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*O. Velychko*

*Doctor of Economics, Professor, Head of Management and Law Department,  
Dnipro State Agrarian and Economic University, Ukraine*

*L. Velychko*

*PhD in Public Administration, Senior lecturer at the Department of Economics, Entrepreneurship and Management of Enterprises, Oles Honchar Dnipro National University, Ukraine*

*R. Ivanchuk*

*Master of Management, Junior Scientific Officer  
Dnipro State Agrarian and Economic University, Ukraine*

## **MANAGEMENT OF COMPETITIVENESS OF THE SUPPLY CHAIN IN THE LOGISTICAL SYSTEMS OF A SMALL AGRARIAN BUSINESS**

*О.П. Величко,*

*доктор економічних наук, професор, завідувач кафедри менеджменту і права,  
Дніпровський державний аграрно-економічний університет, Україна*

*Л.А. Величко,*

*кандидат наук з державного управління,*

*доцент кафедри економіки, підприємництва та управління підприємствами  
Дніпровський національний університет імені Олеся Гончара, Україна*

*Р.О. Іванчук,*

*магістр менеджменту, молодший науковий співробітник,*

*Дніпровський державний аграрно-економічний університет, Україна*

### **УПРАВЛІННЯ КОНКУРЕНТОСПРОМОЖНІСТЮ ЛАНЦЮГА ПОСТАЧАВАННЯ В ЛОГІСТИЧНИХ СИСТЕМАХ МАЛОГО АГРАРНОГО БІЗНЕСУ**

*Under contemporary conditions, the development of the integrated approach features to the logistics management in the supply chain is crucial. Considering that fact, the development of methodical approaches toward grounding managerial decisions in the logistics systems of agrarian enterprises is essential. A small-scale sector of the agrarian enterprise plays an important role. In the article, the features of managing agricultural supply chain based on the logistical approach have been represented. The purpose of the research is to develop the system of the logistics management over the supply chain and development of the measures of its improvement under the conditions of the business activity in small-scale agricultural enterprises. The methods of the research: monography, calculating-constructive, economic-statistical, graphic, linear programming, grouping, comparison, correlation-regressive analysis, ABC-XYZ-analysis, time-study and so on. The theoretical-methodological means of the logistics management within the agribusiness have been developed. The peculiarities of the logistics system of management over the supply chain in a small-scale sector of the agrarian production have been generalized. Further development of applying the existing knowledge of the optimal management over the supply chain*

*in new objects of the logistics management of a typical small-scale enterprise in the agrarian sector of the economy has been studied. The model of integrative application of the logistics concept LP, the system of satellite navigation, procedure of management based on ABC-XYZ-analysis, methodical approach toward selection of the logistics strategy of cooperation with consumers and methods of optimizing the system of distribution logistics have been suggested. The development of the strategy of the supply chain at enterprises of small-scale agrarian businesses should be based on integration and cooperation; it will make possible to receive a set of possibilities and advantages for processing and selling the produce. This measure will promote the integration of the members of the cooperative with the interests of other links in the producing-logistics chain and lead to decreased compatibility at agricultural enterprises. The essence of the obtained results could be considered in the development of the possibilities of the integrated management over the supply chain based on the principles of logistics in small agricultural enterprises. The developed recommendations might be used in the logistics activity of farming enterprises.*

