# Sugar VAC Analysis of Kyrgyzstan: Strengthening Supply Management

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## CONTENT:

BACKGROUND INFORMATION: 2

SUGAR MARKET: 3

FARMERS AND PROCESSORS RELATIONS 8

Problems of the last season 9

Prices for sugar beet/ payment conditions 10

2017 conditions / contract: 11

Value added Chain «Sugar» 12

Supply structure: 13

Primery Production 14

SUPPLY CHAIN MANAGEMENT: 16

Value added within the value chain 18

Sustainability issues 19

Crop rotation 19

Irrigation water 20

Labour 20

Achievable Impact 20

CONCLUSION: 20

## BACKGROUND INFORMATION:

Sugar ranks among the six core products of horticulture for the evaluation the level of food security of Kyrgyzstan (Enactment by the regulation of the Government of Kyrgyz Republic) «About the asseveration of the condition about monitoring and indicators of food security of Kyrgyz Republic» from the 9th of March 2009, №. 138. In accordance with the Food Security Program of Kyrgyzstan, volume of sugar beet production is the most unstable (annual deviation from the average annual volume of production during the period of 2010-2015 had attained up to 100%). Average of yield index of sugar beet has increased in recent years, however it still remains poor (39 tons from hectare in 2015 [1] versus 60 tons from hectare, in the countries with the high level of agriculture). However, because of favorable weather conditions, average sugar beet yields with the last indicators set up 57.4 tons from hectare in 2016.

**Table 1 –** ***The Kyrgyz history of Sugar Beet versus Sugar Production:*** [2]

| Year | Total territory (ha) | Yield (t/ha) | Total production (t) | Production of sugar (t) |
|---|---|---|---|---|
| 1970th (During Soviet Union) | 50.000 | 38,00 | 1.900.000 | 235.600 |
| 1993 (After Independence) | 11.700 | 18,80 | 220.000 | 27.280 |
| 2003 | 31.200 | 26,03 | 812.200 | 100.712 |
| 2008 | - | - | - | - |
| 2009 | - | - | - | - |
| 2010 | 7.000 | 17,20 | 120.400 | 14.929 |
| 2011 | 7.400 | 21,46 | 158.818 | 19.693 |
| 2012 | 5.200 | 19,62 | 102.010 | 12.649 |
| 2013 | 6.300 | 31,11 | 196.027 | 24.307 |

[1] *Based on information from Kaindy-Kant*

[2] *Database of Kaindy-Kant*

| | | | | |
|---|---|---|---|---|
| 2014 | 6.239 | 28,09 | 175.239 | 21.729 |
| 2015 | 4.686 | 39,10 | 183.226 | 22.720 |
| 2016 | 12.200 | 57,38 | 710.000 | 68.800 |
| 2017 (Estimation) | 15.500 | 50,00 | 775.000 | 96.100 |

## SUGAR MARKET:

According to National Statistic Committee's data on consumption of products per capita in Kyrgyzstan, annual average **demand for sugar** and confectionery products based on sugar is 80 thousand tons. This is the optimal norm of consumption approved by the government. However, the real consumption of sugar in a country shows **100-110 thousand tons**[3]. According to a real market of sugar, **up until 2015,** Kyrgyzstan satisfied its own needs **by 20%,** and currently as a result of **2016's season – 65%.** The result of 2016 was the increase of farmers number (from 2.5 thousand to 5.5 thousand), expansion of areas under sugar beet (from 4800 ha in 2015 to 12000 ha in 2016), and favourable conditions of weather; that 710 000 tons of sugar beet collected (650 000 tons taken for processing) versus 183 thousand tons in 2015.

With the current investments planned internal production might meet stable supply as much as 70% of the total internal demand. There is still a lot of room to increase production for the internal market. But it needs concentrated focus on bottlenecks existing in the primary production: starting from mechanization promotion to knowledge of farmers on cultivation of sugar beet on a right way.

In 2016, Kyrgyzstan imported sugar in a value of 15.3 mln USD (if the average price of 1 ton sugar – 550 USD, the import constituted 27 790 tons), comparatively to 2015 – 39,5 mln USD. But, during 2012-2014, the country used to import sugar for about 55 mln USD every year. Interestingly, Kyrgyzstan started importing raw cane and raw beet sugar for further processing in 2016 and the value of this product was about 16 mln USD.

**Table 2 -** ***List of sugar products (value/ton) imported by Kyrgyzstan:*** [4]

| Code | Product label | 2012 | 2013 | 2014 | 2015 | 2016 | Imported value in 2016,US Dollar thousand | Imported quantity in 2016, Tons |
|---|---|---|---|---|---|---|---|---|
| | | Imported unit value, US Dollar/Tons | Imported unit value, US Dollar/Tons | Imported unit value, US Dollar/Tons | Imported unit value, US Dollar/Tons | Imported unit value, US Dollar/Tons | | |
| 170199 | Cane or beet sugar and chemically pure sucrose, in solid form (excluding cane and beet sugar . . . | 763 | 688 | 697 | 565 | 550 | 15,289 | 27,790 |

[3] *Based on information from Kaindy-Kant*

[4] *Trademap.org*

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 170114 | Raw cane sugar, in solid form, not containing added flavouring or colouring matter (excluding . . . | | | | | 513 | 13,840 | 26,999 |
| 170112 | Raw beet sugar (excluding added flavouring or colouring) | 746 | | | 1,000 | 474 | 12,152 | 25,632 |
| 170191 | Refined cane or beet sugar, containing added flavouring or colouring, in solid form | 3,500 | 1,438 | 373 | 938 | 692 | 18 | 26 |
| 170111 | Raw cane sugar (excluding added flavouring or colouring) | | | | | | 0 | 0 |

**Chart 1 – Sugar production in Kyrgyzstan versus imported sugar**

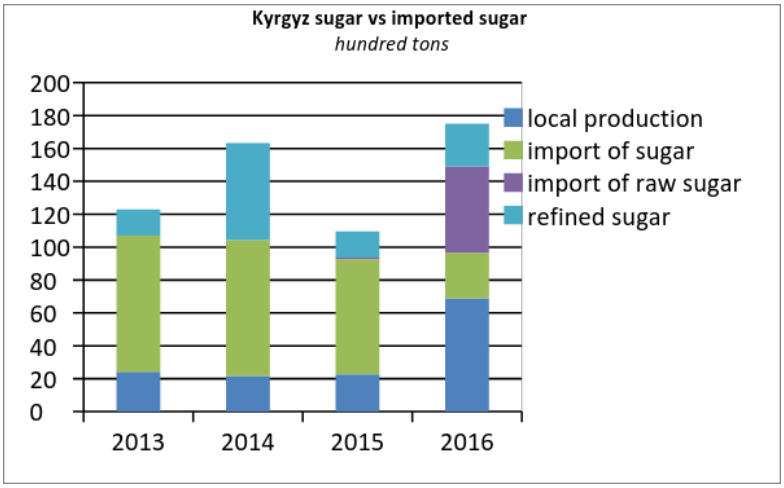



Chart 1 demonstrates figures from table 1 and 2 that although the local production is increasing, imports are not decreasing in similar quantity. But, import of 2016 has to go together with local production of 2015. Therefore, when data of sugar import within 2017 is available, it should added to locally produced sugar – 68 800 tons.

