

Kazakhstan: Transport and Logistical Risks in Grain Export

Kazajstán: transporte y riesgos logísticos en la exportación de cereales

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ABSTRACT:

One of the important sectors of the economy for developing countries is the export of grain. For Kazakhstan, which cannot conduct maritime trade, the development of transport infrastructure for the grain trade is important. To achieve this goal, we have used a range of methods: statistical analysis, economic-statistical and analytical methods, also, we summarized the experience of domestic and foreign researchers on the subject. Statistical results of empiric examination will facilitate the governments of the countries-importers in determining grain export management strategy of Kazakhstan taking into consideration transport-logistical risks, which can be used in export-import policy.

Keywords Grain export, Transport logistics, Systemic risks, Market relations

RESUMEN:

Uno de los sectores importantes de la economía para los países en desarrollo es la exportación de cereales. Para Kazajstán, que no puede llevar a cabo el comercio marítimo, es importante el desarrollo de infraestructuras de transporte para el comercio de cereales. Para lograr este objetivo, hemos utilizado una serie de métodos: análisis estadístico, métodos estadísticos y analíticos, también resumimos la experiencia de los investigadores nacionales y extranjeros sobre el tema. Los resultados estadísticos del examen empírico facilitarán a los gobiernos de los países importadores en la determinación de la estrategia de gestión de las exportaciones de cereales de Kazajstán teniendo en cuenta los riesgos logísticos del transporte, que pueden utilizarse en la importación y exportación política.

Palabras clave exportación de granos, logística de transporte, riesgos sistémicos, relaciones de mercado

1. Introduction

The complexity of the functioning of transport-logistic system in the agricultural sector characteristic of developing countries is determined by such basic problems as:

- the presence and complex interaction of a large number of participants and processes;
- the presence of multi-level organizational management;
- the low quality of the knowledge base and proactive introduction of electronic technologies of information exchange;
- lack of integration of information systems; the search for acceptable solutions to optimize inventory to increase liquidity of products;
- the need to build a new and modern transport infrastructure and introduction of risk management system;
- the need to consider interaction with the changing external environment (Abdymanapov et al., 2016);

Main factor of agri-food markets development is the increasing consumption of food products in the world (OECD, 2015). In these terms, growth of grain production makes Kazakhstan one of potential leaders in global market and their increasing influence on food situation. FAPRI macroeconomic model shows that by the year 2017 the needs in wheat and corn will increase due to fodder production and industrial use of cereals (The world market of wheat and corn, 2010).

Remoteness from global markets and lack of direct access to seaports determines special position of grain export in Kazakhstan. In terms of post crisis conditions, positions of Kazakhstani grain exported are unstable and subject to significant fluctuations depending on price situation and global market condition in which underdeveloped export production and logistical infrastructure is the restricting and hindering factor. Infrastructural restrictions and transport-logistical costs, lack of guarantees on terms of deliveries restrict implementation of grain export potential of the country. Grain cost that is delivered to the domestic market and export, share of infrastructural costs ranges from 30% to 70% that results in decrease of purchase price and market prices for agricultural commodity producers (Fomin, 2011).

Currently grain and grain products export policy should be based on multi-vector and bipolar principles, and such approach will provide an opportunity for sales markets diversification and flexible choice of perspective directions of grain and grain products sales. World experience shows that application of methods of logistics allows to reduce inventory levels by 30-50%, reduce the time of product movement by 25-45% and in the end to minimize transaction costs.

On the background of decreasing global prices of grain, the growth of grain export infrastructural costs (including transaction costs) is observed in Kazakhstan. So, growth of railway tariff by 10-15% (2014) resulted in the increased grain production cost, storage cost and transshipment. In this marketing situation it is needed to establish grain terminal network at perspective directions of Kazakhstani export, their effective functioning and their linkage with development of own transport-logistical infrastructure including sea shipping.

Grain delivery offer with delivery to seaports to buyers will be more attractive for grain importers and will have stimulating impact on grain export. Currently it is needed to diversify grain export at different directions with delivery to final consumers via highway, railway or sea (river) transport, development of logistical infrastructure on the border of Kazakhstan as well as places of transshipment of cargo for potential buyers of grain (foreign ports in Black Sea basin, Baltic Sea).

Relevance of this research is conditioned by the need to significantly reduce infrastructural barriers and share of logistical costs in delivery of Kazakhstani grain for export. Imperfect existing transport-logistical system of grain transportation in Kazakhstan reduces competitiveness of grain producers and grain traders on global market. The researches make an attempt to find relevant ways out of this market situation. Statistical results of such empirical examination will help governments in developing countries identify risk management strategies that can be used as powerful tools for economic development.

According to the FAO forecasting, food production will grow by 70% to provide food for the world population that will reach 9 billion people by 2050. Consequently, there is a need for an integrated approach to global efforts to ensure sustain able food production and consumption

(Nellemann et al., 2009; The Global Agenda, 2009; Foresight, 2011).

According to FAO forecasts 11% growth in global wheat production is expected by 2021. Whereas the projected growth in global production of forage grains (mostly corn and barley) in average term perspective will be approximately 20% - up to 1.4 billion t. By this period Kazakhstan is able to increase wheat production by 40% and forage crops by 22 % (OECD-FAO, 2015). These projections are based on global-level models, partial economic equilibrium models and, of course, like any economic model, are based on a number of assumptions on GDP growth, population income, increase of population, changing of consumption level of certain types of products (OECD-FAO, 2015).

Research on price situation on the world grain market shows that average prices of milling wheat of Class 3 in major producing countries tend to unsustainable growth. However, the trend of recent years is as follows: high supply and strong USD contribute to the decrease in international food prices (FAO, 2015). On this background, the decrease of total global value of imports in 2015-2018 is expected to the five-year minimum.

