



***Timur Bimaganbetov, Anthony Beresford, Stephen Pettit,  
Shang-Min Lin, Vasco Sanchez Rodrigues***

## **Multimodal Transport Solutions for Grain Exports from Kazakhstan**

### **Abstract**

The purpose of this paper is to evaluate multimodal transport developments in Kazakhstan where operating conditions are complicated by the historic connections to the former Soviet Union generating for example, a bias in trade direction and in operating protocols. This paper seeks to examine the trading methods and transport movements of grain exports from Kazakhstan highlighting the unusual nature of both routeing and carrying methods.

Kazakhstan is a landlocked country and trade through neighbouring countries gives access to the sea either directly or indirectly as several neighbouring states are themselves landlocked. The paper explores existing and alternative routes available to Kazakh grain exporters. On these major trading routes, specific logistics and transportation problems, which are both soft (intangible) and hard (tangible), are highlighted. In order to best demonstrate the salient operational characteristics, an analysis of the movement of grain from Koleshetau (northern Kazakhstan) to Bandar Abbas (Iran) is conducted. An established multimodal transport time-cost model is used as a framework to evaluate the effectiveness of both existing and potential routes.

The route via the port of Aktau (Aktau Port), although efficient and competitive in terms of time and cost, is constrained by capacity limitations, in particular the need for additional investment in both port infrastructure and grain terminal facilities. The routes through Uzbekistan and Turkmenistan face a range of problems including delays in the reverse flow of rail-wagons which in turn leads to transit restrictions by the neighbouring countries. The route through Russia is both very long and very time-inefficient and is often used as a route of last resort for a small number of traders.

**Keywords:** Grain, Kazakhstan, Export, Multimodal Transport.



## **1. Introduction**

Kazakhstan, located in Central Asia, is one of the five landlocked countries in this sub region (along with Uzbekistan, Turkmenistan, Tajikistan and Kyrgyzstan). Each borders at least two of the others and they are double or even triple landlocked. The remoteness from sea ports and isolation from world markets lead to unstable trading conditions for Kazakhstan grain exporters to world markets. Long distances from the markets and additional border crossings increase the total expenditure for transport services. As a consequence both export and import goods often transit through more than one neighbouring state, making transport complex (UNESCAP 2003). Therefore reliable and adequate transport and communications facilities play an essential role in the country's economic development. Rapid development of trade and globalization of the processes foster the necessity to invest in the transport sector. As Mazharova (2011) states, by 2015 the trade value between Asia and Europe is likely to increase to \$1 trillion and the advantageous geographic position of Kazakhstan as a bridge can be exploited. However transit opportunities require modern transport infrastructure meeting international standards. The recent utilisation of Aktau Port as a regional hub shows that efficient multimodal transport can play a significant role in increasing Kazakhstan's trade competitiveness.

Increasing the number of markets places Kazakhstan under pressure to evaluate and revise its transport system. Kazakhstan, after gaining independence in 1991, inherited from the former Soviet Union transport infrastructure which was built mainly to move the raw materials produced in Kazakhstan to Moscow. Overall, the transport infrastructure can be described as poor and there has been insufficient emphasis on the logistics sector which is still immature. The recent economic downturn emphasises the vulnerability of the transport sector and as a result steps are being taken to modernise the infrastructure. Mazharova (2011) reports that the levels of investment in the transport sector in 2014 will reach \$18.8 billion.

## **2. Aims and Objectives**

This paper is concerned with the assessment of multimodal transport development in Kazakhstan in the context of grain export. The aim of the paper is to assess the various routes and modes currently being utilised, or that could be utilised, for the movement of grain exports from the northern region Kokshetau to the Port of Bandar Abbas located on the Persian Gulf in Iran. It also evaluates the decision making process behind the choice of transport routes and modal conditions. The benefits and constraints of each route and infrastructure quality are considered.



### **3. Grain Exports from Kazakhstan**

Significant shifts in the geographic pattern of trade have been observed in the last decade. The key trading partners of Kazakhstan are China, Russia and the European Union and there has been growing Chinese influence. For example, China's share of imports in 2010 was 13% or \$4.3 billion. This trend is not surprising as China is becoming major player in the markets of Central Asia, and Central and Eastern Europe. The relative importance of Russia has been declining, namely as a destination for Kazakhstan's exports (IMF, 2011).

In recent years Kazakhstan has become one of the major players in the grain market. Kazakhstan is one of the ten largest wheat producers and one of the five largest exporters of grain in the world. Its large land area and low production costs provide the prospect of moving up the value chain with more handled wheat crops (OECD, 2010). In research carried out by OECD (2010) it has been reported that the low production costs create a key competitive advantage in the world grain market. As an example, wheat production costs in Kazakhstan in 2008 were only \$105 per ton, while in the USA and France they were \$248 and \$202 per ton respectively.

Wheat production in 2010 remained at around 10 to 12 million tonnes, which allowed Kazakhstan to meet domestic demand, and export up to 5 million tonnes of grain (ATF Bank, 2010). In 2011/2012 Kazakhstan grain yield rose to 27 million tonnes, including 22.7 million tonnes of wheat, which would have allowed the export of 15 million tonnes (July to July (Sakenova, 2012). Since July 2012, Kazakhstan has exported about 7.5 million tonnes of grain, 34 percent of this amount in the form of flour.