If there is the tendency of growing local production and no decrease of imports at the same time, we can only make assumptions in this regard: 50% of locally produced sugar at farmers' hands might be (even unofficially) exported to neighbouring countries. For instance, officially, Kyrgyzstan exported only 5 tons of sugar to Afghanistan in 2016 and 200 tons to Kazakhstan in 2010.

**Table 3 – *List of Sugar Products (quantity) imported by Kyrgyzstan:*** [5]

| Code | Product label | Imported quantity, Tons | | | | |
|---|---|---|---|---|---|---|
| | | 2012 | 2013 | 2014 | 2015 | 2016 |
| 170199 | Cane or beet sugar and chemically pure sucrose, in solid form (excluding cane and beet sugar . . . | 84,917 | 82,708 | 82,661 | 69,911 | 27,790 |
| 170114 | Raw cane sugar, in solid form, not containing added flavouring or colouring matter (excluding . . . | | | | | 26,999 |

[5] *Trademap.org*

| | | | | | | |
|---|---|---|---|---|---|---|
| 170112 | Raw beet sugar (excluding added flavouring or colouring) | 118 | | | 1 | 25,632 |
| 170191 | Refined cane or beet sugar, containing added flavouring or colouring, in solid form | 2 | 16 | 59 | 16 | 26 |
| 170111 | Raw cane sugar (excluding added flavouring or colouring) | | | | | |

Currently, top 5 countries exporting sugar Russia, Azerbaijan, Ukraine, and Belarus. Brazil in this sense is an exporter of raw sugar to Kaindy Kant which further processes for white sugar.

| Exporters | 2009 Imported quantity, Tons | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| **World** | **81,692** | **61,876** | **86,739** | **85,037** | **82,723** | **82,720** | **69,928** | **77,318** |
| Brazil | 0 | 0 | 0 | 0 | 2,389 | 0 | 0 | 26,008 |
| Russian Federation | 2 | 477 | 10,419 | 7,809 | 9 | 23 | 6 | 23,804 |
| Azerbaijan | 6,080 | 4,160 | 9,280 | 2,304 | 14,080 | 28,928 | 9,043 | 7,424 |
| Ukraine | 14,643 | 266 | 261 | 11,615 | 25,288 | 203 | 44,197 | 6,427 |
| Belarus | 55,406 | 39,930 | 57,890 | 49,252 | 29,295 | 20,495 | 11,382 | 6,253 |
| Kazakhstan | 2,275 | 13,151 | 1,476 | 1,744 | 9,024 | 0 | 110 | 3,837 |
| Romania | 0 | 938 | 1,746 | 0 | 302 | 1,418 | 1,031 | 2,515 |
| Austria | 2,966 | 2,191 | 1,378 | 4,888 | 1,251 | 1,625 | 125 | 1,000 |
| Iran, Islamic Republic of | 10 | 0 | 1,944 | 1,330 | 57 | 81 | 23 | 22 |
| China | 0 | 2 | 0 | 0 | 0 | 0 | 2 | 13 |

Conclusion: Kyrgyzstan has a chance to refuse from import substitution, supplying 100% of internal demand and become an export oriented country. For this purpose, all actors of the value chain have to make their own contribution into development of overall sector, sharing most possible risks, investing necessary inputs, and planning the processes.

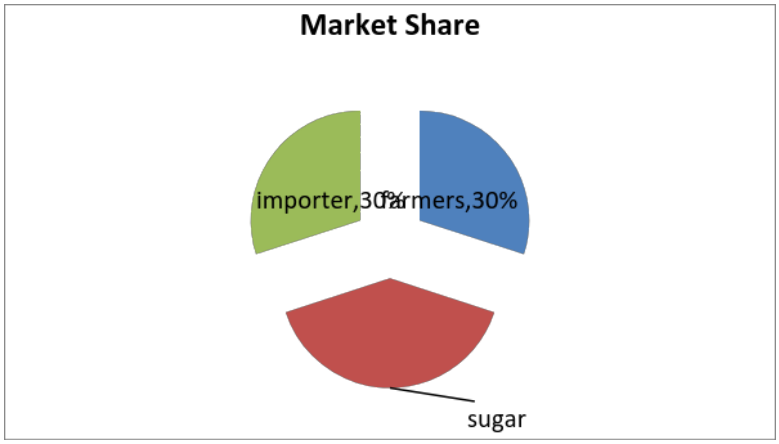
The sugar market has a clear seasonality. Prices before New Year are the lowest ( is , creating condition for the price growth. The difference of price for sugar is from 45 KGS to 55 KGS per kg. Sometimes the price of sugar is dictated on customs and logistics issues when the big portion of sugar imported to Kyrgyzstan is flowing in not on expected dates by suppliers. To mitigate risks of high fluctuations of prices, government together with sugar plants might be able to solve some current problems.

The only measure of the government to support local producers is the exemption of VAT for local processors and producers of sugar beet. Unfortunately only farmers and processors and small scale traders (on the market) are not subject to VAT. Sugar beet producers are buying inputs with VAT including gasoline, fertilizers, seeds, etc., but selling their sugar beet to sugar plant without VAT.

Larger retail stores, which play an increasing role, have to pay VAT on sugar. ,also Since they have to buy without VAT all VAT is collected at retail level. This gives a great disadvantage to larger retailers. To compensate for that the sugar processing plant sells sugar to retailers for a discounted price (as compared to non VAT traders) to make up the disadvantage. Hence only a part of the tax benefit does benefit producers and processors and protects against imported sugar that is subject to VAT.

The Kyrgyz sugar market can be characterized as an unusual oligopoly. A major share of the market (more than 2/3rd) is controlled by a small number of actors ,but the shareholders of those actors are a similar group of people. They control not only the processing of sugar beet (currently on plant – soon an additional plant will be rehabilitated), they are also the biggest traders  with imported sugar.

