Peculiarities of the logistic approach in the agro-industrial complex

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Abstract. Effective sale of products is one of the main directions of increasing the financial stability of enterprises in the agro-industrial complex. The use of a logistic approach implies a change in the existing situation at the enterprises of the agro-industrial complex, the introduction of new technologies in order to reduce the costs of commodity movement, and the coordination of interaction between participants in the logistics system. It is necessary to take into account the specifics of the food market more fully, consider the logistics system in conditions when a large number of economically independent market entities enter the market. The paper examines theoretical approaches to studying the problem of using the logistic approach in the agro-industrial complex and reveals the basic nodes of the agro-logistics system. Peculiarities of using logistics in the agro-industrial complex are described, basic logistic flows and processes in the given branch are reviewed. Types of distribution of products in the agro-industrial complex are analyzed. Influence of use of logistic methods of management generally and of stocks in particular on production and financial activity of enterprises in the given sphere is estimated.

1. Introduction

In modern conditions one of the main peculiarities of agrarian economy is management of innovations, information and relations. Obviously, effective management and reduction of production costs, transition to the resource-saving economic management type will contribute to improvement of competitiveness of agroproducts. Initially all innovations were mainly implemented in high-tech industries. Besides, new information technologies are the main driving force in addition to the existing forces of the agro-industrial complex. Just a few key components – microprocessors, local networks, robotics, sensors, programmable controllers, effective use of GIS technologies in automatic control of operating processing of agricultural machines, wide use of navigations technologies – made the concept of an automated agroenterprise real.

All this requires an innovative approach to providing enterprises of the agro-industrial complex with materials and equipment, financial and information resources, attraction of highly qualified personnel, development of the sphere of services and technical service, effective management of material and information flows.
At that, the demand for logistics as a new concept of management of material flow and related financial and information flows by all enterprises of the agro-industrial complex grows.

In countries with a developed system of market relations, marketing is an integral part of management and forms the basis of the development strategy of enterprises of the agro-industrial complex, which helps prevent disparities in production, rationally use resources and avoid ineffective costs. It has been established that practically in no country in the world there is a single universal system and programs of sales relations between categories of commodity producers.

Agrologistics instrumentation contributes to achieving goals of agricultural enterprises with optimal spending of resources.

Theoretical aspects of classical logistics are described in works of foreign scientists [1]. Many authors study strategic management of logistics, touching upon the problem of supply chain management and organizational aspects of ensuring efficient logistics [2]. Some works address the problem of effective inventory management and the development of an inventory management program that will maximize net profit [3].

Many scientists are concerned about the problem of supply chain management and inventory management program, which will maximize net profit [4]. The others deal with the problem of supply chain management and the development of an inventory management program that will maximize net profit [4]. Some economists are addressing the issues of reducing costs in the supply chain and improving customer service [5], while there are authors who study successful strategic relationships in the supply chain [6] and informational component of logistics [7]. The peculiarities of the logistic approach in agriculture are also of concern to many authors [8].

The issues of introducing a logistic approach in the agro-industrial complex are considered in the works of Russian scientists studying the features of agrology [9]. The fundamentals of commercial logistics are presented in separate works of the authors [10].

Despite numerous studies in the field of agrologistics there is still a question whether development and use of logistic systems in the agro-industrial complex can ensure high effectiveness of production, especially in introduction of resource-saving technologies. It is evident that effectiveness of agrarian production is greatly determined with its technological resource as optimal flow of the agroproduction process is determined namely by the level of introduction of material flow therein.

The purpose of our study is to show how logistics can optimize all types of internal and external relations of the agro-industrial complex, including the supply and sales relationship, which belong both to the agro-industrial complex as a whole, and to its individual divisions, and to identify the directions of development of agrology in modern conditions.

2. Logistic approach in agro-industrial complex

In modern conditions the existing agrologistics of agro-industrial enterprises at all stages of the process of growing, processing and delivery of products to the consumer is not quite effective. The following drawbacks in the production technology can be distinguished: lagging technologies of growing and harvesting of products; inefficient machines, many passes of machines over the field, heavy spending of fuel and losses of products; high power consumption for grain drying; ineffective storage ways leading to loss of products; numerous sortings and transshipments of products as well as a costly multi-chain delivery system and related energy, labor inputs and losses of products.

Analysis of logistic systems in the agro-industrial complex reveals the need in improving them.

It should be noted that the modern agro-industrial complex represents a large network structure including enterprises and organizations producing production facilities and material resources, agriculture itself, processing industry as well transport and informational support of material flows, provision of all production spheres with personnel. Therefore, use of the logistic approach makes it possible to increase effectiveness of operation of enterprises and macrologistic systems in the sphere of agro-industrial complex.