The geography of Kazakhstan grain exports comprises 25 countries namely: the CIS countries, the European Union, the Middle East and North Africa. Traditional buyers of Kazakh grain are the countries of Central Asia. Geographical proximity, similarity of trading systems and the high quality grain makes Kazakhstan an attractive supplier for these countries. Demand for grain from the Central Asian countries remains stable and less price elastic, since the population of the region is characterized by constant growth with low levels of income (RFCA Ratings, 2010). As a further stabilization strategy and to increase grain and flour exports, measures have been taken to develop the following corridors:

**1) Western corridor - through Aktau Port on the Caspian Sea in two directions - to the ports of Iran and to Baku;** for effective use of the Caspian Sea route, in 2007 a grain terminal at Aktau Port was been redeveloped, doubling of its capacity. In the same year, a new grain



terminal at the port of Baku (Azerbaijan) was built, with the handling capacity of 350,000 tonnes per annum. The plant includes a grain terminal and flour mill complex, with five silos for temporary storage, each of which can accommodate up to 3,000 tonnes of grain, storage thus totals 15,000 tonnes.

**2) South corridor – to Central Asian countries and Afghanistan;** In 2010 the grain terminal in the port of Amirabad (Iran) was constructed with a throughput capacity of up to 700,000 tonnes of grain per annum. At the Beineu station in Mangistau region in 2009 grain silos were built with a storage capacity of 100,000 tonnes, which provides handling capacity for up to 1.5 million tonnes of grain for export to the Caspian region, Central Asia and Middle East.

**3) East corridor - to China;** In order to promote the export of Kazakhstan's grain to the Chinese market a new grain terminal was developed on the Chinese border between 2011 and 2013. This has an annual throughput of 500,000 tonnes of grain per annum, with a possible increase to 1 million tonnes and 25,000 tonnes of storage capacity.

Iran is one of the major importers of Kazakh wheat and is also used as a transit point for Middle and Far East Countries through the port of Bandar Abbas. Iran and the Central Asian countries are becoming strategic partners for the export of grain, as Kazakhstan plans to exit the Black Sea markets. The Iranian grain import market is of interest not only to Kazakhstan. Among the major suppliers of grain to Iran are Canada, Australia, Germany, Argentina, Russia and Ukraine, which supply wheat mainly to the southern regions. At the same time the Iranian government generally supports freight delivery of grain. This is facilitated by the geography of the country: the north of Iran borders with the countries of the Caspian Sea region, to the west it has access to the Gulf countries, and on the south it has access to the open ocean through the Ottoman Gulf. In summary, flows into Iran are varied and price competitive.

The route for Kazakh grain to the Iranian grain market via the Caspian Sea was opened up in the mid-1990s. Up to 600,000 tonnes of grain per annum are handled through the Aktau Port terminal, which is a 100% subsidiary of the JSC "Food Contract Corporation" (FCC). FCC's mission is to ensure food security, stabilise the domestic grain market and promote the development of Kazakhstan's grain export potential through the effective management of resources and the promotion of grain export infrastructure in the grain industry. FCC buys grain from the farmers at a price of \$134-140 and exports it overseas. FCC is the main operator in the Kazakhstan grain market and it operates on behalf of the state. Kazakhstan plans to expand grain



exports to Iran to 700,000 tonnes per annum. For a landlocked country such as Kazakhstan, the movement of grain is a challenging issue. In Kazakhstan, due to the long distances, as a norm grain is transported mainly by rail but at the same time there is scope for multimodal solutions (Mazharova, 2011).

#### **4. Methodology and Analysis**

A routing analysis of the grain transport from Kokshetau North Kazakhstan to Bandar Abbas, Iran is carried out. A case study approach is used to investigate current multimodal developments instigated in Kazakhstan. Data sources used in this research include both primary and secondary data.

The main source of primary data was a series of semi-structured interviews with Russian, Kazakh and Iranian transport companies (typically road hauliers), Logistics Service Providers or LSPs (offering tailored logistics packages, often including value addition), freight forwarders (agency services), public and private (usually specialist) grain traders. All data about transport costs and distances were retrieved using real-time CIS Logistics software "Rail Tariff" for Russia, Turkmenistan, Uzbekistan and Kazakhstan, and data regarding Iranian transport were obtained from Iranian LSPs, freight forwarders and transport companies. Current and up-to-date information regarding the grain market were collected with the help of "Kazakh Zerno" Grain Information Agency. Secondary data about Kazakhstan were obtained from the National Library of the Republic of Kazakhstan and the Library of Railway Studies.

In the interviews a standard format was used with an accent on systematic sampling and fixed response categories and combination of loading procedures with statistical methods and quantitative measures. Unstructured interviews were used for this research due to their convenience for both parties. The interviews were tape recorded, having obtained consent, and used as a support material. Information and data were obtained through telephone, email, Skype and face-to-face interviews. Data collected through the research process were then applied to the Beresford cost model (Beresford, 1999).