In view of assessment of global market situation, according to the International Food Policy Research Institute (IFPRI), it should be noted that the dynamics of global prices of grain is determined by the world's largest exporters and importers (USA, Canada, Argentina, Australia, EU, China, India, Pakistan, Japan). Rising of global prices of wheat, is mainly due to the dynamically developing countries of Southeast Asia, which don't have sufficient land resources and satisfy the growing demand by global market resources (Global Food Policy Report, 2015).

In modern conditions the main trend in the world economy – is simultaneous reduction of tariffs and at the same time - growth of non-tariff barriers. These should include measures such as technical and phytosanitary import requirements; antimonopoly legislation; common agricultural policy, quotas on imports of agricultural products (EU countries); farm subsidies and import restrictions on agricultural products (USA, Canada) etc. Research on value added chains of cereals characterizes main trends in product value change and its structural elements (production costs, income of farmers and grain traders, transport and logistical costs etc.) (Table 1).

According to forecasts of experts, Kazakhstan is able to produce from 22 to 28 mln. t. of grain. For domestic consumption 17-18 mln. t. of grain is needed, of which 14-15% for food, for seeds-20, fodder – up to 60, for annual replenishment of fodder insurance fund - 4-5%, the State reserve - up to 1% , the rest of grain is shipped to foreign markets. Depending on year conditions, the farmers of Kazakhstan are able to export from 3.5 to 6 mln. t. of grain, in the structure of export grain, wheat is 75% , of which 35-40% – strong wheat, 10-15% – hard wheat.

Table 1
The value added chain in wheat export by major exporting countries, 2008-2012 USD/t

Country	Cost	Producer's margin	Average purchase price	Transport costs	Exporter's margin	Export price
Wheat						
Kazakhstan	132,9	47,1	180,0	42,0	38,0	260,0
Russia	128,9	37,3	166,2	22,0	51,9	240,1
Ukraine	114,0	63,0	177,0	22,0	11,0	210,0
Canada	258,4	91,9	350,3	50,0	29,6	430,0
Australia	257,7	44,4	302,1	38,0	53,3	393,4

EU countries	231,3	84,9	316,2	9,6	28,4	354,2
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A significant share in the structure of food production takes grain processing industry - 19.4%. A significant obstacle to increased production and effective marketing of grain in Kazakhstan is critically underdeveloped transport and logistical infrastructure. There is a significant imbalance between export potential of the country and availability of terminal and transportation capacities on grain export, which significantly limits the ability of Kazakhstan's exports. Implementation of grain export potential assumes the removal of restrictions on carrying capacity of internal logistical infrastructure.

The main problems at the stage of transportation within the product delivery system include undeveloped infrastructure (roads, bridges, etc.), lack of appropriate transport systems and shortage of specialized transport etc. In most developing countries, the roads are not quite adapted for specialized vehicles for grain transport. In addition, vehicles and other transportation types are not available for farmers (Kader, 2002).

Analysis of current practice shows that development of specialized grain marketing infrastructure – linear, junction and port elevators–terminals, located in the main freight traffic and freight receiving points of transport network, becomes a determining condition for increasing the efficiency of the entire grain supply logistical chain (Mirotin et al., 2003; Morozov, 2011; Delz, 2011).

Global and national experience in bulk cargo transports shows the usefulness of transport innovative technologies based on the use of the route shipping. Routing of transportations accelerates cargo traffic, increases safety of transported goods, creates conditions for tracking their movements, increases the efficiency of multimodal transportations (Delz, 2012). The introduction of grain cargoes transportation system by trains will allow to manage the whole transportation cycle, smoothen peak load and seasonal character of demand, solve the problem of shortage of rolling stock and avoid traffic jams on access roads.

Issues of tariff policy in railway transport are of special anxiety. High tariffs on railway transportation of grain destroy the unity of internal market and restrict market opportunities and, consequently, production growth in grain producing regions. For these purposes, it is important to develop transport infrastructure companies with own railway fleet for performing grain shipment consolidation function and routing of shipments from junction consolidating elevators. Organization of logistics company involves consolidation of grain flows and control of grain movement throughout the whole supply chain and rapid elimination of gaps in supplies, beginning from farmer's storage up to the transfer of grain to the end user, control of shipment terms, condition of grain and compliance with transportation requirements.

The main factors restricting development of export-oriented transport logistics on transportation types which are typical for conditions of Kazakhstan are:

(A) *highway transportations* -relatively high transportation costs, loss of time due to traffic congestion on terminal elevators in the "peak periods", considerable deterioration of vehicles and higher depreciation and high amortization expenses due to the poor quality of roads, inefficient transportation over long distances;

(B); *railway transportation* - State monopoly on transportation services and wagons rolling stock, critical lifetime of most grain wagons, low carrying capacity of railway stations in the "peak periods", lack of investment programs on renewal of grain wagons fleet;

(C) *sea and river transportations* - low mobility and efficiency of transportations, limited transportation areas, risks of insignificant load of ports and terminals logistical capacities, high capital volume of own terminals and fleet development, limited access of terminals to deep water sites (Velichko, 2012).

Significant reserves of increasing efficiency of transport system operation occur at junction of

interaction between logistical supply chain links: linear elevators, junction elevators, transport infrastructure, grain port terminals. The capacity of all transport and logistical grain transportation system objects should be balanced in relation to the forecasted transportation volume in order to avoid downtime or shortage of infrastructure facilities. Optimization of the existing terminal and transport infrastructure is determined based on outlining of clusters in the areas of highest concentration of grain cargoes taking into account inter-district and regional freight flows.

To ensure efficient cargo handling in ports and grain terminals, at least 60% of export grain shipment by railway should be done from cargo forming junction elevators which provide concentration of grain, preparation and shipment of export grain consignments by route trains in 50-60 wagons each (Velichko, 2012). In addition, for the efficient export grain shipping it is necessary to establish a developed freight flows dispatching system and supply planning system based on a single information network, including market operators, grain transporters, elevators and grain terminals.