*У сучасних умовах актуальним є розширення можливостей інтегрованого підходу до логістичного управління ланцюгом постачання в агробізнесі. Зважаючи на це важливим є розвиток методичних підходів щодо обґрунтування управлінських рішень у логістичних системах аграрних підприємств. Особливе місце серед них займає дрібнотоварний сектор аграрного виробництва. У статті розглянуто особливості управління агропродовольчими ланцюгами постачання на засадах логістичного підходу. Метою дослідження є розвиток системи логістичного управління ланцюгом постачання та розробка заходів з її удосконалення в умовах діяльності дрібнотоварних сільськогосподарських підприємств. Методи дослідження: монографічний, розрахунково-конструктивний, економіко-статистичний, графічний, лінійне програмування, групування, порівняння, кореляційно-регресійний аналіз, ABC-XYZ-аналіз, хронометраж та ін. Розвинуто теоретико-методологічні засади логістичного управління в середовищі агробізнесу. Узагальнено особливості логістичної системи управління ланцюгом постачання у дрібнотоварному секторі аграрного виробництва. Знайшло подальший розвиток перенесення відомих знань з оптимального управління ланцюгом постачання на нові об'єкти в логістичному менеджменті типового малого підприємства аграрного сектору економіки. Запропоновано модель інтегрованого використання логістичної концепції LP, системи супутникової навігації, процедури управління запасами на основі ABC-XYZ-аналізу, методичного підходу щодо вибору логістичної стратегії співпраці зі споживачами, а також методів оптимізації системи дистрибутивної логістики. Розвиток стратегії ланцюга постачання підприємств малого аграрного бізнесу на засадах інтеграції та кооперації дозволить отримати низку можливостей та переваг з переробки та реалізації продукції. Цей захід сприятиме об'єднанню інтересів членів кооперативу з інтересами інших ланок виробничо-логістичного ланцюга та сприятиме підвищенню конкурентоспроможності сільськогосподарських підприємств. Значущість одержаних результатів полягає у розвитку можливостей інтегрованого управління ланцюгом постачання на засадах логістики в малих підприємствах агробізнесу. Розроблені рекомендації можуть бути використані в логістичній діяльності фермерських господарств.*

**Keywords:** *logistics system; chain of supply; management; lean production; GPS; stocks; strategy; agribusiness.*

**Ключові слова:** *логістична система; ланцюг постачання; менеджмент; lean production; GPS; запаси; стратегія; агробізнес.*

#### **Setting a task.**

At the contemporary stage of the economic development logistics due to the systematic approach, which is implemented in the process of managing material flows, has become more widespread. Nowadays innovative and

network manufacturing-logistics concept of forming the supply chain by national enterprises has become widely accepted and it takes place in accordance with the requirements of the integral paradigm of logistics, which appeared in the XXI century to replace the technological and marketing paradigms.

The efficiency of the logistics activity at national enterprises is directly dependent on the logistics chains developed by those enterprises. Purchase of material-technical agricultural resources, which are the initial link in the logistics chain, determine the functioning of the manufacturing process, price, quality that is competitiveness of the produce, that determines the highest essence of the purchasing logistics in the logistics system of the agrarian enterprise. At present, the efficient business activity of modern agricultural enterprises does not depend only on the availability of high-tech equipment or innovative developments.

The growing requirements and demands of customers, rapid economic growth and more fierce pressure from competitors encourage modern agricultural enterprises toward integration within the supply chains. Such a decision leads to a greater specialization and efficiency as a result of allocating tasks between certain members of the chain, decrease in operating costs, risk sharing. Agrarian enterprises, which aim at strengthening competitive positions at the sales markets, are to possess the information and to be responsible for the activity of all their suppliers. In this particular case the issue of studying the term “logistics management in the supply chain” is basic for managers of not only transnational companies, but also for small agrarian enterprises [12, 13].

Under contemporary conditions, the development of the integrated approach features to the logistics management in the supply chain is crucial. Considering that fact, the development of methodical approaches toward grounding managerial decisions in the logistics systems of agrarian enterprises is essential. A small-scale sector of the agrarian enterprise plays an important role.

In this context the research made by K. Lowder et. al. states that in the whole world there are about 570 million farms. Most of them are managed by families and are small in size agricultural grounds. Today small farms (smaller than 2 ha) process about 12%, and family farms – about 75% of all world agricultural grounds [10].

All the mentioned above determined the actuality of the theme of the scientific research.