##### *4.1. Freight Flows*

When the crop is harvested, local farmers sell grain to the FCC or private traders. As mentioned earlier, the FCC buys the grain on behalf of the state for the established prices. In the August during this study the price was \$134 - \$140 per ton. FCC has Grain Bases and Silos in several regions in Kazakhstan which are used for the storage of the grain and to bring it to standard



conditions. Farmers, either on their own or by contracting local freight forwarders, transport the cargo by road to the nearest silos and transaction is completed by handling the cargo to the FCC bases. All transport costs incurred up to the Grain Base are borne by the farmer. The cost of movement by road varies from season to season and is usually negotiable. According to Ministry of Agriculture records these can vary between \$0.5 and \$26 per tonne. Grain is mostly transferred by Kamaz trucks with a capacity of between 20 to 25 tonnes. For the rail leg grain wagons, covered wagons and gondola wagons are used.

There are two routes which are currently in use by Kazakh grain exporters. The first route is through Uzbekistan and Turkmenistan to Iran by rail. The second route is via Aktau Port and then to Bandar Abbas. Two more routes in use by Kazakh private traders through the Russian ports, also involve multimodal transport. A further route is currently under construction through Turkmenistan. A summary of the all alternative routes and intermodal combinations are given in Table 1.

**Table.1 Routeing alternatives for grain export, Kazakhstan-Iran**

All rail	All rail via Uzbekistan and Turkmenistan All rail via Turkmenistan
Multimodal	Rail-sea-road via Aktau Port Rail-sea-road via Olya port Rail-sea-road via Astrakhan

Usually grain is transported by rail through Uzbekistan and Turkmenistan to the Sarakhs station, which is located at the border between Turkmenistan and Iran. After this point Iranian merchants take over responsibility for the freight and use on their own methods to distribute the grain. On the route via Aktau Port Iranian buyers load the cargo at the port on Free-on-Board (FOB) terms. Kazakhstan sells the grain to Turkey and the UAE, and uses Iran as a transit country. Two routeing options are available: through Russia and via the Black Sea to Turkey and via the Caspian Sea through Iran to the UAE. In the latter case cargo reaches the port of Amirabad and is then moved to the port Bandar Abbas in the Persian Gulf.

#### *4.2. Kokshetau - Aktau Port - port Amirabad - port Bandar Abbas*

This is the optimal route in terms of cost and because no middle country is involved in transit. It is the most competitive in terms of rates and transit times. For grain exports this route was suggested by as an alternative to the route through Uzbekistan (Sergeev, 2009).



Currently it is in regular use by Kazakh exporters. In Kokshetau 40 – 60 grain wagons are loaded in the linear silos per shipment. The capacity of the grain wagons can be 60, 65, 70 and 73 tonnes. The cost of loading is approximately \$3 per ton. After each wagon is sealed and all customs formalities completed, the certificate of export is issued and the grain transported to Aktau Port. The distance to Aktau Port is 2,260 km and distance the transit time around 5 to 11 days. The route passes through main stations: Kostanai, Tobol, Altynsarin, Khromtau, Kandyagash, Sagyz, Kulsary, Beineu, Mangyshlak. Many freight forwarders offer their service, but some private traders carry the cargo by themselves. The main operator is JSC "Kazakhstan Temir Zholy", and they also offer covered and gondola wagons to the private traders. The important issue to notice is that in 2007 new rail network connecting Altynsarin station to Khromtau is constructed. The distance between stations is 403 km. Before this date, all the movements from North Kazakhstan to Aktau Port were operated through Russia. New railway construction cut the distance to 1500 km and saved up to 10 days delivery time. At the station Mangyshlak 15 km to Aktau Port, JSC "KaskorTransService" takes over the wagons and carries to the port. The cost for rail leg is \$34 per ton.

Aktau Port is the only port in Kazakhstan and was built in 1963. From 1996 to 1999 it was reconstructed and now serves as a hub for the exports and imports of the goods to/ from Kazakhstan. In 2002, for the purpose of the movement of grain, the "Ak Bidai Grain Terminal" was built with a throughput capacity of 600,000 tonnes per annum (Table 2). Currently the grain terminal provides transshipment of 30,000

to 75,000 tonnes of grain per month at different times of the year and depending on the volume of exports in the direction of the Caspian countries. This is the main problem, since the limited capacity of the grain terminal is the main bottleneck, where all problem starts. The monthly demand from Iran is 350,000 tonnes a month and the terminal is not able to comply with it (Black Sea Grain, 2010). Transshipment via the terminal operates as follows: the grain is fed to the terminal by rail in special tank-grain "hopper" or grain wagons. Wagons are supplied to the receiving device for unloading, then unloaded grain poured into the silos for the storage and accumulation of the ship's party. On arrival of the vessel the grain then poured into it.

**Table 2. Volume of grain shipped through JSC "Ak Bidai Terminal"**

Year	2005	2006	2007	2008	2009	2010	2011	2012
Volume (000' tonnes)	36.2	125.9	180	260.4	557.5	403.8	307.7	500



Source: Alzhanova (2012)

Major transactions are processed on a FOB basis at Aktau Port. The vessels with a capacity of 3000 or 5000 tonnes are loaded over 4 days. The speed of pouring machine at the terminal is 200 - 220 tonnes per hour. And with the paperwork the vessel stays at the port for 6 days. The cost of the movement in the terminal is \$7 per ton. Also document charges, such as fumigation, certificate registration fee, port charges and etc. will total around \$35 (Table 3).