The following research areas have been identified as the most relevant:

- (1) Forecasting of priorities and parameters of grain transportation logistical base in regional aspect;
 - (2) Development of grain transportation demand modeling mechanism, taking into account seasonal factors, yield capacity forecasts, assessment of internal and external market conditions, and other relevant factors;
 - (3) Preparation of marketing solutions on placement of infrastructural objects in accordance with the requirements of transport and food policy.
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2. Methodology

Systematization of grain market logistical infrastructure of Kazakhstan is based on analysis and evaluation of production potential and grain consumption in the country's regions, availability of storage and processing facilities, as well as internal and export cargo flows. The conducted research is based on identification of production specialization and grain consumption areas, identification of grain exports priority areas and their concentration based on accounting and systemic logistical risks evaluations.

These methodological approaches allow to localize infrastructural development areas at regional and national levels, identify areas with greatest concentration of grain cargoes for establishing transport and logistical units, identify priority ways of cargo flows formation, forecast perspective internal and export transportation corridors. Development of principles of placement of objects of terminal and transport infrastructure of grain market in view of the existing cargo flows should foresee application of advanced transportation and technological schemes of delivery and accounting of systemic logistical risks.

Market researches enabled us to obtain the following preliminary results:

- forecast parameters and directions of grain transportation volumes in regional (internal market) and national (external market) aspect;
- develop logistical solutions on modeling grain transportation demand taking into account seasonal factors, yield capacity forecasts, assessment of internal and external market conditions and other relevant factors;
- develop marketing solutions for placement of transport and logistical junctions (terminals) in accordance with the requirements of transport and food policy of Kazakhstan in accounting and evaluation of systemic logistical risks.

To achieve the objectives was conducted the monitoring of materials of printed and electronic business and specialized editions, materials of statistical and departmental authorities at national and regional levels, Internet, researches of the authors and other sources. The analysis was performed using standard marketing methods, including analysis of the dynamics, growth

rates and structure; construction of BCG matrix, Delphi technique, analysis of performance indicators, comparative analysis of transport and logistical costs in priority areas of grain export etc.

3. Results

In current conditions in grain industry of Kazakhstan, necessary legal and institutional framework for the development of grain industry have been established. Legislative regulation is carried out within the laws of the Republic of Kazakhstan "On grain" (2001) "On State regulation of agri-industrial complex and rural development" (2015) etc. Preventive measures on storage and logistical infrastructure development and stimulation of grain export have been undertaken in Kazakhstan.

In Kazakhstan, investment project "Kazakhstan Cluster Initiative" has been implemented (2004), in which grain products cluster is based on Central Kazakhstan and North Kazakhstan regions. The share of the regions in general grain production in Kazakhstan is as follows: on wheat - about 80%; 90% - oats; of buckwheat and millet - 40-55%; for barley and legumes -70%. The three leading grain-producing regions are: Kostanai (35.2% total yield of wheat), North Kazakhstan (29.7%), Akmola (20.9%) regions.

Depending on grain production and consumption, grain-producing regions of Kazakhstan can be divided into three groups:

- (1) *importing* grain (Atyrau, Mangistau, Kzyl Orda regions, West Kazakhstan);
- (2) *self-sustaining* regions - on availability of arable lands are close to the average in the country (Aktobe region, West Kazakhstan; East Kazakhstan region, Eastern Kazakhstan; Almaty, Zhambyl regions, South Kazakhstan; Karaganda region, Central Kazakhstan; Pavlodar region, North Kazakhstan)
- (3) *grain exporting (export-oriented) regions* - two-thirds of grain of the country is produced here (Akmola and Kostanai regions, North Kazakhstan) (Table 2).

Table 2
Storage and placement of commodity grain and grain seeds in Kazakhstan

Indices	Regions of Kazakhstan					Total
	North	South	Center	West	East	
(I) Grain receiving enterprises (terminal, linear elevators)						
quantity, items	147	27	11	24	13	222
Storage capacity	10953,5	882,4	371,6	1203,1	443,3	13 853,9
(II) Agricultural producers (grain storages, warehouses)						
quantity, items	3 978	835	512	719	599	6 643
Storage capacity, thous. t.	5 607,9	1 029,8	491,9	570,7	431,1	8131,4
including						
(a) for food grain						

quantity, items	1691	334	228	271	258	2782
Storage capacity, thous. t.	2923,7	553,8	191,5	205,1	199,7	4073,8
(b) for grain seeds						
quantity, items	1488	187	170	253	240	2 338
Storage capacity, thous. t.	1876,2	141,8	259,5	153	155,1	2585,6
(c) for forage grain						
quantity, items	799	314	114	195	101	1523
Storage capacity, thous. t.	808,1	336,2	40,8	212,6	76,3	1474
(III) Total						
quantity, items	4 125	862	523	743	612	6 865
Storage capacity, thous. t.	16 561,4	1 912,2	863,5	1 773,8	874,4	21 985,3

Grain storage facilities are concentrated in grain-producing regions of northern Kazakhstan. Production and logistical infrastructure is not diversified and is mainly focused on consumption and processing on domestic market, there is no clear export orientation. High physical and moral deterioration of technological equipment for primary grain processing leads to accumulation of significant amounts of non processed grains in linear and terminal elevators, which increases grain technological losses and increases risk of grain quality deterioration.

Farmers have to transport grain to elevators directly from the fields, which are located 50-75 km or more (up to 200 km) from the place of harvesting, and as a result – there is 7-9% (15-20%) increase of the volume of non-productive transportation and their costs. In order to ensure timely processing of grain it is necessary to update the existing points of grain acceptance and primary processing in order to increase their productivity and introduce new facilities.

In these circumstances, we believe it is advisable to invest in construction and modernization of grain storages so that it will facilitate grain sales during periods of higher procurement prices, and thereby increase profitability of grain business. For these purposes in Kazakhstan operates the program of investment subsidies (2014), which allows partial reimbursement of costs of establishing grain storage facilities and thereby accelerate their returns.

