as processing of initial agricultural materials owing to that they receive economical effect from the production scale and control over the logistical chain (storage, transportation, distribution and so on).

The enlargement of agrarian manufacturing to a large extent is caused by the attempts to use the advantages of effect from its scale. In practice it concerns both private-corporative and farmer-cooperative models of agribusiness. Along with that the real manifestation of such an effect is either debatable or limited due to disproportional increase of inputs for management, control, transportation and so on.

However, the decrease of level of constant expenses per unit of finished product is not the only and often not the main advantage of scale effect in agribusiness.

So, today middle levels of agricultural enterprises in Ukraine are among the highest in Europe and the rest of the world. But the main purpose of such enlargements is not achieving the larger economic effectiveness from a unit of agricultural product or limited resource (ha, unit and so on), but receiving the bigger amount of net profit and increase in abilities to use powerful investment resources.

Furthermore, main investments into agrarian sector of economy are made at the level of big agricultural holdings. Big agrarian companies in the search for relatively cheap and powerful investment resources have the opportunity to enter the global financial markets and receive funding not only through issuing and selling own securities but also through bank crediting. In Ukrainian banks interest rate on such credits

is twice or thrice overstated.

According to the American researcher B. Johnson corporative agrarian business more likely strengthens rural economy than weakens. But the ability of corporative rural enterprises to increase the effectiveness of agrarian economy without depopulation of rural local and degradation of village communities is doubtful [13].

Both small and middle-level farm-cooperative manufacturing and high private corporate agribusiness have the right to exist. However they must perform different functions. Owing to the former it is necessary to develop labor-consuming agribusiness, be the economical base for village communities, employ rural population, and support agricultural landscapes and so on. The task of the latter is to invest into export-focused big-scale production in plant growing and cattle breeding. Thus there can be correspondingly different regimes of taxation, export, government support [14].

Meanwhile the world experience upholds the need for developing both alternative system of export of agricultural produce which is based on cooperative measures.

Taking the above-mentioned into account it is necessary to work on the fiscal strategy which would create the conditions for reasonable involvement by a corporative business in the system of agrarian export logistics of numerous cooperative joint ventures.

One of the most priority directions of the flexible tax regulation may become foreign trade operations with grains. Meantime carrying out agritrading activity with the help of logistical objects (elevators, transportation organizations and so on) which in the defined limits will be upon control of joint cooperative establishments, the government and traders must receive certain exemptions.

Such conditions will partly stimulate private-corporative businesses to investment participation in development of alternative export grain logistics in regions of Ukraine.

In theory of agricultural cooperation and providing logistics it is reasonable to use the terms "specialized agrilogistics cooperative society" and "cooperative society with attendant agrilogistics activity". Their essence is worth connecting with measure of focusing on logistical provision of main activity for users of cooperative services. Moreover such agricultural serving cooperative societies are reasonable to be considered as a type of providers on the basic level of outside logistics.

The experience in ASCS functioning in Ukraine confirms direct relation of volume of logistical services and indirect relation of their price and number of members of a cooperative society which uses these services.

The strategic analysis of regional development within a cooperative model of agrilogistics providing is reasonable to be carried out using the SWOT-model. Meanwhile the study has defined that nowadays in Dnipropetrovsk region there are serious threats which increase the probability of manifesting weak factors and withhold development of cooperative dairy logistics in the region. Furthermore there are numerous strengths which to a certain extent uphold the existing prospective opportunities of forming the cooperative model of stockpiling and distribution of initial dairy materials.

At present stage priority approaches of regional development should be dairy and fruit-vegetable food logistics. In the long-term prospect development of export-focused grain cooperative logistics based on forming mixed agrilogistics providers is also necessary and actual.

Stimulation in development of alternative export-focused cooperative logistics of the regional agrarian complex of regions

in Ukraine should to be carried out through flexible application of special fiscal instruments in the system of agritrading activity.