The route is very reliable, and it includes rail, sea and road transport to the port Bandar-Abbas. Rail freight represents 45.9% of total journey and 19.75% of total transport cost, the sea leg accounts for 15.9% of the total journey and 18.71% of the total transport cost. The road transport share of the total journey is 38.14% with more than 32% of total cost. The total transit time is 28 days. The road leg in Iran is very price competitive. Although port Amirabad is the only port at Caspian Sea, who has rail link to hinterland, Iranian freight forwarders prefer road haulage, as it is fast, flexible, reliable and in this case cheap. Road share of total cargo and passenger movement in Iran accounts for 90%. For example, Khadem Group charges \$37 per ton for trucking, plus \$1.5 LSP fees.

Sea freight rates fluctuate depending on the season from \$17 to \$35 per ton. The delivery time for 420 nautical miles is 2 days at the 10 knots speed. Sea freight is the most expensive, probably due to the short distance. The vessels are mostly under Iranian flags. The shipment can be made to northern ports of Iran, such as Amirabad, Anzali and Nousheher.

Delays are unfortunately commonplace on this route and the causes can be summarised as: limited silo capacity; lack of long-term grain storage; inefficient loading-unloading equipment at Aktau Port; lack of preparation of documents in advance; lack of coordination between railway, port and ship; shortage of dry bulk fleet capacity; lack of regular shipping lines and lack of terminal facilities and inefficient loading-unloading operations at the port of Amirabad (KTZH, 2012). If the delays along this route were to be eliminated, it could save shipping time and cost of transfer. It takes 26 days and \$184 per ton to move the grain to the port Bandar Abbas. The optimal option takes only 16 days and \$159 for the same distance.





**Table 3 Kokshetau - Aktau Port - port Amirabad - port Bandar Abbas**

Day	Leg	Mode	Transit time (days)	Distance (km)	Cost (USD)
1	Kokshetau (Loading)		1	0	3
2	Kokshetau - Aktau Port Port charges	Rail	8	2,260	34
			4.5	0	23
			1,5	0	
15	Aktau Port - Port of Amirabad Port charges	Sea	2	785	35
			5	0	32
22	Port of Amirabad - Port of Bandar Abbas Iran LSP Handling Charges Other Charges *	Road	5	1,878	40
			0	0	1.5
27	Port Bandar Abbas (Unloading )		1	0	10
28	Total		28	4,923	178.5

\* Customs charges in Iran varies time to time up to 50%

A further option is shipment via the Aktau Port Ro-Ro ferry terminal, which gives an additional capacity of 500,000 tonnes per year. Table 4 details the movement and handling of TEU container on the ferry terminal.

**Table 4 Cost per TEU container via ferry terminal of Aktau Port**

Day	Leg	Mode	Transit time (days)	Distance (km)	Cost (USD)
1	Kokshetau (loading)		1	0	72
2	Kokshetau - Aktau Port Port charges	Rail	8	2,260	600
			4.5	0	78
			1,5	0	438
16	Aktau Port - Port of Amirabad/ Anzali/ Nousheher Other charges *	Sea	2	785	650
27	Total		17	3045	1838

\* Customs charges in Iran varies time to time up to 50%



This clearly demonstrates that the rail leg is cost competitive compared to carriage by sea. The rail leg accounts for 74.2% of the total distance to the port Amirabad, while sea leg is only 25.8%. However, cost share of the rail is only 32.6% for 2260 km, whereas share of the sea presents 35.4% of the total cost for only 875 km.

Currently two types of ferry are operated by the Azerbaijan State Caspian Shipping ferries; with capability to carry 28 or 52 wagons at a time. The ferry schedule is not provided because of the expectations of the Azerbaijani side of their optimum loading at the port of Baku, while in Aktau Port the load is guaranteed. Depending on the season at the port dozens, and sometimes hundreds of wagons can be queued to be loaded. In this regard, the national carrier of the JSC "Kazmor-transflot" planned to purchase of four of its own ferry boats, and construct of a new ferry terminal (Sergeev, 2012). Total delivery time fluctuates from 16 to 25 days, and depends on the various factors, such as availability of the vessels, port procedures etc. Handling charges at Aktau Port for wagons is \$16.72 per ton. Additional \$24.50 per ton charged for delay and security at the port. This option is usually used for transshipment to Azerbaijan, but some traders tried to use the ferry terminal to carry to Iran. Sea freight to Azerbaijan is \$1668 per wagon. During the field research for this study it was found that most Kazakh traders are not aware of the option of using the ferry terminal and another alternative using bagged grain, the latter not being discussed in this paper.