Construction of grain storages (linear, terminal elevators) is possible in following objective conditions: (1) a significant increase in production of oilseeds and cereals; (2) construction of grain storages not only in grain-producing regions, but also in regions of export oriented production; (3) reconstruction and modernization of existing grain storages. Marketing researches on these areas based on expert evaluations have been carried out. Alternative grain

logistics lies in the fact that following options should be observed: (A) provide grain resources storage facilities which are sufficient to cope with peak loads in favorable years (27-30 mln. tons); (B) availability of elevators and storage facilities which are suitable for the average yield (18-22 mln. tons). Calculations on project investments and payback have been carried out.

Option (B) requires lower capital and operating costs. However, forecast of market situation, when growing demand and need for grain storage and transportation during high yield harvesting becomes inelastic – and results in a sharp price growth for transportation and logistical services, as happened in 2011 (when gross grain harvest was 27 mln. t). Therefore, option (A), aiming at technological modernization of existing grain storage facilities and construction of new facilities in priority export areas seems to be more attractive.

Structuring and diversification of grain market by establishing a single regional grain market of Eurasian countries (Russia, Kazakhstan, Belarus, Central Asia and the Caucasus, etc.) aimed to stabilize and regulate internal market - is one of the priorities of the State program "Agribusiness - 2020 " which is being implemented in Kazakhstan. This approach ensures guaranteed sales market and coordination of inter-state and regional grain policy. Development of export potential of Kazakhstan requires solution of two strategic tasks:

(1) development of export-oriented grain distribution channels structure (export clusters);

(2) modernization and increase of grain infrastructure carrying capacity.

Undoubtedly, limited export opportunities result in the increase of transitional grain stocks for the next year. Transitional grain stocks depending on year conditions are subject to fluctuations, seasonal and cyclical time periods:

1) in bad years (2010, 2012) - reduce to 0.8 mln. tons;

2) average years (2013) - remain at the level of more than 5.7 mln. tons;

3) favorable years (2009, 2011) - increased from 9.5 to 15.0 mln. tons of grain (Agriculture, forestry and fisheries in the Republic of Kazakhstan, 2014).

At the same time, the ratio between annual transitional grain stocks and domestic consumption amounted: in bad years - 5,8-6,4%; in average years - 46.0%, and in good years - 83,7-126,7% of total domestic consumption.

Every year grain exports policy varies, depending on market situation, and needs of potential importing countries. Depending on this, transport and logistical policy is built-scenarios, options of grain deliveries for export are calculated, grain export balance is determined, transport and logistical export costs and other areas are calculated.

In fact, in exporting of Kazakhstani grain there are many systemic and non-systemic risks due to the under developed logistical infrastructure of grain storage and transportation. There are many excellent examples. Thus, the objective difficulties related to the transit through Uzbekistan has led to the fact that Kazakhstan has completed construction of a new railway line in south direction to Turkmenistan in order to have direct access to Iran, bypassing Uzbekistan.

Political and customs barriers to grain trade have become the main obstacle apart from high grain transportation costs to the countries of Central Asia, Iran, Afghanistan via Uzbekistan. The UN report "Human Development in Central Asia" (Central Asia Human Development Report 2005) notes that trading costs are significant in Central Asia due to high customs duties, fees and administrative barriers to trade (strict customs regulations, non transparent trade rules and regulations, arbitrary exercise and corruption). Tajikistan depends on imported wheat supplies and flour from Kazakhstan to more than 90%, however still continues unconstructive trade policy (Table 3).

Table 3
Import Duties and Tariffs

	Tajikistan		Afghanistan	
	Wheat Grain	Wheat Flour	Wheat Grain	Wheat Flour
Customs, %	5	5	-	-
Import Tariffs, %	10	18	4	6
Import Duties and Tariffs, %	15	23	4	6

Source: materials research Beuter Thomas (2007), FAO (2009).

Transportation tariffs observed in private freight companies during field studies showed that wheat grain or wheat flour transportation costs from Kazakhstan to Afghanistan and Tajikistan are still high (Table 4).

Table 4
Wheat Transportation Tariffs from Kazakhstan
to Southern Central Asia

Country	Station of delivery of freight	Station of shipment	
		Karaganda, Central Kazakhstan	Kokshetau, Northern Kazakhstan
		Tariff for transportation, dollar USA/ton	
Uzbekistan	Tashkent	22	26
	Termez (Uzbek-Afghan border)	50	55
Tajikistan	Khujand	46	51
	Dushanbe	93	98
	Kurgan-Tyube	94	99
Iran	Sarakhs (Turkmen-Iranian border)	71	76
Kyrgyzstan	Osh	55	60
	Bishkek	21	26

At the same time, Iran, Afghanistan and other countries remain important markets for Kazakhstan (USDA / ERS; Chabot Ph. and Dorosh P.; Ayra A .; World Bank) (Persaud, 2010) with a certain complexity of delivery of Kazakhstani grain (Schulte (2007) and high transport and logistical costs for potential buyers (Table 5).

Table 5
Marketing Margin for Wheat Trade from Northern
Kazakhstan to Dushanbe (Tajikistan)

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Item	Cost, dollar USA/ton	Cost structure*, %
Wheat price in northern Kazakhstan at elevator	200	58,14*
Transport to Sary Agash and customs duties	35	10,17*
Wheat price delivered at frontier in Sary Agash	235	x
Transport through Uzbekistan	55	16,00*
Transit tariff increase (as of April 2011)	8	2,33*
Wheat price in Kulyagash (Uzbek-Tajik border)	303	x
Import duties for wheat grain of 10%	20	5,81*
Customs duties of 5%	10	2,90*
Transport from Kulyagash to Dushanbe	11	3,20*
Import parity price in Dushanbe	344	100,0*
Price differential	144	41,86*
Including		
Transport expenses, total*	109*	31,68*

According to research results typical costs of grain storage in elevators and service charges have been identified. In this technological chain negative influence have terminal elevators at GRP at grain shipment both for export and domestic market (Table 6). Farmers face considerable losses due to inefficient operation of terminal and linear elevators during loading of grain due to their unplanned prevention measures, technological stops and power outages. As a result of weak organization of loading and unloading works, cargo shippers have to pay higher rates for overtime grain loading, and losses amount up to 600 thous. tenge per 1000 tons of grain (3.2 thous. USD, which is equivalent to 15 tons of grain).