References: 1. Величко О. П. Сутність раціоналістичної і забезпечувальної логістики та її зв'язок з менеджментом / О. П. Величко // Вісник Національного університету "Львівська політехніка". Серія "Логістика". – 2012. – № 735. – С. 26–33. 2. Velychko O. Typology and type diversity of logistics in economy / O. Velychko // Економіка розвитку. – 2013. – № 1(65). – С. 14–19. 3. Гаджинский А. М. Логистика : [учебник] / А. М. Гаджинский. – М. : ИТК "Дашков и К", 2005. – 432 с. 4. Biere A. Agribusiness Logistics : An Emerging Field in Agribusiness [Electronic resource]. – Access mode : https://www.ifama.org/events/conferences/2001/cmsdocs/Biere_Arlo.PDF. 5. Manikas I. Modeling (identification and prioritization) of logistics processes in the Agrifood Supply Chain / I. Manikas, A. Kelemis, D. Folinas // CIOSTA & CIGR Section V, Conference, 2011, 29 June – 1 July 2011, Vienna, Austria – Access mode : http://www.nas.boku.ac.at/fileadmin/_/H93/H931/CIOSTA_Presentations/manikas.pdf. 6. Зіновчук Н. В. Сільськогосподарський обслуговуючий кооператив як організаційна форма виробництва та реалізації біопалива // Н. В. Зіновчук, В. В. Зіновчук, В. В. Кухарець // Вісник Житомирського національного агрокологічного університету. – 2011. – Т. 2. – № 1. – С. 65–73. 7. Свиноус І. В. Сучасний стан функціонування кооперативних зв'язків в тваринницькій галузі України / І. В. Свиноус // Сталій розвиток економіки. – 2012. – № 3. – С. 239–243. 8. Гончарук О. Ринок земель сільськогосподарського призначення: погляд на проблему потенційних учасників [Електронний ресурс] / О. Гончарук. – Режим доступу : <http://racurs.ua/print/111>. 9. Портрет землевласника на тлі його паю [Електронний ресурс]. – Режим доступу : <http://racurs.ua/117>. 10. Інформація щодо діяльності сільськогосподарських обслуговуючих кооперативів (СОК) станом на 01.07.2012 р. [Електронний ресурс]. – Режим доступу : <http://minagro.gov.ua/uk/ministry?nid=3976>. 11. Розвиток сільськогосподарських обслуговуючих кооперативів в Україні [Електронний ресурс]. – Режим доступу : <http://minagro.gov.ua/uk/ministry?nid=3694>. 12. Елеватори України. Дніпропетровська область [Електронний ресурс]. – Режим доступу : <http://www.4sg.com.ua/elevators.php?o=3>. 13. Johnson, Bruce B. Corporate Restrictions in U.S. Production Agriculture: Economic Implications / Johnson, Bruce B. // Journal of American Society of Farm Managers and Rural Appraisers. – 1995. – Pp. 21–26. 14. Матеріали до обговорення проекту Закону України "Про ринок земель" [Електронний ресурс]. – Режим доступу : <http://be.convdocs.org/docs/index-67598.html>.

References: 1. Velychko O. P. Sutnist ratsionalistychnoi i zabezpechualnoi lohistyky ta yii zviazok z menedzhmentom [The Essence of rationalistic and providing logistics and its connection with management] / O. P. Velychko // Visnyk Natsionalnoho universytetu "Lvivska politekhniky". Seria "Lohistyka". – 2012. – No. 735. – Pp. 26–33. 2. Velychko O. Typology and type diversity of logistics in economy / O. Velychko // Ekonomika rozvytku. – 2013. – No. 1(65). – Pp. 14–19. 3. Gadzhinskiy A. M. Logistika [Logistics] : uchebnik / A. M. Gadzhinskiy. – M. : ITK "Dashkov i K", 2005. – 432 p. 4. Biere A. Agribusiness Logistics : An Emerging Field in Agribusiness [Electronic resource]. – Access mode : https://www.ifama.org/events/conferences/2001/cmsdocs/Biere_Arlo.PDF. 5. Manikas I. Modeling (identification and prioritization) of logistics processes in the Agrifood Supply Chain [Electronic resource] / I. Manikas, A. Kelemis, D. Folinas // CIOSTA & CIGR, Section V, Conference, 2011, 29 June – 1 July 2011, Vienna, Austria. – Access mode :