#### *4.3. Kokshetau - Saryagash – Sarakhs – Bandar Abbas*

This route bypasses Uzbekistan and Turkmenistan and is mostly used by private traders from Kazakhstan and Iranian freight forwarders. The transport cost of empty wagons back to Kazakhstan already included in tariffs. In 2001 Kazakhstan was transporting 100,000 tonnes of grain every month, which is 1.2 million tonnes per year. The last four years brought problems with Iran keeping grain wagons for 40-60 days (Konyrova, 2012). According to the Farmers Union of Kazakhstan (2010), this route is the most challenging, congested and problematic route. Two serious constraints exist with this corridor: customs restrictions and problems with return of the wagons. Sitting at the border of Iran and Turkmenistan queued Kazakh grain wagons are the results of customs processes in Turkmenistan. The unloading process of the wagons is very slow in Iran, and the average reverse flow of the returned wagons is about 20-24 empty grain wagons per day.

This measure is also used by Uzbekistan as a competitive tool for the Iranian market to decrease the competitiveness at the Black Sea and Baltic areas (Farmers Union, 2010). All of these



Conventional Bans frequently imposed by Turkmenistan and Uzbekistan seriously affects the grain trade and lowers the priority of this route. The decision on granting and removing the Conventional ban is under Central Board of Railway Transport located in Moscow. This route is the oldest and traditional for grain exporters. The cost from Kokshetau to Saryagash is \$29.52 per ton and delivery time is approximately 4 to 11 days. This route passes through such major stations, as Astana, Karagandy, Sary-Shagan, Shu, Lugovaya and Shymkent.

The distance in Uzbekistan from Saryagash to Farap is 732 km and the cost estimated at \$34.05, delivery time 4 days. The route follows the stations Tashkent, Kavast, Uluqbek and Buhara. The distance from Uzbekistan to Turkmenistan is 469 km and the cost is \$21.40. The route follows via stations Mary and Altyn Sahra (Table 5).

**Table.5 Kokshetau - Saryagash - Farap - Sarakhs - Bandar Abbas**

Day	Leg	Mode	Transit time (days)	Distance (km)	Cost (USD)
1	Kokshetau (loading)		1	0	3
2	Kokshetau - Saryagash	Rail	11*	1964	29,52
13	Saryagash - Farap	Rail	4	732	34,05
	Additional Charges (\$ 8.77 per shipment)		0	0	0.1
	Military Convoy (\$ 80.96 per wagon,		0	0	1.34
17	Farap - Sarakhs	Rail	3	469	21.40
	Military Convoy (\$ 33.77 per wagon)		0	0	0.56
	Brake of gauge charges (\$ 203 per wagon)		1	0	3.38
20	Sarakhs - Bandar Abbas (by rail)	Rail	9	1619	54
	<b>Sarakhs - Bandar Abbas (by road)</b>	<b>Road</b>	<b>9</b>	-	<b>37</b>
	Sarakhs charges		0		1.5
	LSP Handling charges		0		1.5
	Unloading charges at Bandar Abbas		1		10
	Other charges **				
30	Total (by rail)		30	4784	160.35
	(by road)				142.97

\* For Kokshetau – Saryagash 11 days allowed according to “Rail Tariff” software, although normal time is 5 days

\*\*Customs charges in Iran varies time to time up to 50%

Two options are available in this corridor: all-rail route from origin to destination and another with the split from rail to road at Sarakhs border. In the first option grain travels all the way from



Kokshetau to Bandar Abbas by rail. In Iran at Sarakhs border breaks of gauge occur at a cost of \$203 per wagon and goods delivered to final destination. All rail routes would be more expensive, and entail problems with wagon delay. In the second option at Iranian border merchants unload the cargo to the nearest warehouse and load them to trucks. Carriage by road in Iran is the main means of transport. It is popular, cheaper and faster and the cost fluctuates from \$37 to \$50 per ton. Usually Iran takes over the goods at Sarakhs and can resell them in the country, as demand for Kazakh grain is high and the selling price is inside Iran around \$290 - 300 per ton.

There are some Iranian freight forwarders which offer services from Astana and Almaty to Bandar Abbas, and they charge \$250 and \$210 per ton respectively, but their capacity is limited. Delivery time from Astana to Bandar Abbas is 18-20 days and from Almaty 10-12 days. At Sarakhs, border grain wagons unloaded to the warehouses and the wagons are sent back to Kazakhstan. Transshipment of road haulage will cost \$200 per wagon. From Sarakhs to Bandar Abbas the carriage rate is \$50 per ton by truck. Delivery to Sarakhs can take up to 25-30 days, but with the tight control of the freight forwarders it can be decreased to 7-10 days. Border waiting procedures are the most time consuming, and can last to 15 days. Breaks of gauge are a quick process itself, but sometimes these procedures can take two days.

Uzbekistan charges \$8.77 per shipment, regardless of the size of load and compulsory military security \$80.96 per wagon. The cost of military security in Turkmenistan is \$33.77 per wagon and is not a compulsory charge. At the Turkmen - Iran border breaks of gauge occur (1520 - 1435 mm) and additional \$203 should be paid. Also there is Sarakhs border charge at \$1.5 per ton and LSP handling fee at \$1.5 per ton. At the port Bandar Abbas the unloading activities cost \$ 10 per ton. At the peak season it is impossible to get the grain wagons for this direction, and Kazakh private traders use covered wagons for transport. Covered wagons are given at an indicative price by KTZH. Both doors are locked firmly very tightly and the grain poured from the top. The gross capacity of the wagon should not exceed 88 tonnes. Net capacity is 68 tonnes.