**Chart 2 – Market share of sugar suppliers in Kyrgyzstan:**



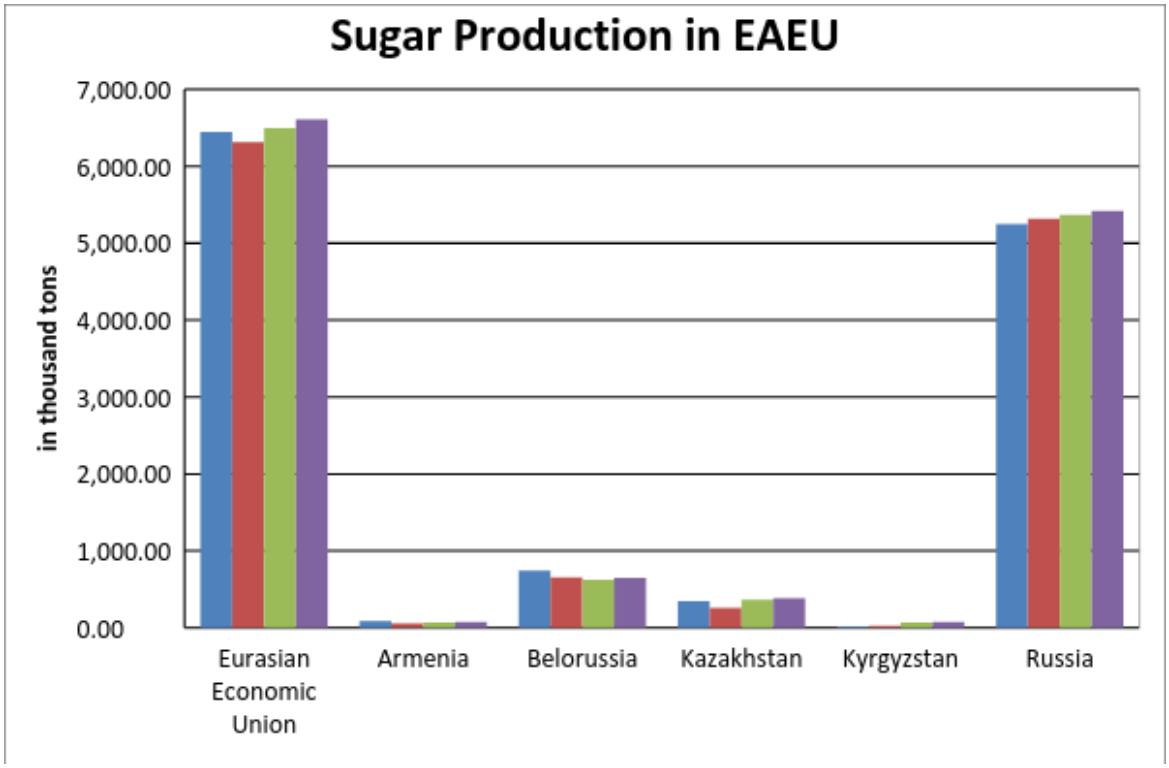

About 0% of locally produced sugar is being sold by farmersbarterfactory Farmers sales have had an estimated market share of 30% (65% of sugar supplied is local sugar) in 2016 and are expected the market share of farmers will decrease in future.

Given the market power of the processors/importers the price for the farmers is set by them. This is not profitThe “oligopoly” tries stabilizing the prices. Without the current situation it must be expected that prices for sugar would fluctuate even more. reflects

## SUGAR PRODUCTION IN EAEU:

Sugar production in the EEU is growing. Expected to have a production growth of sugar by 1.8%, constituting 6.6 mln tons of sugar in the territory of EAEU in 2017.

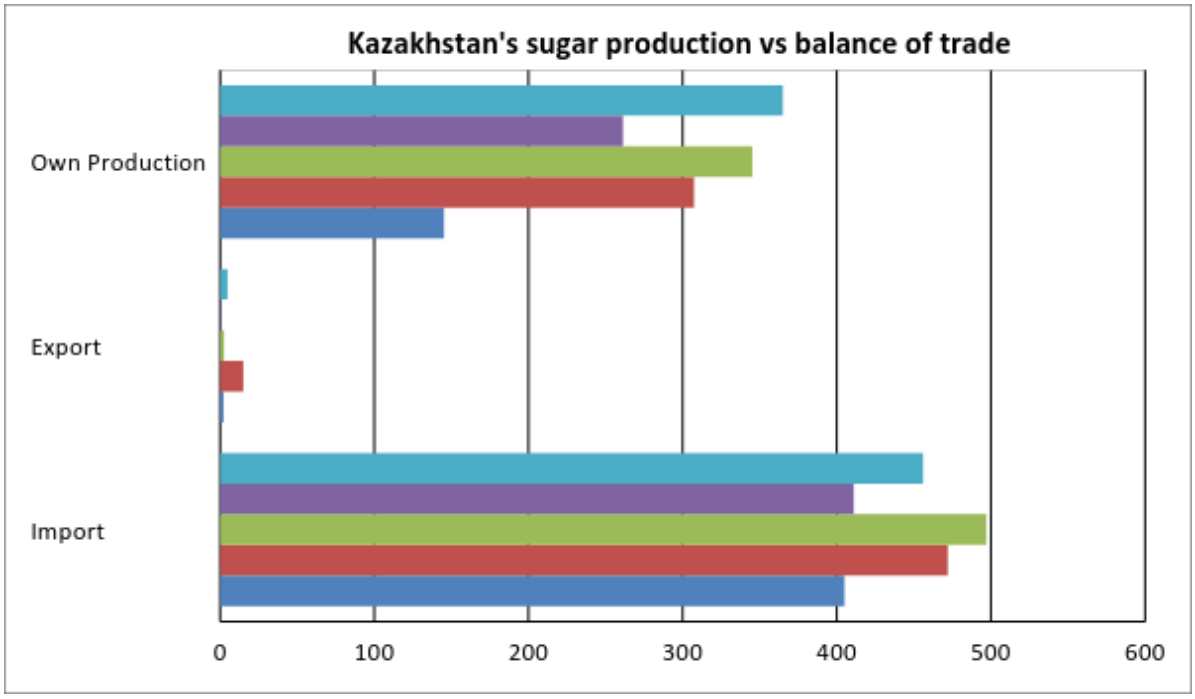
**Chart 3 – *Production of sugar in countries-members of EAEU***



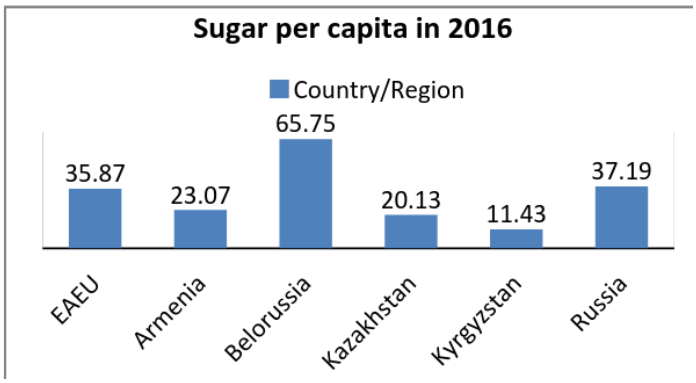

Conclusion: Kyrgyzstan has the fastest growing sugar production of the EAEU (increase of 350% as compared to 2014) while EAEU production at the same time period is increased by less than 1,5%.

Closest neighbour of Kyrgyzstan within EAEU - Kazakhstan is able and trying to become a major competitor to Belarus and other EAEU members in sugar production. The Kazakhstan's government is subsidising sugar beet growers and sugar producers in the southern Kazakhstan which is very close to Kyrgyzstan. Substitution includes financial products with lower interest rates to primary producers and cost share for sugar plant development. However, these strives are not very successful even though Kazakhstan has stronger machinery and equipment and better access to the market of mechanization. According to statistics of Kazakhstan exported overall 4.3 thousand ton of sugar to Tajikistan, Russia, China and Mongolia while overall production of sugar was 365 thousand tons in 2016 that made about 20kg of sugar per capita. And, the import of Kazakhstan became over 456 thousand tons, 71% of which supplied by Brazil. Following importing countries are Russia, Cuba, Ukraine, Azerbaijan, etc.

Chart 4 [6]




As it is seen, Kazakhstan mainly imports raw cane sugar to process it further.




Conclusion: Kazakhstan could be considered as the main sugar producer in EAEU and as the closest neighbour of Kyrgyzstan could supply sugar with less transport costs on lower price, and absence of tariff and non-tariff barriers, but it's not expected in nearest future since Kazakhstan is still dependent on imported sugar itself and due to unsuccessful interventions of government into sugar production overall.

Russia and Belarus play very important role in sugar production within EAEU, most possibly drawing the design of sugar market in future.

Within the EAEU (or Russsia) the sugar market is regulated since many years. The aim of the regulation is a stable internal sugar price (400 USD/t). This target was achieved by the introduction of flexible tariffs

[6] Kazakagro.kz

on sugar imports for the EAEU. The intervention was successful and sugar production in EAEU is growing.