#### **Analysis of the latest achievements and publications.**

Study of theoretical approaches to defining the term “chain supply” made possible to determine key aspects, which are considered by most scientists. Thus, G.G. Zaimes [14], V. Kravtsov [7], M.Y. Postan [11], K. Caffrey [3], M. Chakkol [4] consider that the chain supply is first of all a set of certain organizations, business entities which are regulated by the flows and processes, underlining the space measurement of the supply chain. Moreover, S. Chopra and P. Meindl state that the supply chain consists of all involved parties, which directly or indirectly influence the processing of the customer’s demand. In each organization, where an enterprise is the manufacturer of produce, the supply chain includes all functions, which are connected with receiving and processing the customer’s request (development of new goods, marketing, operations, distribution, finances and customer service) [5].

D.J. Bowersox, J.T. Mentzer, J. T. and T.W. Speh describe the supply chain as a set of three or more objects (organizations or physical entities), which directly participate in the flow of goods, services, finances and/or information from the source to the flow up and down the stream. According to them, there are three levels of complexity in the supply chain: “direct supply chain”, “extended supply chain” and “final supply chain”. Furthermore, the final supply chain includes functional mediators, such as research firms, financial and logistical providers. The supply chain could be of a different complexity, connected with a number of members and a diversity of business processes, but there is always a central organization. That organization can control all components in the supply chain, and even though its organization is not perfect, the supply chain exists as a phenomenon in the business environment [2].

D.M. Lambert [8], S. Lambert [9], V. Govorukha [6] consider the supply chain as the integration, sequence, combination of processes, business-processes, focusing on logistical processes which take place in the supply chains and create the customer value for clients. Such an approach corresponds to the process approach for determining the supply chain; its essence is in consideration of the logistics chain as a sequence of flows and processes, which take place in the functional areas within key logistics business processes of logistics, as a result of logistical functions and operations.

Krykavskyj, Ye.V., Pokhylchenko, O.A., and Fertch, M. in their works stress the importance of determining the supply chain as the chain with the target-focused type of relations between business entities, which lead to integration, cooperation of participants in space and time. The application of the behavioral approach to defining the supply chain reveals the possibilities for obtaining the synergetic effect in the supply chain which is the result of the integration and cooperation in the logistics systems [1].

In our opinion, the latter approach to determining the supply chain is the most contemporary hence it corresponds to the newest integral paradigm of logistics at the current stage of the economic development – competence and cooperation.

However, it is worth noting that the systems of managing operational processes in the supply chain in the integration with other means of logistics modelling, have been studied insufficiently. Furthermore, insufficient attention has been paid to methodological approaches of managing agricultural supply chains within the middle-scale business. Therefore it determined the main tasks of the author’s research.

#### **Goal setting in the article.**

The purpose of the scientific research is to develop the system of logistics management in the supply chain and develop the measures aimed at improving it under conditions of small-scale agricultural enterprises.

The research has been based on the idea of transferring the existing knowledge to new objects with the purpose of their adaptation to field and manufacturing conditions. The methodological base of the research is the combined application of the logistics concept LP, ABC-XYZ-analysis, system GPS, linear programming, as well as mini-max and max-mini approaches in a win situation.

The object of the research is the process of managing the supply chain at enterprises of a small business in the agrarian economic sphere.

The subject of the study is theoretic-methodological and practical aspects of managing competitiveness of the supply chain based on the logistics approach.

Materials for the research were a group of typical farming enterprises in the Novomoskovsk area of the Dnipropetrovsk region (Ukraine). At that, the general scientific and special methods of the research were used in the study. The latter included: monography, calculating-constructive, graphic approaches, linear programming, grouping, comparison, correlation-regression analysis, ABC-XYZ-analysis, time-study and so on.