#### *4.4. New route: Uzen (Kazakhstan) - Bereket (Turkmenistan) - Gorgan (Iran)*

This railway line will bring Kazakhstan to the Persian Gulf and the sea ports of Iran and will increase turnover among the littoral states. This route will be one of the shortest, cost effective and fastest way connecting Europe and Central Asian states with Gulf and Indian Ocean States. It is three times shorter than the route via Suez Canal. This route will increase grain exports to Iran up to 5 million tonnes per annum. Total projected traffic for the first year of operation of the



road is 9.6 million tonnes of cargo. In April 2011 an agreement on the construction of an international transport and transit route "Uzbekistan-Turkmenistan-Iran-Oman-Qatar" was signed in Ashgabat (Lukic, 2011).

In May 2012 a new international railway entry point at Bolashak (Kazakhstan) and Serhetyaka (Turkmenistan) opened which connects Iran with Kazakhstan via Turkmenistan (Tengrinews, 2012). MTK RK reports, that this event is one of the stages of an international project of the modernization of "North-South" and the construction of the railway line Uzen - Gorgan is one part of the project. "North - South" project is implemented based on the agreement signed between Kazakhstan, Turkmenistan and Iran in 2007. Total distance is 686 km, within Kazakhstan 146 km, within Turkmenistan 470 km and within Iran 70 km. Construction cost within Kazakhstan estimated at \$433 million. Possible capacity is 12 million tonnes (MTK RK, 2009). Initially it will transport 3-5 millions of tonnes of cargo annually, but this figure is expected to be increased to 10-12 million tonnes (Turkmenistan.ru, 2012).

In addition to supplementing existing routes via Aktau Port and through Uzbekistan, this corridor will add an extra 3 million tonnes of capacity annually. According to President of Grain Union of Kazakhstan, with the completion of the railroad shipping costs of Kazakh grain to Turkey will drop from \$135 to \$41 per ton and the market will shift from the Black and Baltic Region to Iran, through Iran to Turkey and Persian Gulf states, with consumption of 23 million tonnes annually. Although this new route is not in use, some calculations can be made. According to Rail Tariff software, the cost from Kokshetau to Uzen station would be \$36.95 per ton for 2,435 km. With the remaining 146 km to Turkmen border it may constitute at \$37 -38. LSPs appraise the cost for the Turkmen side at about \$30 to 35 per ton. And the Iran leg will estimate at \$40 per ton by road. With additional charges the carriage to Bandar Abbas will cost approximately \$153 (Sergeev, 2012).

#### *4.5. Transport via Russia*

A significant problem for the realization of the export potential for Kazakhstan is the continental location and neighboring with major producers - Russia and Ukraine. These countries along with Kazakhstan are unstable producers of grain. Russia with a yield of 30 million or less tonnes a year becomes a net importer of grain, and purchases vast volume from Kazakhstan. With a yield of more than 55 million Russia virtually stops buying grain and becomes a major player in the export market. Thus, if the region hits a big harvest, wheat prices are significantly shrinks, and given the fact that Russia is a major importer of Kazakh grain, the drop in prices is worsens by



decreased demand. Kazakhstan producers in this situation have a very short period of time to seek new markets, using an aggressive marketing policy, which also has a negative impact on the selling price (ATF Bank, 2010). Transport via Russia is the most expensive and very problematic. There are many sophisticated procedures and additional charges imposed by RZHD and JSC "RusAgroTrans" Shyntimirov (2010).

For comparison, movement of the Kazakh grain from "Bulaevo" to "7th Continent" would cost \$31 per ton for 90 km distance, while transport costs from "Smirnov" (North Kazakhstan) to "Saryagash" (South Kazakhstan) are \$30 per ton for 2,115 km. When transporting in Kazakh wagons RZHD insist on contracting "LPTrans", which in turn charges extra \$10 per ton (Shintimirov, 2010 c). The research revealed that all Russian Caspian Sea ports are busy with the shipment of Russian grain and shipments via the "Astrakhan Grain Terminal" and via the grain terminal in Olya port for Kazakh grain is currently not possible. The capacity of the Olya grain terminal is limited and Russian grain is prioritised. A second phase of construction will expand the capacity to 1 million tonnes a year, possibly allowing this route to be utilised.

Olya port is located in the delta of the Volga River for 67th km of Volga-Caspian canal, close to the Caspian Sea. Advantageous geographical location creates conditions for year-round cargo transshipments, provides access to the river, sea, road and rail line. In 2012 a new grain terminal opened, with a throughput capacity of 500,000 tonnes per annum and 27,400 tonnes of storage capacity.