Table 6
Typical grain storage costs in Kazakhstan

Cost items	Value		Comments
	Tenge/t	USD/t	
Delivery to elevator	3000	20	Distance 150 – 180 km.
Receiving, drying, cleaning	2000	14	Price: - Drying 300 Tenge (2 USD) per 1% of reduction of humidity level - Cleaning 30 Tenge (0.2 USD) for 1% of reduction of quantity of inclusions - Cleaning 30 Tenge (0.2 USD) for 1% of reduction of

			quantity of impurities
Possible losses in low quality assessment	2000	14	Lower in go factual level of gluten content in received wheat. Assessment of appropriate costs is calculated as difference between price of 3-grade wheat with 23-24% and 27-30% gluten content.
Possible losses overestimation of moisture level	1400	10	Overestimation of actual moisture level of the received wheat. Assessment of appropriate costs is calculated, assuming that price of wheat is 20 000 Tenge / t (133 USD/ t), and humidity level is actually lower by 7%.
Storage per month	300	2	Grain storage 1 month
Total costs	8700	59	-

Note: expert survey of agricultural producers

Table 7

Costs of exporters in transporting grain from internal elevator to exit station to export market USD/t

Place of export shipment	Terms of delivery	Costs			Total	Direction of grain shipment to importing countries
		Transportation	Other	Port services		
Aksaraiskaya railway st. (Astrakhan region., Russia)	DAP	25.9	10.8	-	36.7	Black Sea ports, ports of Azerbaijan and Georgia
rail. station Tobol (Kostanai region., North Kazakhstan)	DAP	8.1	10.8	-	18.9	ports of Black and Baltic seas, the EU, countries of the Near and Middle East
Port Aktau (South, West Kazakhstan)	FOB	45.6	10.8	14.0	70.4	Iran, Azerbaijan and Georgia
Sary Agash station (South Kazakhstan)	DAP	29.3	10.8	-	40.1	Uzbekistan, Turkmenistan, Iran, Afghanistan and Tajikistan
Lugovaya Station (South Kazakhstan)	DAP	23.6	10.8	-	34.4	Kyrgyzstan
rail station	DAP	23.1	30.4	-	53.5	China and Southeast

Dostyk (South,
East
Kazakhstan)

Asia

*Note: 1) data at the beginning of 2012 .;
2) DAP - terms of delivery of cargo to destination; FOB - terms of delivery
of cargo on ship board, railway wagon, vehicles.*

Table 8

Non-transportation costs of grain exporter on supplies in the northern
direction (rail station Novoishimskaya, North Kazakhstan), 2012

Cost item	Price of services, USD/ t	Cost structure, %	
		including	
		official costs	unofficial costs
Certificate of product quality and compliance	0,1	1,35	0,93
Certificate of product origin	0,2	2,70	1,85
Phytosanitary examination	0,0	0,0	0,0
Certificate of grain quality (SGS S.A.)	1,0	13,51	9,26
Customs duties	0,1	1,35	0,93
Broker services	1,4	18,92	12,96
Grain storage (1 month.)	3,6	48,64	33,33
Loading of grain into wagons	0,5	6,76	4,63
Sealing of wagons	0,4	5,41	3,70
Fumigation			
Total official costs	7,4	100,00	68,51
Unofficial payments for railway, highway delivery	2,9	X	26,85
Other unofficial payments	0,5	X	4,63
Total expenditures	10,8	X	100,00

Note: SGS S.A. (Société Générale de Surveillance) - International multinational company providing services in independent expertise, control, testing and certification

On the basis of sample survey conducted among grain traders and operational data of the Ministry of Agriculture, the estimation of transportation costs (2012) and arrangement of documents needed for grain movement from internal elevator to main border stations has been presented (Table 7). In the period from 2007 to 2011, transportation costs increased significantly (by 20-25%), and from 2012 to 2014 increased by 20% (due to devaluation of Tenge against the US dollar). For example, transportation of goods by railway from Tobol station to Aksarai station (1498 km) (station owned by JSC "Kazakhstan Temir Joly" (KTJ), but located in Russia) has risen by 28% - from 19.6 to 25.1 USD/ t.

In addition to payment of high transport tariffs, grain traders bear official costs of obtaining various permits, certificates of passage, customs clearance and other costs (Table 8). Below are shown the component costs, according to grain export data passing through station Novoishimskaya (Northern Kazakhstan).

It should be noted that in addition to official costs (7.4 USD/ t) grain exporters bear informal costs (3.4 USD/ t). So, to obtain railway wagons, unofficial costs are 2.9. USD/ t (calculations are shown per 1 ton in calculation 200 USD/wagon and taking into account wagon capacity 69 t). After grain loading and unloading costs, this is the second largest article of non-transport costs incurred to grain exporters (31.5% of structural costs).

One of the promising directions of Kazakhstani grain export is China and countries in South-East Asia. However, logistical risks in this area of grain exports are also high. Export costs to China are estimated as 30.4 USD / t of grain –and it is 3 times higher than in other areas of grain exports. China applies phytosanitary restrictions on Kazakhstani grain, transported through its territory, which negatively affects the competitiveness of Kazakhstani grain supplies to the Pacific Asian sales markets (Japan, Korea, China, Malaysia, etc.). In addition, China also uses nontariff barriers using claim on wheat transport in bags rather than in bulk in grain wagons.