#### **Results of the research.**

The stocks are some of the most expensive assets for most small enterprises in agribusiness. Therefore, the efficient management of stocks makes possible to decrease the costs connected with their surplus or deficit. The carried out research with the help of the method ABC-XYZ in the farming enterprise “Skif” revealed that the category of produce “AX” (winter wheat, corn for grain) is characterized by the demand, high consumer value; “AY” (sunflower) is characterized by high consumer value, average level of prediction reliability; “BY” (wheat) is characterized by uneven but predictable demand; “BZ” (spring barley) is characterized by average consumer value, average amounts of sales and not regular consumption; “CY” (sugar beet) provides the insignificant profit; “CZ” (buckwheat) is characterized by the unpredictability and small amounts of demand, therefore it is desirable to get rid of that produce stocks.

Moreover, the carried out research made possible to conclude that the stocks of produce are of a high demand, and make a big share in the profit of the enterprise (produce AX – winter wheat, corn for grain), therefore they should be placed as close to the consumer as possible. The lower the coefficient of the demand variation by a certain type of produce, the higher the probability of keeping it in stock. The work with the produce, which has a high demand, but provides not a big profit (produce CY – sugar beet), should be critically analyzed and reorganized with the purpose of decreasing costs and consequently increasing the profit. The produce, which creates a small demand, but also brings a small profit (produce CZ – buckwheat), should be sold as soon as possible.

Optimization of warehouse stocks was made based on the carried out ABC-XYZ-analysis (Tab. 1).

**Table 1. Stocks of produce at the warehouse after optimization and redistribution by the method of ABC, %**

Group	Factual loading of the warehouses, %	Optimized loading of the warehouses,%
A	35	50
B	15	30
C	30	20

Source: developed by the third author

As a consequence the percentage of loading groups A and B increased, group C remained at a small amount. At the same time, it promotes the increase in the level of servicing, since the produce of a high and average demand is represented in a big amount. Besides, to solve most problems, which arise between the transportation department and warehouses, it is sufficient to clearly plan and organize correctly the interaction between them. At that, it should be done only in two points where business processed of these two departments intercross, that is receiving and shipping produce.

The logistics concept Lean Production implies the application of new principles of management based on the constant clarification of the real price of the produce, constant optimization of the flow of creating the value, provision of the continuous creation of the value, formation of conditions for “extracting” the produce by the consumer.

The application of the satellite navigation system will make possible to determine real areas of fields, realize how the equipment works. Since the enterprise actively expands, the process of measuring land usage will be continuous if the area of the rented land increases. Moreover, the installation of GPS-navigators in the equipment will make possible in the first year of using this system to reduce the accounting work, control over the carried out works, analyze the downtime.

Besides the implementation of the GPS system of monitoring vehicles with the system of parallel driving will make possible to provide the minutely control over the work of vehicles including unreasonable trips, optimize routes of transport and enhance the quality and time of carrying out technological operations. The practical reduction in mileage is 25 %; the decrease in mileage also decreases the petrol costs, and provides a very high precision of driving, which is achieved by the preset routes even in cases of bad visibility. The system makes possible to reduce the petrol costs at the expense of the control over filling up vehicles and stealing petrol by 8%, and average losses due to the downtime and uneconomical use of the working time (Tab. 2).

Hence, the total sum of saving per year is 90648 UAH. Besides, the optimization of the workplace and application of the navigational system influence the efficiency of the works, in particular decrease the downtime, additional trips and so on. The analysis of the carried out main works done by a tractor-driver during harvesting work (fragment) has been made and represented at the existing scheme based on the logistics concept LP (Tab. 3).