The strategic location of Olya port at the Caspian Sea serves as a link between Europe and Asia. Some Kazakh private traders transport grain in containers via Olya port. Each container is filled with 50 kg bags of grain and the net weight of each TEU is 24 tonnes. From Kokshetau to Olya port transfer is via Russia through the Kartaly station. The total distance to Olya port is 2,717 km. The distance from Kokshetau to Kartaly is 649 km and the cost is \$234.1 per TEU. The remaining distance from Kartly to Olya is 2,068 km and the cost is \$1954 per TEU. From Kartaly, wagons are moved by Russian Railways and rent for container and railway charges are included. The major stations are: Orsk, Orenburg, Pugachevsk, Ershov, Urbah, Astrakhan and Trusovo. Port charges estimated at \$800 per ton and time spent at the port 7 to 10 days. The sea freight is \$1700 per container and from 2 to 3 days delivery time.

For this route, freight movement in TEU containers from Kokshetau to port Bandar Abbas via Olya port and Anzali port, rail freight represents 36.54% of the total transport cost and 48.5% of



the total journey, while sea leg illustrates 25.6 percent of the total cost and 17.8 percent of the total journey. The road transport share of the total cost is 19.5 percent of the total cost with 23 percent of the route. Thus the sea leg is the most expensive leg, since it is not dominant. The cost of rail transport in Russia is higher than for road due to the tariffs imposed by RZHD, the rail operators. Only small traders use this route as an alternative because of high costs. The cost per ton for this corridor is approximately \$276.5 per ton. Table 6 suggests approximate cost for each leg. Very scarce information found for this corridor, as it is not attractive for Kazakh grain traders.

**Table 6: Kokshetau - Kartaly - Port Anzali - Port Bandar Abbas (per TEU)**

Days	Route	Mode	Distance (km)	Transit time (Days)	Cost (USD)	Cost %	Distance %
1	Kokshetau - Kartaly	Rail	649	3	234.1	3.5	11.5
4	Kartaly - Olya Port Port charges	Rail	2068 0	10 10	1954 800	29.4 12.05	36.9 0
24	Olya Port - Port Anzali Port charges	Sea	1000 0	3 5	1700 650	25.6 9.8	17.8 0
31	Port Anzali - Port Bandar Abbas	Road	1878	5	1300	19.5	23.2
	Total		5595	36	6638.1	100	100

All interviewees agreed that Russian railway administration does anything to postpone the shipment of Kazakh Grain at the Russian Border. Border crossing points delays are mostly procedural, and the excessive waiting time can entail additional costs, deterioration of the grain and cancellation of the contract with Iranian merchants.

## 5. Discussion

From this study it has been found that Kazakh grain exporters use two main routes for grain shipments to Iran. The first route via Aktau Port is the most advantageous and does not require the need to use a third country for transit purposes. Shipment through Uzbekistan and Turkmenistan is not reliable, although competitive in terms of price. Delay of the reverse flow of the wagons worsens the situation with shortages of grain wagons in Kazakhstan. Frequent Conventional Bans imposed by transit countries decrease the attractiveness of this route. Kazakhstan is very optimistic of the new route via Turkmenistan, which could add an additional 3 million tonnes of capacity a year, however, private traders still believe that new route will not



be as competitive as anticipated. The route via Russia is the less competitive in terms of price, transit time and reliability, and only a few traders use it. Transport by road in Kazakhstan is expensive and is used only to carry the grain to the silos. The price by road varies and negotiable.

Although the Iranian rail network has access to ports, the cargo volume does not reflect the current demand. The ports of Bandar Abbas, Amirabad, Bandar Imam Khomeini and Khoramshahr have rail links, but their rail share is not significant. Other ports, including Anzali, Chabahar, Nousheher, Bushehr and Asaluyeh do not have rail connections. According to PMO statistics, out of 140 million tonnes of cargo shipped to/ from ports, rail freight's share constitutes only 3.4 million (PMO News, 2011). Great importance is still placed on road transport, accounting for over 90% of freight and passenger traffic

From this study it has been found that for such landlocked country as Kazakhstan the dominant leg for long distances would be rail, reliance on this mode being created by no access to the sea and the poor condition of road network. Road haulage despite its flexibility only serves as a feeder leg. Due to the capacity and value ratio of the grain, transport by air is excluded. The distance of the sea leg is short and may therefore be regarded as short sea shipping.

Of all the alternative routes between Kokshetau region and Iran, the routing via Aktau Port is the most cost competitive, being both reliable and with good transit times. This route is the fastest and no middle country is involved in the transshipment. Routes through Uzbekistan are cheaper, but there are problems with delay, and bans imposed by Uzbekistan and Turkmenistan decrease the attractiveness of this corridor. It must also be noted, that in reality, sea freight rates between Aktau Port and Amirabad are adjusted to account for peak seasons. The freight rate fluctuates from \$18 to \$35 and the highest rate is used in this study. The rail transport to Aktau Port averages 8 days, although it may take only 5 days. All the transactions are usually made on FOB terms and accordingly Iranian buyers take over the cargo at Aktau Port and bear all onwards expense. The capacity of the grain terminal is limited to only 50-70,000 tonnes a month with an annual demand of 300-350,000 tonnes, which in turn creates the need to look for alternative routes and options. Kazakhstan grain traders suggest that expansion of port infrastructure and investment on building more grain terminals at Aktau Port will solve all the existing logistics and transport problems.