Exports of sugar outside the EAEU must be expected in future – at least in years with a surplus in production. It must be expected that the price of sugar will be less stable in future. It is likely that sugar prices will start to change according to world market prices (at least in years with a surplus production) if there will be no new policy to stabilize prices (which is unlikely and expected to be expensive). In this regard, Kyrgyzstan also has an opportunity to take an advantage and in the unison of other EEU members conquer new markets.

Nearest market for export opportunities are Tajikistan and Uzbekistan which cannot produce sugar with possibilities to expand coverage from Turkmenistan to Afghanistan, if EEU members including Kyrgyzstan will be competitive enough in terms of price with sugar producers as Azerbaijan, Turkey, India. However, Tajikistan imported 34.4 thousand tons of sugar, mainly from Russia, Belarus, and Kazakhstan. Uzbekistan imported 38.8 thousand tons of sugar, 98% from Brazil. Turkmenistan most interestingly decreased its imports from 56.9 thousand tons in 2012 to 2.9 thousand tons in 2016 (main exporters are Russia and Belarus). Afghanistan imports mainly from Pakistan and India.[7]

These findings demonstrate that the sugar produced in EAEU, especially in Kyrgyzstan has to be competitive enough in terms of price. To have that advantage, overall sector should work on decrease of production cost, not only on the sugar production level, but also on the level of primary production.

On April 11, 2017, 33.5K RUB per ton in Russia = 583.7 USD. In Kyrgyzstan, 1 ton of sugar is 650 USD. According to ISO (International Sugar Organization) average price for white sugar is about 450 USD/ton in April, 2017.

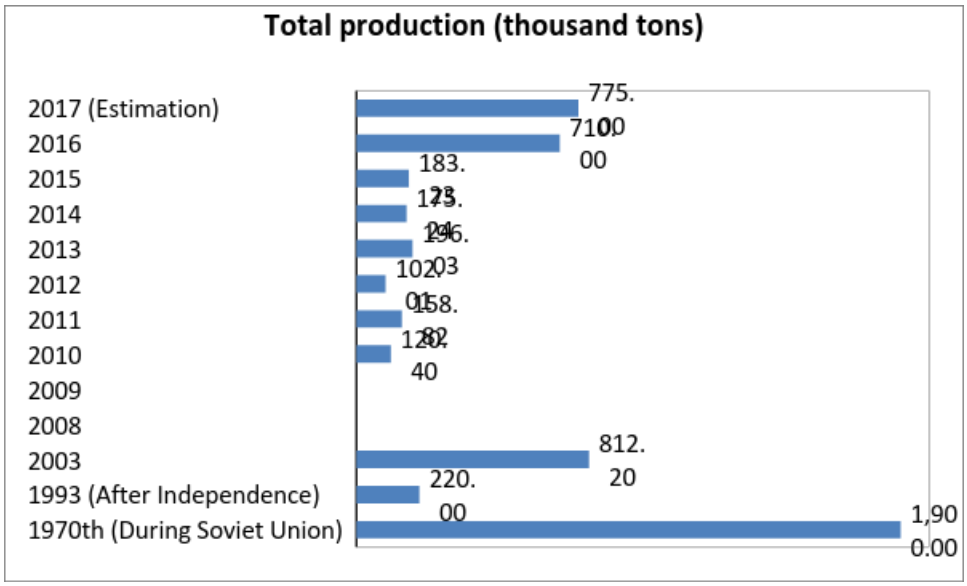
## FARMERS AND PROCESSORS RELATIONS

Sugar beet production takes its roots from the period of soviet union when five-year plans requested increase of cultivation areas and production of sugar overall, having 7 sugar plants in Chui region of Kyrgyzstan. After independence of Kyrgyzstan, in 1993 the Kyrgyz government started denationalization, privatization and land reform in a country. As a result, half of sugar plants were destroyed, sold out as metal to China and remained ones was left without state support. Nowadays, there are only two sugar plants “Kaindy-Kant” and “Koshoi”. Both of them have optimal capacity up to 350 thousand tons of sugar processing within 120 days in a year. Kaindy Kant had been functioning with in 1990$^{th}$ until 2000$^{th}$ with the lowest production volume and had been resold several times from one to other owners. In 2012, new owners of the plant established a new strategy of sugar production in a country. “Koshoi” had been remained conserved until the end of 2016, and as a plan it should start working in the season of 2017 after reconstruction for the credit line of 10 mln USD from the Kyrgyz-Russian Fund (KRF).

Coming back to history, since 2012 management of Kaindy Kant started building better relations with farmers promoting cooperation scheme with fixed prices for tonnage, support models for agro-technological innovations, and

[7] *Data from trademap.org*

mechanization of cultivations to increase yield of farmers. 2015 and 2016 was crucial years for the sugar sector. In 2015, many farmers understood that growing sugar beet would have guaranteed sale of their product with fixed price comparatively to many other crops where the price fluctuation is too high and unpredictable. Moreover, in 2014 after Kyrgyzstan entered EAEU, many farmers grew various vegetables and could not return on their investments because they were not able to sell products in EAEU market, as politicians promised (non-tariff barriers became more tough and complicated due to the lack of testing laboratories as one of main requirements of technical regulations). Therefore, sowing area under sugar beet in 2016 had become 3 times larger than in 2015. However, new problems have been generated.




## Problems of last seasons:

Since sugar sector of Kyrgyzstan took a new path of development, one of strategic and main goals was to increase the primary production. For the last few years, except for 2016, there was a huge gap of sugar beet for processing. Only 1/3-1/2 part of capacity of sugar plant has been used, burdening possibility to make additional profit and consequently do necessary investments into further development. Nevertheless, sugar plant as an aggregator of the value chain started working on production increase together with its partners. But, there were a number of problems in the period of 2012-2015, majority of which has to get solved:

- Limited number of farmers who were interested in growing sugar beet (most of them were small) that was effect of;
    - In some regions of Chui Oblasts, no access to right mechanization;
    - Negative experience of cooperation with sugar plant in the past;
    -
- Lack of knowledge about growing sugar beet (norms of planting, irrigation periods, finding mechanization, doze of plant protection products, etc.);
- Poor options of and limited access to plant protection products, fertilizers, herbicides, etc.;
- Lack of finance in high seasons when resources were needed.

Coping with a huge portion of above stated problems, 2016 became a crucial year for further development of sugar sector since many farmers had believed in a cooperation system with sugar plant that fixed price is guaranteed for their product, farmers who invested in production and received paybacks played significant role in creation of more and more farmers interest. In addition, relatively bigger (middle sized) farmers started purchasing necessary equipment and serving neighbours; special sugar beet (micro) loans have been presented and quality and quantity of plant protection products have been increased. As a result, total area of plantation was induced for 3 times and harvested total yield was 710 thousand tons (2 times greater than optimum capacity of sugar plant and increase of over 350% in comparison to 2015), but new problems occurred:

a) Due to lack of thorough planning of seed distribution and permissibility of sowing hybrids from third parties, sowing area was bigger than expected;
b) Weather conditions (level of humidity in spring and massive rain falls in summer) allowed sprouting 100% of all planted seeds (usually 5-10% did not sprout properly);
c) Again because of weather conditions, the yield was increased from 39 tons/ha in 2015 in average to about 57.4 tons/ha in 2016;
d) Due to lack of mechanism to regulate amounts of sugar beet supply nor delivery time by collection points according to their optimum capacity, long-lined queues of suppliers occurred that brought some complains with escalations of conflict in places;

However, sugar plant "Kaindy-Kant" could cope with occurred problems and accepted all 710 thousand tons (in gross) of sugar beet to save farmers' attention in future and 65 thousand tons of sugar beet had been sold to Kazakhstan for lower price than accepted from farmers. Except for it, sugar plant had to prolong processing period until the end of February of 2017, having losses starting from January.