Other logistical risks are associated with international certification of goods. International grain traders do not recognize quality passports (certificates), issued by Kazakhstani independent accredited laboratories. They prefer to have international certificates of survey companies that perform analyses according to international standards with modern equipment in the laboratories. For this reason, grain purchased in Kazakhstan, with 23% of gluten, is sold by grain traders to third countries (after their renewal) by international certificates with gluten of 26% or more. As a result, grain traders receive additional profit from sale of high-quality wheat and Kazakhstani farmers receive less share of their profits.

Final stage of export path - from internal exit station to exports from Kazakhstan to export market. The research materials include transportation costs for delivery of Kazakhstani grain from major exit point to exports to major overseas grain markets (Table 9). Transportation costs are still major export costs, which impedes their sales (The world market of wheat and corn, 2010). On the background of reduction of grain prices there is a growth of infrastructural costs (transaction costs) of grain export (for example, growth of railway tariffs since last year by 10-15%, increase of production costs, storage costs, transshipment).

Table 9
Transportation costs in Kazakhstan between internal export station and external market in 2011

Border crossing point	Terms of delivery	Freight rate through		Payment for port services	Total	Potential grain importing countries
		Russia	Ukraine / Latvia / China			
Azov (Russia)	FOB	45,9	-	20,0	65,9	Turkey, Jordan and the EU
Ventspils (Latvia)	FOB	85,3	11,0	16,0	112,3	North Africa and the EU
Kherson (Ukraine)	FOB	63,0	21,0	20,0	104,0	Turkey, North Africa and Middle

						East
Novorossiysk (Russia)	FOB	49,1	-	25,0	74,1	Turkey, North Africa and Middle East
Lianyungang (China)	FOB	-	57,0	12,0	69,0	Japan, South Korea, Southeast Asia
Sarakhs (Turkmenistan)	DAP	42,0	-	-	42,0	Iran
Naushki (Mongolia)	DAP	73,5	-	-	73,5	Mongolia

Note: FOB - terms of delivery of cargo on ship board, railway wagon, vehicles; DAP - terms of delivery of cargo to destination.

Source: Centre for Economic Policy Research in AIC according to data of Ministry of Agriculture of the Republic of Kazakhstan

Main grain and grain products export transportations are carried out mainly by railway transport. Kazakhstani grain wagons fleet (2013) includes 7379 units, including 6379 grain carriers and 1000 semi-wagons equipped with a removable roof. This quantity of grain wagons cannot meet the growing needs of traders in a period of massive grain shipment and increase grain export potential in 2020 to 10 mln. t. Among them, according to specifications, currently only about 4 thous. grain wagons (with total transportation volume of 250 thous. t.) are able to exit the country.

It is necessary to take into account time of departure and wagons turnover from Kazakhstan territory in dispatch of wagons to the territory of neighboring states, as well as untimely return of wagons. If we consider that export potential of Kazakhstan is expected to reach 10 mln. t (grain and flour in estimation to grain), it is needed to monthly export more than 1 mln. tons of grain, that requires an additional 4-5 thousand of grain wagons in addition to the already existing. In addition, it is also necessary to take measures to upgrade grain wagons which outdated from standard operating time.

First of all, the issue primarily concerns transport logistics. JSC "Kazakhstan Temir Joly" (KTJ) is a natural monopolist in transporting of goods by railway and LLP "Kaz Temir Trans" (KTT) its subsidiary. When appeared the new Kazakh-Russian railway grain operator JSC "Astyk Trans", cooperation between Russia and Kazakhstan should become much more mobile, taking into account inter-government cooperation (Customs Union (CU) and Eurasian Economic Space (EAEP)).

Merging of wagon fleets in Kazakh and Russian carriers provides good perspectives to transport logistics:

- (1) a positive synergy of efforts of earlier competing companies "Rus Agro Trans" (RAT) and "Kaz Temir Trans" (KTT);
- (2) a significant increase in vehicles providing services to Kazakhstani market;
- (3) introduction of new logistical technologies, such as "routing" of grain transportations, that enhance saving of time and costs.

The delivery of about 4 thousand of grain wagons to Kazakhstani market on a regular basis, made it possible to eliminate shortage of rolling stock, especially in transporting of Kazakhstani

grain for export.

Establishing a uniform price transport policy in the field of transportation of grain have increased the stability of transportation tariffs for cargo owners. Transport logistics risks in transporting goods by railway have drastically reduced due to the possibility to calculate grain transportation costs. In the future, it is necessary to reduce transport costs by offering through rates taking into account port duties, using rational commodity movement logistic schemes, tailwind loading, transport services market research etc.

The main innovative business idea is to change the existing wagonload technology into route trains system (grain transporters) logistic system building technology and guaranteed provision of all railway transportation of Kazakhstani grain in more efficient way. According to research materials and preliminary estimates, formation of route trains will make it possible to reduce wagon turn over almost twice, increase statistical load rate, reduce wagon repair costs and unit costs, arrange transportation by fewer quantity of vehicles, reduce tension in the most over loaded parts of transport network etc.

In practice, the alliance between RAT and KTT does not provide proper results. KTT artificially creates different organizational, economic and technological barriers - such as doesn't provide grain transporting wagons and dispatch them on long routes. JSC "Kazakhstan Temir Joly" and its subsidiary KTT, being a natural monopolist on transportation service market, use their monopoly position to increase their service value - that results in sharp increase of breach of terms of delivery of goods. Failures in providing grain transport wagons leads to the break of export deliveries in grain shipments ports. In addition to technological delays in delivery of wagons, the railway transportation tariffs have increased to 7-8 USD /t. A paradoxical situation is that Russian side does not raise tariff rates, however KTT (Kazakhstan) increases them, and this results in the growth of transportation tariffs in the Customs Union and EAEA, and grain exporters revenue decreases.