**Table 2. Efficiency of implementing the GPS system in FE “Skif”, UAH**

Indexes	Before installing GPS system (2017)	After installing GPS system (project)	Decrease in costs, UAH
Due to mileage control			
Average mileage of one vehicle, km/year	2700	2200	500
Average mileage of 5 vehicles, km/year	13500	11000	2500
Average fuel costs per 1 vehicle, UAH/year	72900	59400	13500
Average fuel costs per 5 vehicles, UAH/year	364500	297000	67500
Effect due to control, UAH/year	378000	308000	70000
Due to the decrease in mileage			
Economic effect due to the decrease in mileage for all vehicles, UAH/month	21705.6	15193.9	6511.7
Due to the control of filling up and fuel theft			
Average fuel costs per 1 vehicle, l/100 km	27	25	2
Average fuel costs per 5 vehicles, UAH/month	13500	12150	1350
Total effect from fuel theft, UAH/year			16200
Due to the application of the parallel driving system			
Average costs due to downtime and inefficient use of labor time, UAH	6523	3256	3267
Total sum resulted from the general effect from installing the GPS system	419729	338600	97329

Source: developed by the third author

Owing to the application of the logistics concept LP, it made possible to reduce the duration of work by 7.4% for the examined period. It has proven that the performance of works using the old strategy is more labor consuming and takes more time; application of the LP concept can reduce downtime, and performance can be more productive and the working day of a driver-mechanic can be shorter.

On the whole, the application of the LP concept makes possible to decrease the costs. In general it has been planned to reduce the total costs within the logistics LP concept per 1456.14 thousand UAH in 2019.

**Table 3. Time study of work time of a tractor-driver during the harvesting works (fragment) in the farming enterprise of the Novomoskovsk area**

Work	Routine works			Works considering LP			Duration of work LP in % to routine works
	Duration, min.	Start	End	Duration, min.	Start	End	
Initial examination		5.30	-	-	5.30	-	
Examination of a tractor	5	5.30	5.35	3	5.30	5.33	60.0
Technical maintenance	8	5.36	5.44	7	5.34	5.41	87.5
Trip to the field	10	5.45	5.55	10	5.42	5.52	100.0
Examination of a grain-binder	3	5.56	5.59	3	5.53	5.56	100.0
Attaching a grain-binder to the tractor	7	6.00	6.07	5	5.57	6.02	71.4
Downtime	5	6.08	6.13	-	-	-	-
Loading of a grain-binder	8	6.14	6.22	7	6.03	6.10	87.5
Start of the engine	2	6.23	6.25	2	6.11	6.13	100.0
Working stroke	25	6.26	6.51	23	6.14	6.37	92.0
Turn	7	6.52	6.59	6	6.38	6.44	85.7
Working stroke	25	7.00	7.25	23	6.45	7.08	92.0
Turn	7	7.26	7.33	6	7.09	7.15	85.7
Examination of a grain-binder	6	7.34	7.40	4	7.16	7.20	66.7
Quality control of gathering	20	7.41	8.01	17	7.21	7.38	85.0
Loading of a grain-binder	5	8.02	8.07	5	7.39	7.44	100.0

Working stroke	25	8.08	8.33	23	7.45	8.08	92.0
Turn	7	8.34	8.41	6	8.09	8.15	85.7
Working stroke	25	8.42	9.07	23	8.16	8.39	92.0
Break	8	9.08	9.16	8	8.40	8.48	100
End of the examination		-	9.16	-	-	8.48	92.6

Source: developed by the third author

It is called a keizen task, which concerns all the personnel of the organization – from mechanics to managers. The value of the target cost reduction, which in the aggregate represents the keizen task, is determined by the whole list of costs (mainly changeable), such as direct material costs, direct labor costs and so on. Thus, this task is completely applied on the whole production cycle, which is a continuous circle of regulating the product improvement and manufacturing processes, optimization of certain units and objects.

Thus, the implementation of the concept model LP will make possible to: improve the quality of services, which have recently been far from perfect; motivate and teach the staff of the enterprise new methods, it leads to labor productivity improvement; build an efficient, modern enterprise, that is able to improve by itself, and that uses minimal resources for fulfilling its tasks.

Under contemporary changeable conditions, it is very essential to carry out the estimation of the cooperation between the existing consumers as well as the resolution of tasks toward collaboration with potential clients. To create the efficient logistics strategy of collaboration with customers we will use the win criterion of Wald, criterion of extreme pessimism, criterion of Hurwicz, Savage's minimax regret criterion and Bayes' criterion.