NOTE: 557 thousand tons (netto) of sugar beet was processed {710 thousand gross - (58k dirt percentage + 65K sold to KZ + 30K losses on storage and transportation) = 557K net).

## Prices for sugar beet/ payment conditions:

Price for sugar beet is the subject of discussion with the State Agency on Antimonopoly Regulations under the Government of the Kyrgyz Republic. Usually, price ranges from 3400 KGS to 3500 KGS per ton depending on region of Chui oblast. Regions such as Kemin and Tokmok received 3500 KGS per ton and 77 kg of sugar as barter for 1 ton of beet. Regions like Sokuluk and Panfilov received 3400 KGS per ton and 76 kg of sugar for the delivered 1 ton of beet.

For supplied beet, farmers get payment 50% cash out of the total beet cost. Depending on farmers' wish, payment is made by cash and/or via bank transfers. Usually, bank transfers take more time while farmers need urgent finances to payback loans, pay for field workers, machinery services, etc. Therefore they prefer cash payment instead. And, 50% is paid by sugar after the beet is processed (as soon as sugar plant starts processing).

Conclusion: The contractual relations between processor and supplier do not ensure a reasonable planning for both sides. The plant does not have a guaranteed supply but has the liability to buy or process all produced sugar beet. In years with very high yields this responsibility of the company is very expensive and almost impossible to keep. Better risk sharing is needed.

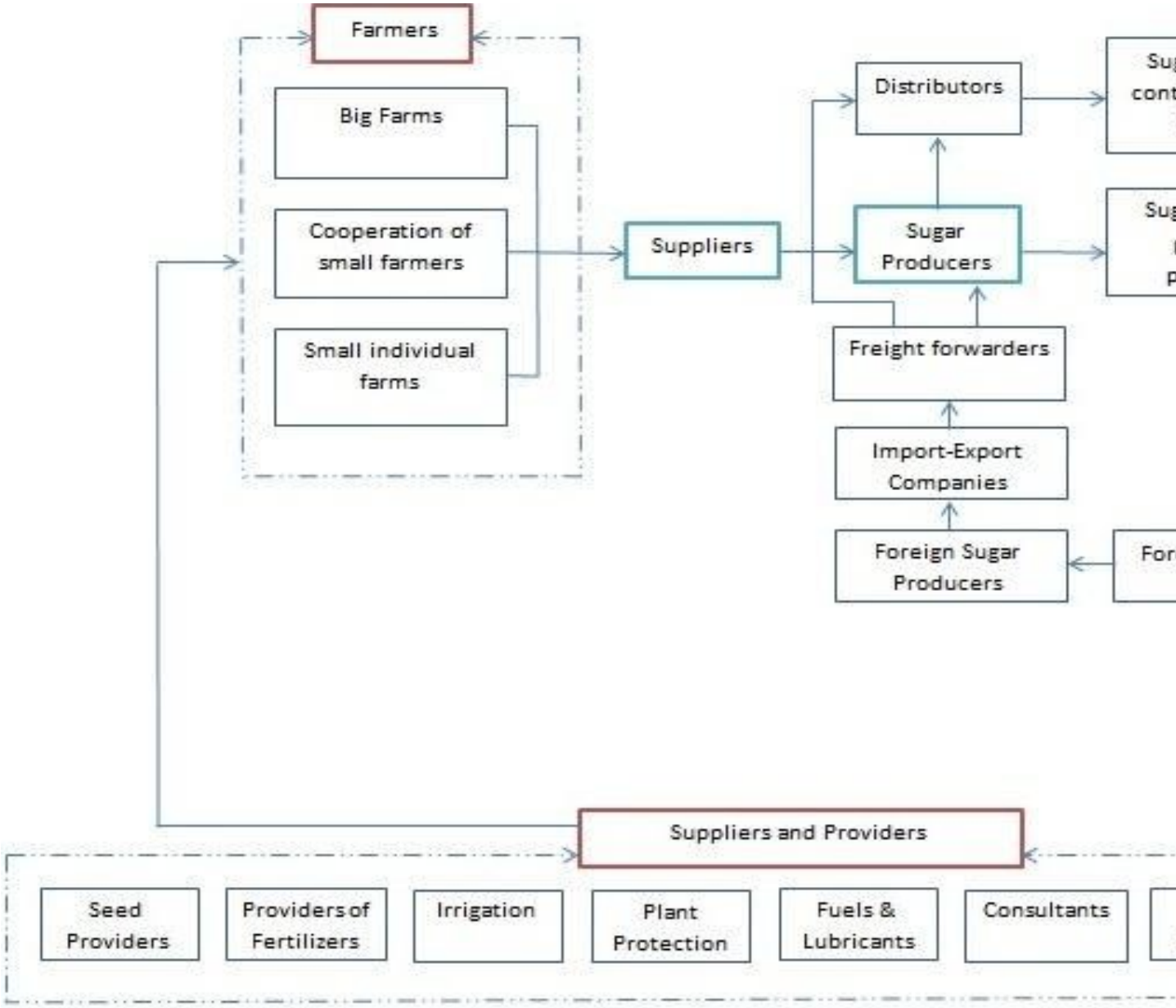
Sugar beet producers do already carry a part of the risk of changing prices for sugar - they receive "sugar" but not cash for about 50% of production.

## 2017 conditions / contract:

Up until 2017 season, there were three separate contracts with farmers: 1) for supply of seed to farmers, 2) cash payment for delivered sugar beet (50% of total cost), and 3) payment by sugar for delivered beet (50% of total cost). Because of problems occurred in 2016, management of sugar plant decided to introduce some quotas in 2017 season for sugar beet delivery with two separate contracts (for seed supply and beet delivery):