The weakness of transport logistics is lack of public information on routes of wagons movement on the official website of JSC "Kaz Temir Trans". Earlier the cargo shippers themselves counted transport logistics and cargo itineraries. Now KTT deliberately hide this information from cargo shippers in order to increase the length of the routes. So, additional distance of 100 km provides KTT significant profits from grain transporting. According to cargo shippers, losses caused by this policy is about 2 USD/t (Table 10).

Table 10
Tariffs on terminal elevators services in Kazakhstan USD/t

Destination of cargo dispatch	City	Tariffs for grain storage per month	Grain processing	Acceptance of grain by trucks	Shipment of grain by transport	
					auto	railway
North	Kostanay	1,40	0,20	1,80	2,60	5,70
	Petropavlovsk	1,49	0,23	1,25	3,02	4,61
	Kokshetau	1,80	0,2-2,1	1,60	4,00	4,30
	Pavlodar	1,50	0,60	1,40	1,40	2,90
Center	Karaganda	1,81	0,63-4,37	-*	2,68	3,02
South	Taldykorgan	1,50	- *	1,30	2,20	3,20

East	Ust-Kamenogorsk	1,02	2,04	1,19	1,00	1,80
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Note:1) exchange rate of USD to Tenge: 182,06 KZT /USD; 2) *not performed;
3) As of 01.04.2014, the data of "Kaz Agro Marketing".

A considerable length of grain delivery to end-users is one of the major logistical problems and systemic risks for cargo shippers. So, when grain is transported to the countries of Central Asia (Uzbekistan, Tajikistan, Turkmenistan, Afghanistan) it goes through Sary Agash station. In this connection, there is a large load on railway junction that results in a low carrying capacity of transport corridors. The high concentration of cargo in one place does not allow to quickly move grain and grain products from the country, as internal shipments accumulate - resulting in decrease of carrying capacity.

It is necessary to diversify transport and logistical risks of goods deliver. During transportation to the South (Georgia, Turkey, Egypt, Tunisia, Morocco), the problems and risks of transport logistics – are high transport tariffs on grain transportation, artificially created obstacles from Russian side at level of economic entities. Complex mechanism of regulation of transport matters does not allow to quickly solve transit matters on cargo transportation on the territory of Russian Federation. It is difficult to estimate risks and assess in advance both in value and lost time.

Until recently (2010-2012) transport company Rus Agro Trans (Russia) agreed on a plan of transportation of Kazakhstani grain through the territory of Russia only in case if logistical services on the territory of Kazakhstan will be provided by Russian company ST "Trans", which charged a fee for its services in the amount of 20 USD/t (twice higher than the established tariffs). Here is protectionism and lobbying of a narrow group interests of Russian side. In this regard, transport costs for grain exports via the Black Sea (Novorossiysk, Tuapse, Taman (Russia), Odessa, Ilyichevsk, Yuzhny (Ukraine) and Baltic (St. Petersburg, Kaliningrad (Russia), Ventspils (Latvia), Tallinn (Estonia), Klaipeda (Lithuania), and other) ports significantly increase, reducing competitiveness of Kazakhstani grain for export.

4. Conclusions

Forecast of dynamics of indicators of Kazakhstani grain market balance, taking into account the implementation of the "Program "Agribusiness-2020" indicates the possibilities of increasing the volume of grain exports and assess to new sales markets. It is important to outline the directions of Kazakhstani grain export:

(A) *northern route* - via railway st. Tobol, Petropavlovsk, Ozinki, Aksaraiskaya towards seaports of the Black, Azov and Baltic Seas (EU countries);

(B) *southern direction* – via railway st. Sary Agash, Beyneu (Uzbekistan, Turkmenistan, Kyrgyzstan, Tajikistan and Afghanistan);

(C) *western direction* – via Aktau port, railway st. Beyneu, Aksaraiskaya (Azerbaijan, Iran, the Middle East)

(D) *east direction* – via railway st. Kulunda, Lokot (Russia, Mongolia), planned directions: via railway st. Dostyk - Alashankou (China, South-East Asia).

For the development of grain exports in these priority directions it is necessary to build rational transportation routes and formulate export transport and logistical infrastructure taking into account the world's grain market volatility. Main priorities in strengthening grain export is to create strong industrial and logistical infrastructure in the Caspian and Black seas, capable to provide growing needs of Kazakhstani grain exports in these marketing directions.

The ports of the Azov-Black Sea basin are final destination of Russian section of the international transport corridor "North-South", through which passes the international transport corridor TRACECA (Transport Corridor Europe - Caucasus - Asia, Europe - Caucasus - Asia). The

project Silk Wind, in which Kazakhstan is involved, is the addition to TRACECA. The sea ports of the Black Sea region play a role of key points, which connect continental transport corridors with shipping lines, which are involved in the maintenance of intermodal transportations (Velichko, 2012).

Unfortunately, directions of Kazakhstani export are constantly changing. Since 2013 shipments via the Black Sea ports of Russia and Ukraine have significantly reduced due to saturation of regional sales market from these countries and fierce internal interstate competition. Therefore there is an urgent need for diversification of sales directions of Kazakhstani grain exports.

In transport strategy of Russian Federation for the period until 2030, with regard to the development of innovative transport system, it is envisaged to increase the role of transport and logistical infrastructure in organizing product distribution with focus on full use of own infrastructure. With purpose of strengthening of export, Russia is developing port transshipment capacities in export directions: (A) Azov-Black Sea region (10-12 mln. t with storage capacity up to 1.9 mln. t. and the amount of handling up to 6.6 mln. T / year); (B) Far Eastern ports (4 mln. t.; storage 460 thous. t. and capacity of handling up to 1.6 mln. T. / yr.); (C) Baltic Seaports (3 mln. t.). Most part (70%) of Russian grain shipment volumes: ports of the Black and Azov seas and up to 30% volume via export corridor - Far Eastern grain terminals (by 2015 grain deliveries- 50/50%).