Wald's criterion and the criterion of extreme pessimism are focused on the careful line of behavior with the purpose of providing success under any conditions. The criterion of extreme optimism is used in most favorable conditions for the enterprise (it has the biggest share at the market of the most competitive produce). The criterion of Hurwicz characterizes the average condition and average optimal conditions for the enterprise.

Therefore, we will carry out the analysis and determine the strategy for the cooperation with consumers based on the expected profits from such a collaboration by key types of produce using the win criterion (Tab. 4).

The research has established that the most favorable for the farming enterprise according to Wald's criterion is to sell the winter wheat via LLC "Lozovkuy zavod" (0.3 million UAH), criterion of extreme optimization determines that it is reasonable to sell the winter wheat via "Dnipro Agro Group" (5.1 million UAH), under conditions of extreme pessimism it is reasonable to choose LLC "Nibas Agrofirma", PE "Agrospetsproject" and LLC "Sit-Reline". The analysis of the logistics strategy by the criterion of Hurwicz proves the reasonability to sell winter wheat and sugar beet by "Dnipro Agro Group".

**Table 4. Logistics grounding of choosing the collaboration strategy with consumers of the agrarian enterprise**

Criteria / Enterprises-consumers	Wald's (maxmini)	Criterion of optimization (maxmax)	Extreme pessimism (minmin)	Criterion of Hurwicz (0.3)		
				min <sub>j</sub>	max <sub>j</sub>	Mean max HG
"Dnipro Agro Group"	0.2	5.1	0.2	0.2	5.1	$0.3*0.2 + (1-0.3)*5.1=3.63$
"Agricor Holding"	0.2	2.1	0.2	0.2	2.1	$0.3*0.2 + (1-0.3)*2.1=1.53$
LLC "Lozovkuy zavod"	0.3	2.2	0.3	0.3	2.2	$0.3*0.3 + (1-0.3)*2.2=1.63$
LLC "Nibas Agrofirma"	0.1	3.4	0.1	0.1	3.4	$0.3*0.1 + (1-0.3)*3.4=2.41$
PE "Agrospetsproject"	0.1	2.6	0.1	0.1	2.6	$0.3*0.1 + (1-0.3)*2.6=3.33$
LLC "Sit-Reline"	0.1	1.7	0.1	0.1	1.7	$0.3*0.1 + (1-0.3)*1.7=1.22$

Source: developed by the third author

Nowadays one of the most visible instruments of the economic diagnostics of the distribution policy of an enterprise is the analysis of the costs spent on the distribution activity from the point of its stage formation. The solution to one of the most essential issues in the distribution policy of the enterprise – to correctly and timely make a managerial decision – can be the application of the methods of economic-mathematic modeling. The optimization of the

distribution costs can be achieved through the optimal allocation of the budgetary funds based on the ratio “costs-effect”.

Further examination and rating of the essence for elements of the structure in distribution costs can be carried out using the expert assessment method and the Delphi method. The rating is determined by the personnel anonymous surveying, which happened in three approaches as well as the information from experts by the results of the previous assessment. On the next stage, factual costs of the enterprises on development of the distribution in 2015-2017 are estimated and analyzed. Then the coefficients of effectiveness for the elements of the structure of distribution costs are determined. The estimation of the efficiency of coefficients for the elements of the structure of distribution costs is carried out using the formulas provided below. The final stage is the assessment of the planned expenses for the distribution of the enterprise for achieving the indices of the business activity set by the enterprise.

The economical-mathematical model was determined using the software Excel. Figures for the planned year were obtained considering the increase in the amounts of the sold produce by 30% compared to the basic level. The amounts and  $S$  ( $i=1, 2, 3, 4$ ), which have to correspond to the data mentioned above, were calculated using the function “Solution Search” in the Excel environment, considering the objective function formula and limitations.