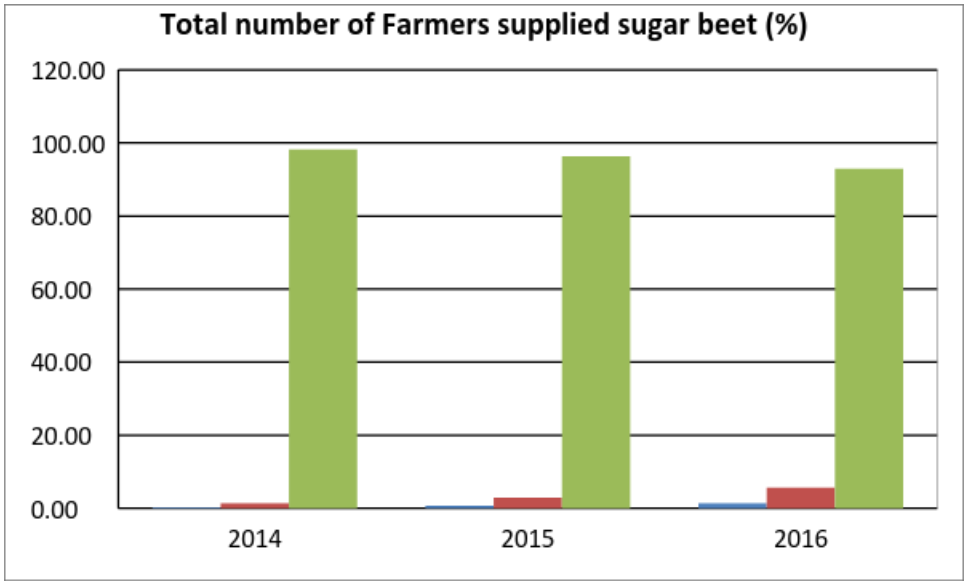
- Chui oblast was divided into zones according to territorial location of collection points and their capacities;
- In divided zones, sowing areas were identified with the list of farmers taking into account the background of farmer, his effective cooperation with sugar plant, his previous supplies, etc.;
- Sugar plant generated three scenarios of situation to estimate how much Kaindy Kant is able to process together with Koshoi which is currently under reconstruction. Based on this, sugar plant ordered beet hybrids from KWS (German) and Florimond Desprez (French) for 16 thousand hectares;
- Seeds were sold for 100% prepayment (in previous years, farmers could pay after the harvest) by the contract of seed provision;
- Sugar plant started signing beet supply contract with farmers (most likely, it will last until farmers supply beet in autumn). One of the main and important part of 2017 contract is sugar plant will accept sugar beet only from those farmers who signed seed provision contracts (in previous years, everyone who brings beet could sign supply contract at delivery time and get payment). But, how sugar plant will identify if farmer brought sugar beet grown from only KWS and/or Florimond seeds, is big question mark.

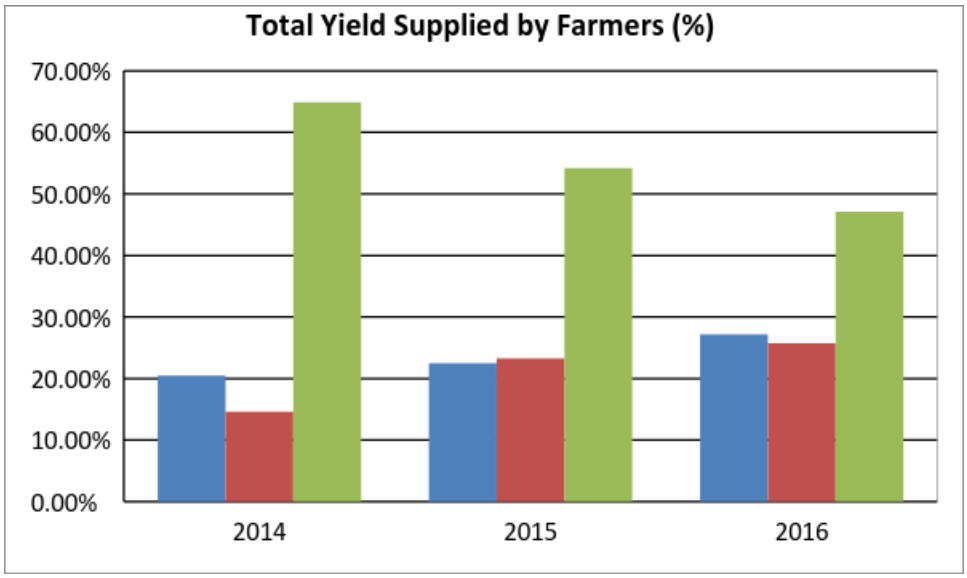
## Value added Chain «Sugar»



## Supply structure:

The sugar plant had 5560 suppliers (farmers) in 2016. About 52.9% of all raw materials were supplied by 7% of big and medium sized suppliers and 47.1% of raw material is supplied by 93% of small scale producers.




*Vision of the sugar processors:* Work exclusively with large scale suppliers – less problems, better cooperation, more mutual understanding. In addition, economies of scale would allow cheaper production, hence lower raw material prices. However, sugar plant's position they cooperate with everyone who wants to grow sugar beet and will support if the farmer meets requirements recently set up.

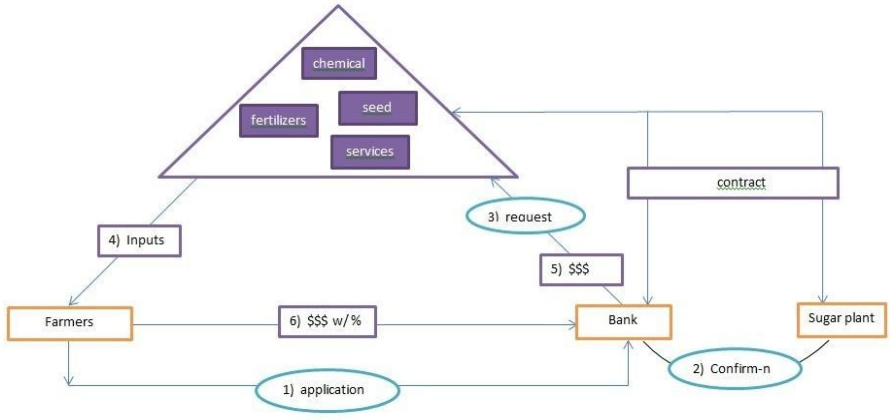
Conclusion: The current development is not favourable for small scale producers and does not contribute to a pro poor economic growth. If the vision of the processor would become reality the value chain would be stronger and more cost efficient. It would make the management of the supply structure much easier for the processor. SMALL SCALE PRODUCERS might sooner or later loose the opportunity to supply the plant or they have to get united in between.

## Primary Production

Total production split in a huge number of small scale producers and a small number of large scale farmers supplying the main bulk. Interestingly, every year a number of relatively bigger farmers are getting increased. For example, in 2014, only 63 farmers supplied 35.1% out 161 thousand tons and 3500 farmers supplied 65% of total sugar beet. And, 394 farmers supplied 53% of sugar beet out of 710 thousand tons, but 5172 farmers supplied 47% of totally harvested sugar beet in a country in 2016. Anticipated that about 50% of sugar beet will be supplied by less than 10% of total number of farmers in 2017. [8]

It's obvious that development of capacities of large scale farmers will give very good effect in a short period of time, but leave out small scale farmers is not a case of Kyrgyzstan. First of all, political power will not allow sugar plant to go with only large scale farmers since about 90% of farmers are small and they will go out to streets if there is anything radically changed. This is why, sugar plants need to change the approach of working with small farmers, taking into account of recent changes.

Usually, the problem of small scale farmers to grow and work more effectively to increase their yield is the low level of financial literacy of farmers. Most of them are not able to distinguish family budget from the budget of agricultural activity that is/could become essential source of income increase of a family itself. Due to the lack of financial literacy and right planning of cash-flows, farmers usually feel the gap in cash while it's needed. Unfortunately, recently created special financial products for sugar beet growers are not that much attractive as other options of credits in terms of their interest rate {Bank "Bai-Tushum" credited only 9 mln KGS in 2016]. Hence, other credits except for "sweet loan" do not offer credit-lines, giving opportunity for a customer to withdraw cash at once. Having excessive money than needed for only planting or buying some inputs allow farmers to use money on different purposes: traditionally setup frames of the Kyrgyz - wedding, funeral, helping relatives, and many others. To mitigate the risk of wasting money and not investing into increase the yield, sugar plants together with financial institutions are able to work out special scheme of financing.