http://www.nas.boku.ac.at/fileadmin/_/H93/H931/CIOSTA_Presentations/manikas.pdf. 6. Zinovchuk N. V. Silskohospodarskyi obsluhovuiuchy kooperativ yak organizatsiina forma vyrobnytstva ta realizatsii biopalyva [Agricultural serving cooperative society as the organizational form of manufacturing and distribution of biomass fuel] // N. V. Zinovchuk, V. V. Zinovchuk, V. V. Kukharets // Visnyk Zhytomyrskoho natsionalnoho ahrokolohichnoho universytetu. – 2011. – Vol. 2. – No. 1. – Pp. 65–73. 7. Svinous I. V. Suchasnyi stan funktsionuvannia kooperativnykh zviazkiv v tvarynnytskii haluzi Ukrainy [Current state of functioning the cooperative connections in cattle-breeding area of Ukraine] / I. V. Svinous // Stalyi rozvytok ekonomiky. – 2012. – No. 3. – Pp. 239–243. 8. Honcharuk O. Rynok zemel silskohospodarskoho pryznachennia: pohliad na problemu potentsiinykh uchasykyv [Market of agricultural lands : a view on the issue of potential participants] [Electronic resource] / O. Honcharuk. – Access mode : <http://racurs.ua/print/111>. 9. Portret zemlevlasnyka na tli yoho pau [A portrait of a landowner on the background of his share] [Electronic resource]. – Access mode : <http://racurs.ua/117>. 10. Informatsia shhodo dialnosti silskohospodarskykh obsluhovuiuchykh kooperativiv (SOK) stanom na 01.07.2012 r. [Information about the activity of agricultural serving cooperative societies (ASCS) for 1 July 2012] [Electronic resource]. – Access mode : <http://minagro.gov.ua/uk/ministry?nid=3976>. 11. Rozvytok silskohospodarskykh obsluhovuiuchykh kooperativiv v Ukraini [Development of agricultural serving cooperative societies in Ukraine] [Electronic resource]. – Access mode : <http://minagro.gov.ua/uk/ministry?nid=3694>. 12. Elevatory Ukrainy. Dnipropetrovska oblast [Elevators of Ukraine. Dnipropetrovsk region] [Electronic resource]. – Access mode : <http://www.4sg.com.ua/elevators.php?o=3>. 13. Johnson, Bruce B. Corporate Restrictions in U.S. Production Agriculture: Economic Implications / Johnson, Bruce B. // Journal of American Society of Farm Managers and Rural Appraisers. – 1995. – Pp. 21–26. 14. Materialy do obhovorennia proektu Zakonu Ukrainy "Pro rynek zemel" [Materials for discussing the draft of Law of Ukraine "On the Land Market"] [Electronic resource]. – Access mode : <http://be.convdocs.org/docs/index-67598.html>.

Information about the author

O. Velychko – Ph.D. in Economics, Associate Professor, Head of Management and Law Department of Dnipropetrovsk State Agrarian University (25 Voroshylov St., 49600, Dnipropetrovsk, Ukraine, e-mail: olvel@ukr.net).

Інформація про автора

Величко Олександр Петрович – канд. екон. наук, доцент, завідувач кафедри менеджменту і права Дніпропетровського державного аграрного університету (49600, Україна, м. Дніпропетровськ, вул. Ворошилова, 25, e-mail: olvel@ukr.net).

Информация об авторе

Величко Александр Петрович – канд. экон. наук, доцент, заведующий кафедрой менеджмента и права Днепропетровского государственного аграрного университета (49600, Украина, г. Днепропетровск, ул. Ворошилова, 25, e-mail: olvel@ukr.net).

A double-blind peer review has been held.

Стаття надійшла до ред. 03.04.2013 р.