For the first and third agro-industrial complex sphere the logistic approach formed for industry enterprises is applicable. From the point of view of material flows, agriculture (second sphere) has
specific features on the macro- and microlevels. Expenses on physical distribution in rural economy are extremely high as there are great distances in Russia between places of production and processing of agricultural products.

The cost of goods received by the consumer includes over 70% of logistics expenses. It is believed that reduction of expenses on fulfillment of logistic functions by 1% ensures increasing of product sales volumes by 10% [10]. Logistic management is essential for an enterprise as it is logistic management that deals with production tasks by planning and coordination of material flow and related financial and information flows in the whole logistic chain. The specific nature of the agrarian sector of economy determines certain peculiarities of using logistic methods of management generally and of stocks in particular [8].

Material flows generated at enterprises of the agro-industrial complex have a number of peculiarities. Production activity in agriculture is connected with live organisms and in connection therewith material flows can have a biological nature.

The agro-industrial complex is characterized with significant intraproduction consumption of the products produced. For example, for animal husbandry enterprises these can be vegetable feeds made for the enterprise’s own needs. Besides, these very feeds can be a product if sold to other consumers. But in this case feed cost will be determined not only with production cost, but delivery cost as well.

In addition, seasonality of agrarian production explains long-term storage of significant stocks both of ready agroproducts and raw materials. These aims require specialized storage facilities with specified storage conditions (temperature, humidity, illumination, gas environment and other conditions) for different kinds of products. Additional expenses on storage, storage facility management, transportation of products to the consumer cause increasing of logistic costs. All agrologistics principles must be observed.

It should be noted that agrologistics, as logistics generally, cannot be multipurpose. Agrologistics greatly depends on agricultural products that are in the center of processes of their processing. Consequently, it is marketing in these processes that make agrologistics logistics, but not a separate process of storage, transportation, customs clearance.

In agrologistics the relationship of marketing, merchandising and logistics itself forms specific nature of the supply management chain. However, why is it marketing that determines this specific nature? This is due to the fact that from the demand for a commodity, the supply chains of agricultural products unfold further to its production.

Marketing determines the ratio of quality, cost of products as it is not quite evident that the consumer needs a product that has average quality but is inexpensive [9].

Effective use of logistics in agriculture requires breakdown of logistic systems for enterprises of animal husbandry, plant growing, poultry farming and other individual households. On the level of an individual enterprise or settlement it is necessary to estimate effectiveness of supply, production and sales of ready products as well as the interrelation of these functions. Emphasis should be made on optimization of internal flows. This is connected with segregation of production sites or agricultural areas in space and with long distances between residential places of large-enterprise workers and their workplaces. Internal transportsations include delivery of seeds, fuels and lubricants to fields, movement of tractors and combine harvesters over the field, delivery of ready products to storage facilities.

Of special relevance are sales of ready products in case of creation of peasant farm enterprises. If every farmer sells ready products on his own, the scale effect is lost and delivery expenses make up a significant share in product cost. Transportation costs are high with a disorganized system. Therefore it is necessary to create a single system of collection of ready products from producers and their transportation to storage facilities or to processors.

Another special feature of logistics in the agro-industrial complex is that the enterprises are mainly engaged in plant growing or animal husbandry. Therefore, animal husbandry farms receive feeds from an internal supplier, there can be no external supplies for these aims. In case of spatial dispersion of
agro-industrial enterprises this autonomy is important from the point of view of agrologistics expenses. Production waste are also used inside the enterprise.

An objective direction of improvement of logistic systems is integration of its participants and interaction between them in through material flow organization. With organization of agricultural production in vast territories with separation between producers of agricultural raw materials, enterprises of the processing industry and the consumer market there arises the need in structuring of the sphere of agricultural product circulation.

Sales of ready agricultural products should be organized with account for the size of the production enterprise. Of special importance are sales of ready products in case of creation of individual peasant farm enterprises. If every farmer sells ready products on his own, the scale effect is lost, delivery expenses make up a significant share in product cost, therefore it is necessary to create a single system of collection of ready products and their transportation to intermediate storage facilities or to processors, that is why it is necessary to form a macrologistic system of distribution of ready products of agricultural enterprises.

One solution of this task is developing a network of commercial dealers and wholesale fair trade. Such a system existed in Russia till 1917 and thanks to commercial dealers there was no problem of sales of ready products that exists nowadays. Dealers can also deliver mechanical equipment for agriculture (figure 1).

![Product distribution system types in the agro-industrial complex.](image)

**Figure 1.** Product distribution system types in the agro-industrial complex.

An effective distribution system is an essential condition of market success. However, one cannot state that producers can freely choose dealers for their product sales. In fact, more often they have to put up with what they have, rather than have what they want. A dealer is not an employee, but rather an independent market with a large group of clients having deals thereon.