### *Changes over the last years:*

- Agro-technology is better used by farmers and overall yield is increased;

[8] *Yield and farmers data of Kaindy-Kant*

- Total area of cultivation has been increased by about 100% over the last 5 years now: 16.000 ha - still fare lower than the maximum production area of 50.000 ha during Soviet Union time (but, optimum about 20 thousand ha in Chui Oblast with sufficient crop rotations);
- Stable increase of yield for the last 5 years;
- Almost 100% of farmers use high quality seed (starting from 2017, definitely 100% because of sugar plants policy on using only their seed);
- Supply of seed almost monopolized by the processing plant (disadvantage: price control; advantages: better steering of production due to introduction of early varieties; better quality of sugar beet due to high quality seed; high yield potential due to high quality seed, good sugar beet storage if right variety selected, etc.);
- Sugar beet is the most profitable large scale cash crop, if all agro-recommendations are properly followed and used with required investments on time;
- Top yields give an indication what can be achieved: up to 100t/ha seems feasible on good soils (the average yield 80 t/ha is the goal).

### *Input supply to primary producers has been increased over the last years:*

a) Reliable plant protection chemicals from well recognized companies are available as well as cheaper copies from China. Chinese products are preferred by the farmers since they are cheaper – at the same time all farmers claim that the quality is low;
b) Improved supply of fertilizer – farmers used almost exclusively N fertilizer. Today many farmers do also use P and K-fertilizer is much better available than years ago;
c) Seed is supplied by the processing plant of French and German origins;
d) More and stronger machinery suppliers (distributors and leasing companies), providing various options of machinery and equipment even suitable for smaller producers (1 to 100 ha). The market is growing but market penetration is still relatively low;
e) Advisory services for sugar beet producers are available by only one company and only by order of Agencies for development as GIZ. Availability to most small scale producers. Commercial scheme of knowledge transformation is not well developed yet and farmers do not still feel importance of information/knowledge/know-how as part of inputs to increase the yield.

There are significant “economies of scale”. Sugar beet is a crop that can be fully mechanized and use of machines is more effective if machines serve a sufficiently large area.

Large farmers invested already in new machinery – planters, cultivators, sprayers and even harvesting equipment. Access to good quality mechanization services on time is limited. Low service prices are one reason why investments into new machinery (for service provision as well) are not very attractive.

Mechanization does not only reduce the production costs but is a key to minimize production risks. A good seed bed preparation in combination with high quality planting on time ensures good germination – one of the major risks. On time plant protection, cultivation and plant nutrition ensure high yields. Since sugar beet production is always irrigated, rainfall is not a crucial risk. Key is the availability of irrigation water.

Conclusion: Improving mechanization does not only increase labour productivity. It is one of the key measures to reduce the risk of poor germination – one of the key risks in sugar beet production.

### *Problems of small scale producers:*

The biggest of problem of yield increase within small scale famers is their knowledge on agro-technologies, but farmers who are aware of technologies and norms of cultivations face problems as:

- Lack of financial resources. In order to make certain measures in the field in certain period of time, farmers needs money (there are financial institutions providing financial services, they are not attractive enough at current time because interest rates are high, some farmers have already received loans for other purposes, not enough collateral, to many papers to fill in;
- Lack of necessary machineries to use on time. Machinery service providers are also farmers, they first of all cultivate their own fields, then start providing service;
- Limited access to inputs: herbicides, fertilizers, and other plant protection chemicals (have to organize transportation from usually from raion center to villages);
- Because of lack and/or limited access of/to necessary machineries, field preparation for planting to harvesting is made not on a proper way that cuts over 20% yield at the end;
- Lack of water in draught seasons.

Along with above stated problems affecting the decrease of yield, there are number of production risks:

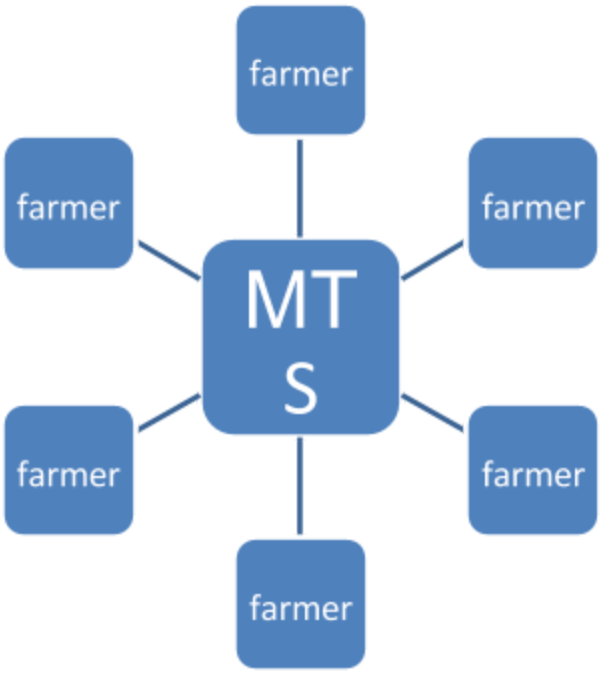
- Poor germination (sprout) due to improper preparation of soil before planting the seed. Biggest issue is farmer does not plough the land in the fall that allow soil generate and normalize minerals needed for the crop over the winter and humidity savage possibility in spring. Also, formed crust due to intensive rain and sharp heat impacts and improper sowing machines can the poor germination that should be replanted again (annually 3-5% seeds out of total are in reserve for this purpose). Sometimes, heavy hail and/or frost in the middle of spring damage optimal growth of beet;
- Insufficient irrigation, lack of water in canals.

Conclusion on problems and production risks: They might be mitigated by utilizing innovative and new technologies and mechanization. Having better adapted to climate and soil conditions German and French hybrids demonstrates mitigation of occurred risks.

## SUPPLY CHAIN MANAGEMENT:

For establishment of favorable development conditions for sugar industry, it is essential to develop small partnership associations (cooperative/cooperation) in between of farmers. It might be informal groups of cooperative on the level of districts, on the level of neighborhood, friendship, etc. These collaborative engagements of farmers could be articulated on MTS and/or individual entrepreneur, as it is

represented in the picture, see below.