As a result of these measures, Kazakhstan maybe in a situation when grain supplies in the Black Sea-Azov direction will be carried out with considerable delay, or this direction of grain exports will be totally closed due to full load of Russian ports. As a result, there are big logistical risks of failure to perform concluded contracts before importing countries with payment of penalties.

Currently, one of the main obstacles to develop exports through the Caspian Sea, is application of export tariff for railway transportations to the port of Aktau, which increases cost of Kazakhstani grain and makes it uncompetitive compared with Russian and Ukrainian grain. In using internal tariff on grain transportation for export through the Aktau port, real economic prerequisites for increasing cargo traffic in direction of Azerbaijan, Turkey, Georgia and the EU will be created.

Establishing of transport infrastructure for grain export, including sea grain terminals in Aktau (Kazakhstan), Baku (Azerbaijan), in Amirabad (Iran) provide favorable conditions for strengthening of position of Kazakhstani grain exporters on markets of countries of Caspian area and the Caucasus. Transshipment of Kazakhstani grain through port of Aktau is the most optimal route of grain deliveries to Azerbaijan, the EU and etc.

In the Caspian Sea in terms of sea transportation of grain resources from port of Aktau (Kazakhstan) in the direction of Azerbaijan and Iran, dry cargo vessels are used which are owned by these countries. Used sea vessels are highly worn out. Prior to grain transportations they were used for transporting ferrous metals and other bulk cargo (gravel, sand, etc.), and now they are not safe in phytosanitary and radiation safety aspects. Transportation of grain by out of date dry cargo vehicles leads to raising of transportation insurance cost, thereby increasing insurance and transport-logistical risks.

In this situation, development of grain terminal network in promising export directions and their effective functioning should be linked with the development of domestic maritime traffic, as Kazakhstanis dependent on potential competitors (Russia, Ukraine) on regional market and more likely bears losses on maritime transportations.

At present, there is a need to purchase their own ships for grain transportation, which should be allocated from the State budget funds for purchasing of tankers - dry cargo ships. Rational solution is to deepen sea bed near ports of Aktau and Atyrau, as well as construction of railways for grain transportation. This investment project is possible under the condition of development of oil and gas sectors in the region and its orientation on energy exports (crude oil, natural gas,

etc.).

With purpose of mitigating price risks, grain terminals should be linked in to a single technological unit - production and transport - logistical infrastructure with mill processing complexes. This will provide opportunity to access potential markets of these countries, not only with grain raw materials, but also with finished products which have constant stable effective demand.

The priority direction in strategy of promoting grain resources export in *south and west directions* is construction of elevator complex with mill in Mangistau region (Beineu station). Commissioning of elevator complex with a mill will facilitate ensuring of grain and flour transportation by highway and railway to Uzbekistan, Turkmenistan and Afghanistan. As a result, final stage of establishing transport corridor in the Caspian Sea water area, sea route for grain transportation to Iran is being implemented, as well as conditions for increasing of Kazakhstani grain export indirection of Turkmenistan and Afghanistan (through Beineu station) are improved.

All investment projects related to grain terminal in Baku (Azerbaijan), Amirabad (Iran) are directly linked to the program of grain terminal development in port of Aktau (Kazakhstan), which is the basis of innovative projects on grain export. After commissioning of grain terminal in Amirabad, transport and logistical chain for grain export to market of Iran and the Middle East countries will be established, as well as for export of Kazakhstani wheat (SWAP-operations) on markets of third countries through southern ports of Iran in Persian Gulf.

Rationalization of grain export infrastructure involves development of transport logistics and other marketing areas. So, *in the south-east* direction one of perspective directions of Kazakhstani grain export is - China. For this purpose was built the railway grain terminal (2014) in the border area of China (Xinjiang Uygur Autonomous Region - Xinjiang) on railway junction station Dostyk - Alashankou (JSC "International center of boundary cooperation "Khorgos "). Project annual carrying capacity of terminal is about 500 thous. t, including elevator with capacity of simultaneous storage of 25 thous. t. of grain. In potential increase of demand for grain, export volumes may increase to 1 mln/t / year.

In the south-west direction the possibility of building a grain terminal in port of Black Sea (Russia, p. Taman) is discussed. Compared to Black Seaports of Ukraine, Kazakhstani grain transportation route to port of Taman is 1,000 km closer. It is important that products cross only one border (Kazakhstan-Russia), the route passes through the country with single customs space (CU and CES). In the perspective, this transport corridor has the opportunity to become the main route for export of Kazakhstani grain to the EU, the Middle East and North Africa in the next decade.

According to marketing estimation of some experts, increasing costs of logistics of grain have a significant impact on the profitability of the grain business of farmers of Kazakhstan. Comparability and validity of the results obtained in this article is confirmed by similar marketing studies conducted by several researchers (Delz, 2011; Delz, 2012) research and marketing organizations.

The research indicates that exporters prefer to incur logistics costs for the delivery of grain up to the border on basic terms (FOB, DAF, FCA, FAS). The main thing here is the desire to limit the delivery of grain Kazakhstan territory, as for the implementation of logistics operations abroad to be lacking in competence often even companies, positioning itself as a major grain traders and logistics provider.

In global supply networks, there is a concentration of freight flows on the optimal directions. In this case, the control and regulation of logistic business processes involves: developing an integrated optimization and control channels of product distribution of grain; the establishment of unified standards for the storage and warehouse processing of cargoes; optimization of traffic flows in peak periods of distribution; elimination of unreasonable loading and unloading; reconfiguration and improvement of supply chain products.

The obtained results allow us to objectively evaluate and to classify the transportation and logistics risks in developing countries exposed to sharp fluctuations connected with political and economic instability; to show solutions to overcome the negative factors.

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