The allocation of the funds between the elements of costs has been suggested to carry out according to significance ratings  $R_i$ . Thus, the economic-mathematical model was tested and used it the optimal structure of costs at the farming enterprise “Skif” on the development of the elements of the efficient distribution activity at the enterprise; it was determined to achieve the planned increase in amounts per 30 % and at the same time decrease the amounts of sales almost per 18 %, which proves the reasonability of its practical application.

The development of the cooperation and integration in the agriculture is one of the conditions for stabilizing and restoring the economic growth in all areas and spheres of the activity in the agrarian sector. Having studied the features of the activity of the farming enterprises in the Novomoskovsk area of the Dnipropetrovsk region, it is worth noting that the enterprises possess all possibilities for the development of the export potential, especially if they use such integration inventory as the creation of the stocking-selling servicing cooperative. As a consequence, the estimation of the efficiency in the activity of the stocking-selling cooperative was carried out in case of the carried out analysis in the amounts of production and distribution of the winter wheat. Considering the internal consumption of the produce as well as the possible distribution at the domestic market, we have calculated the possible amounts of the export. Taking into account that the minimal export amount is 25 tons, the enterprises within the cooperative can export 2500 tons of winter wheat. We have compared the two systems of distribution – by the enterprises independently and via the cooperative. The calculations were made based on the data obtained from the agricultural enterprises in the Dnipropetrovsk region (Ukraine). The administrative costs include salaries and social payments for the workers of the cooperative: 2 marketers, 1 accountant and 1 manager. In the distribution of grain within the cooperative for the export two incoterms EXW and FOB were considered.

The results of the carried out analysis revealed 9.41 percentage points increase in the level of the profitability from the winter wheat via the cooperative under EXW terms compared to the distribution by the enterprises independently, and under FOB terms – 8.4 percentage points. The amount of the profit obtained per 1 ton of produce was the most significant under FOB terms of exporting the grain.

The important issue, set before the agricultural producers is how to resolve with the help of the stocking-distributing cooperative the organization of the distribution logistics. The common building of elevators will make possible to save costs on stocking the produced grain, form a high-quality installment of the grain, sell the grain at the financially most favorable periods.

#### **Conclusions.**

In the enterprises of the small agrarian business to reduce the costs on stocking the seeds and the planting material it is reasonable to use the two-level system with the fixed level of orders and control over the level of stocks; for fertilizers and herbicides – the two-level system with the periodic control over the factual level of stocks; for spare parts – the “minimum-maximum” system.

The implementation in the farming enterprises of the logistics concept “Lean Production” makes possible to reduce the time needed for carrying out operations at the level of 8-10%. The application of the system keizen-costing within the logistics concept LP determines the decrease in total production costs, which influences the increase in profits and the profitability level. The project of the rationalization in the transportation process within the logistics concept LP, based on the application of the navigational monitoring, makes possible to decrease the costs on control and decrease the mileage, control the theft and filling up, decrease the downtime.

The design of the solutions in the system of distribution logistics provides optimization in the structure of the distribution costs for small-scale agricultural enterprises (costs on processing orders – 35 %, costs on market research and advertising – 30 %, costs on servicing – 15 %, costs on allocation and distribution – 20 %). Due to the optimization, the decrease in total costs on distribution will be at the level of 18% whereas the increase in the sales of produce by 25% could be achieved.

The development of the strategy of the supply chain at enterprises of small-scale agrarian businesses should be based on integration and cooperation; it will make possible to receive a set of possibilities and advantages for processing and selling the produce. This measure will promote the integration of the members of the cooperative with the interests of other links in the producing-logistics chain and lead to decreased compatibility at agricultural enterprises.

The essence of the obtained results could be considered in the development of the possibilities of the integrated management over the supply chain based on the principles of logistics in small agricultural enterprises. The developed recommendations might be used in the logistics activity of farming enterprises.

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