With the expansion of the capacity of the grain terminal at Aktau Port to 300,000 tonnes a month, the supply will be matched to the demand and the need to seek for alternative routes will





be eliminated. Firstly, the Kazakh traders will solve the problem with grain wagons. Along with the 5,200 grain wagons, covered and gondola wagons are utilized for the shipment of bulk cargo. And the need to rent extremely expensive grain wagons of "RosAgroTrans" will not be necessary and the utilization of three types of wagons of Kazakhstan Temir Zholy will be sufficient. The turnaround time of the wagons from Kokshetau to Aktau Port and vice versa will be only 11-12 days. Secondly, once the supply matches demand, the need for the alternative routes will be excluded. Transshipment via Russian ports at Caspian Sea is very luxurious, since Kazakh exporters have to rent additional Russian wagons and containers and pay exploitation fees for Russian Railways. All the complicated procedures and sophisticated paper work, along with the extra miles via Russian railways, will not be required.

Thirdly, heavy investment in Aktau Port and expansion of trade agreements with China, whose population is increasing at a massive speed, will be plentiful to export all the Kazakh grain. As interviewee states, the quality of Kazakh grain is similar to Canadian and China can consider the substitution of Kazakh grain to Canadian, US and Australian grains. The entire lengthiest and costly destinations, such as routes via Black Sea to Europe, Japan and Korea may not be vital, and the \$40 per ton state subsidy would remain in treasury. Fourth, once capacity of grain terminal at Aktau Port increased, big bags and other alternate options may vanish. This fact is confirmed with the interviewee, who argues that big bag itself is an expensive material, not to mention its excessive port handling charges. With all the wagons being operated in Kazakhstan the existing problems of keeping and delaying the return of the wagons should be solved. The construction of the new railway from Uzen to Gorgan will only partly solve the existing problems. With the opening new route via Gorgan, the problems with returning grain wagons, breaks of gauge problems and intermediate involvement of transit country, as Turkmenistan would still exist. This route will only remove Uzbekistan on the way and may be considered as an alternative for transit through Iran to Persian Gulf states for grain and other commodities.

The route via Sarakhs is an alternative route and is used mostly by private traders. Only a few companies have a quota to use "Ak Bidai Terminal" and it takes time-consuming paper work to receive it. It is also competitive route and half of the export via Iran is accounted to it. The problems with late delivery of the grain wagons and frequent Conventional bans lower the attractiveness of this corridor. Most of the traders are not aware of another alternative via the Russian ports of Olya and Volga. But expensive rents of the wagons and containers, and expensive Russian railway tariffs increase the usage via Sarakhs. The carriage of 1 TEU from



Kokshetau to Amirabad will cost approximately \$5000 per container. Overall charges per tonne/km for the three routes are shown in Table 7.

**Table 7 Cost of freight/km by modes of transport (in USD), freight unit per ton**

№	Route	Mode	Distance (km)	Cost/ tone-km
1	Kokshetau - Aktau Port	Rail	2,260	0,01
	Aktau Port - port Amirabad	Sea	785	0,04
	Port Amirabad - Port Bandar Abbas	Road	1,878	0,02
	Total	Intermodal	4,923	0,07
2	Kokshetau - Saryagash	Rail	1,964	0,01
	Saryagash - Farap	Rail	732	0,04
	Farap - Sarakhs	Rail	463	0,04
	Sarakhs - Bandar Abbas	Rail	1,619	0,03
	Sarakhs - Bandar Abbas	Road	1,619	0,02
	Total (all rail)	Rail	4,778	0,12
	Total (intermodal)	Rail-road	4,778	0, 11
3	Kokshetau - Kartaly	Rail	649	0,01
	Kartaly - Olya port	Rail	2,068	0,03
	Olya Port - port Anzali	Sea	1,000	0,07
	Port Anzali - port Bandar Abbas	Road	1,878	0,02
	Total	Intermodal	5,595	0,13

Multimodal transport development in Kazakhstan is in its initial stages and its importance and effectiveness are not fully explored. As Banomyong (2001) argues, multimodal transport corridors generate the economies of scale within transport system and each mode orchestrated in efficient productive manner. As geographical pattern of trade expands, the transport system should meet all the requirements to comply with it. Strategies for freight transport should be employed and re-evaluated at the government level. Development of new modal, intermodal and node infrastructure in Kazakhstan the accessibility to the international market will grow in a new level. Smooth and interrelated reliable linkages between modes and infrastructure within transport system will be half the battle.

The route choice decision-making process in this case study is limited and for the private traders direction via Sarakhs is the option in terms of the cost and transit time. One of the other suggestions would be the consideration of port's capital structure change from fully state owned to half public owned by issuing extra number of shares. In this case, the state would hold 70% of



total equity, while the rest 30% would be distributed among local and foreign investors. Funds generated by Initial Public Offerings (IPO) could be invested in further development. Given the increasing demand for grain commodities around the World, the realization of this idea should not fail.

The role of the private traders is not significant in grain movement industry and they have to rely heavily on state subsidies and support. The doors via Aktau Port for them are also closed. The biggest traders could collaborate horizontally for the benefit of the Farmer Unions, and in order to cut production and transport costs.

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