Thus, we should view all participants of distribution channels as clients and sell products to them, but not through them. Successful cooperation with dealers requires:

- understanding their problems;
- understanding needs and demands of their clients;
- understating their competitors;
- understanding their relationships with other participants of the distribution process;
- knowing about changes in distribution tendencies.

Logistics of operation of small holdings, their economic effectiveness is provided by maximum closeness to the production place. But if the transport leg to the production or processing place exceeds the reasonable limit, agricultural production in such logistic systems decays.
3. Influence of modern agrologistics on market efficiency

Most peasant farm enterprises do not have vehicles for delivery of their products directly to chain stores. It is simpler for them to sell agroproducts to resellers that on their own fully load vehicles and send them to salespoints. In this case the farmer, naturally, does not settle issues connected with sales and does not have to arrange delivery and presales preparation. But unfortunately this sales variant greatly reduces the profit level of peasant farm enterprises.

Very often peasant farm enterprises estimate the market from the point of view of resellers, i.e. market of shipments, but not the sales market, i.e. consumers. But they can sell their products directly to sales points. In fact, demand for their products will be high if they are able to supply the products in the required quantity, of the required quality, with delivery to the required place in the required package [8].

At the same time, maintenance services based on logistics methods should provide for proper quality with minimal financial costs.

To sell products in salespoints, a product must be created. At the same time the absolute majority of small and medium-sized producers do not produce a product – they produce raw materials but want to sell them as a product. At that, the end product is a product which is already sorted, packed, cooled (if required) and delivered to a certain salespoint. All the rest is raw materials.

A great role in solving this problem can be played by logistic companies capable of establishing relations with salespoints by logistics directly. It means that there are variants of solving the sales problem of agricultural producers. However, it is necessary to take an optimal solution that must be based on estimation of sales markets, building cooperation with different sales channels. Besides, such complex logistic solutions in Russia are already in use.

The client service policy is the basis during marketing strategy formation. It determines formation of competitive position of an agro-industrial complex enterprise on the market. At that, a task of agrologistics is establishing a reasonable ratio between additional expenses on service quality increase and additional income received from sales of agroproducts.

It should be noted that increasing of agricultural production market effectiveness requires creating a modern system of agrologistics based on a network of modern infrastructure facilities.

Tasks of creating continuous supply chains including consolidation of product shipments, treatment, processing, packing, wholesale and small-scale wholesale are fulfilled by facilities of different specializations and different levels – agrologistic centers, agroindustrial parks, production and logistic centers and complexes and wholesale and distribution centers.

One of essential factors of success is a stable volume of local products received from local consolidation facilities of agrologistics supplemented by interregional crossflows of food products.

The basic nodes of the agrologistics system are shown in figure 2. The central operational link of wholesale and distribution centers is a logistic center of receiving, initial processing, storage, which on the one hand is closer in the chain of supplies to the agricultural producer and on the other hand acts as a guaranteed base of raw materials for processing. This guaranteed resource base enables developing new production directions and sales channels.

Within the framework of creating an integral agrologistics system of the Eurasian Economic Union (EEU) wholesale and distribution centers are a physical base for development of over-the-counter e-trading.

Creation of a single network of wholesale and distribution centers in EEU space requires:
- forming a location map and calculating capacities of agrologistics facilities, incl. wholesale and distribution centers in the territory of EEU participating countries;
- secondly, calculating the sufficiency of respective transport logistics both for transportation between agrologistics facilities, including wholesale and distribution centers, and for delivery to consumers;
- developing and integrating a single logistic standard recognized by all participants of a Single agrologistics system;
- creating a single center for management of agrologistic flows.
This requires implementation of an information platform including:

– a simulation model of agrologistics operation;
– forecast indicators of countries’ AIC development;
– a system of optimization of interregional product flows supported by availability and timeliness of transportation;
– a system of electronic over-the-counter trading.

**Figure 2.** Basic nodes of the agrologistics system.

Generally use of the logistic approach in the agro-industrial complex can contribute to significant reduction of production costs, improvement of competitiveness of enterprises and the sector, as a whole.

**4. Conclusion**

Thus, agrologistics enables improving effectiveness of transportation and storage of agroproducts. It penetrates all spheres of activity of agro-industrial complex enterprises: it encompasses the process of planning, selling, cost control, transportation and storage of materials and ready products as well as related information about supply of products from the place of production to the consumer. In connection therewith to improve competitiveness of agricultural products all participants of the logistic chain should view agrologistics as an integrated system enabling collaborative work and achieving minimization of aggregate costs.

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