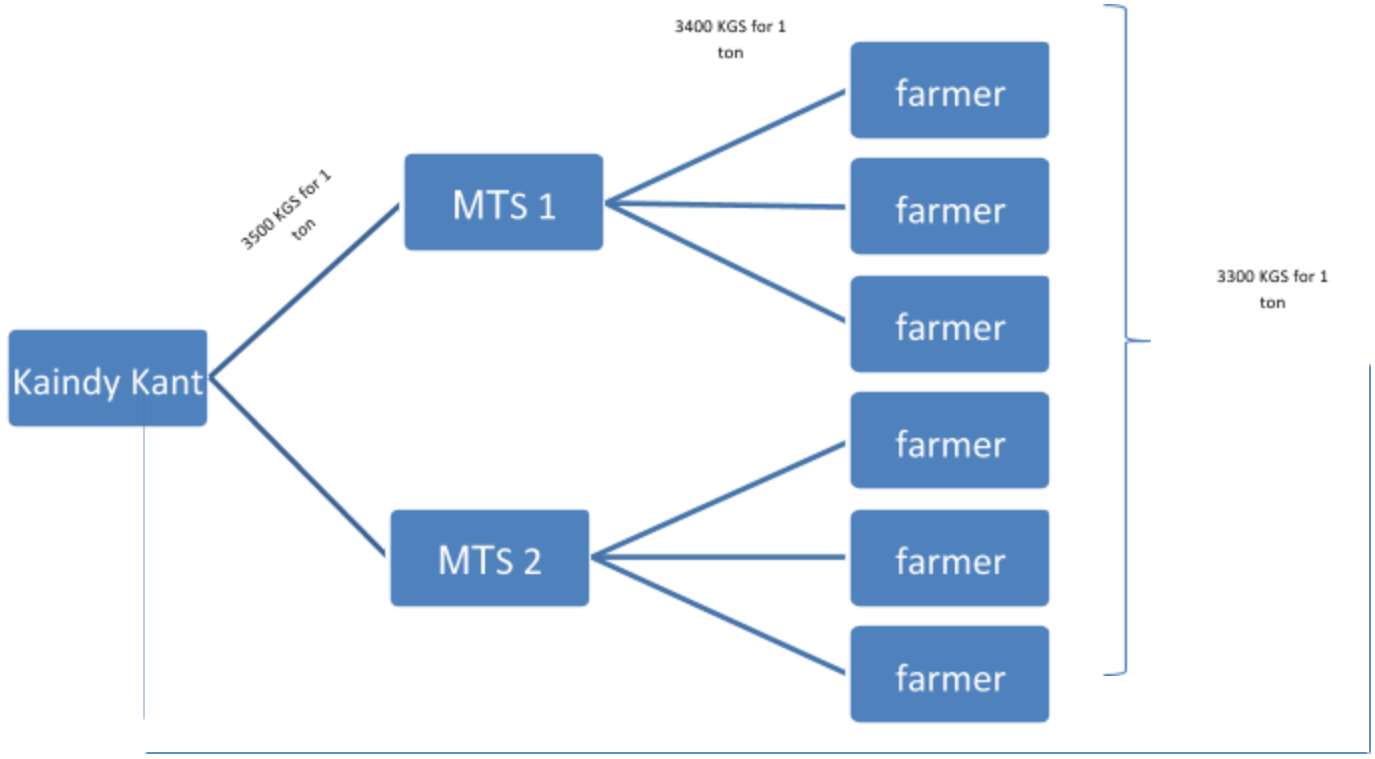



Sustainability of such an  interrelationship could/should be articulated on trust-based relations between farmers and liaison (MTS, IP, etc), as well as long-range planning of planting acreages and group collecting funding resources for the implementation predesigned procedures (soil preparation, seeding, cultivation, fertilizing, chemicalization, irrigation, harvesting, etc). Development of such kind of groups may cause to following indications:

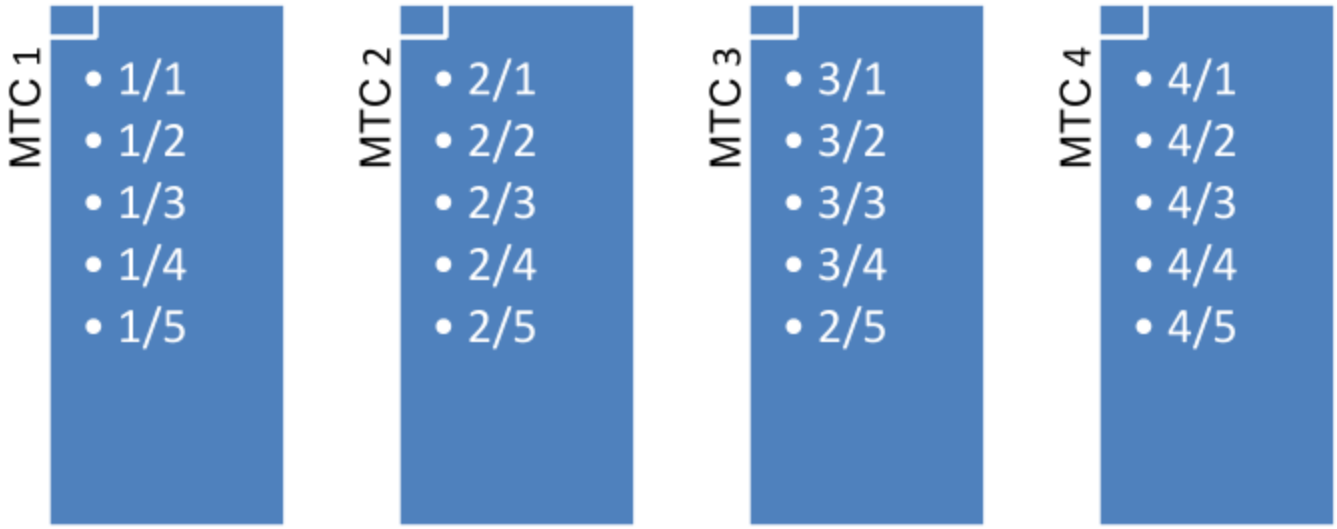
- Co-operative qualitative mechanization;
- Enhancement of agro-technologies (average 80 tons/ha);
- Cooperative sales and distribution;
- Provision of discounts, vouchers, aftersales service, and many other privileges/advantages by service providers.

Quantity of members in such partnerships association can range from 10 to 18 persons for the effective management and for sufficient coating of whole planting acreages. Planting acreage can reach around 50 hectare in the case of 2-3 ha to each member of association.

For the most part such an interrelationship of farmers will develop on the basis of long-term relations and trust-based relationship of Sugar factory with such associations, specifying their priority in performance of a service and provision of finance to their activities. Sugar factory can contribute the development of such associations and strengthening of areas by the way of creation of instruments of influence and one of this bludgeons may be used as interrelationship of factory with cooperatives, as indicated in the picture, see below.

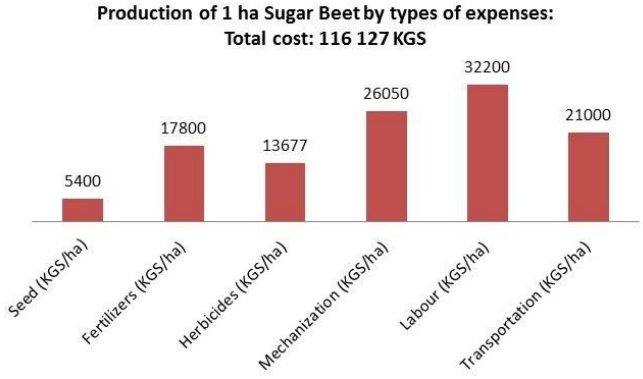



Counting of sugar beet delivery by should be done by the collection points:

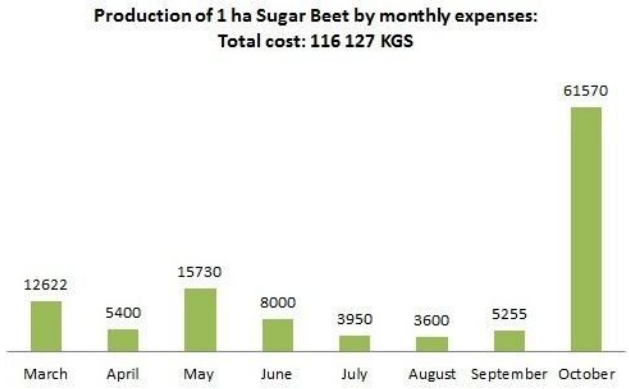


## Value added within the value chain

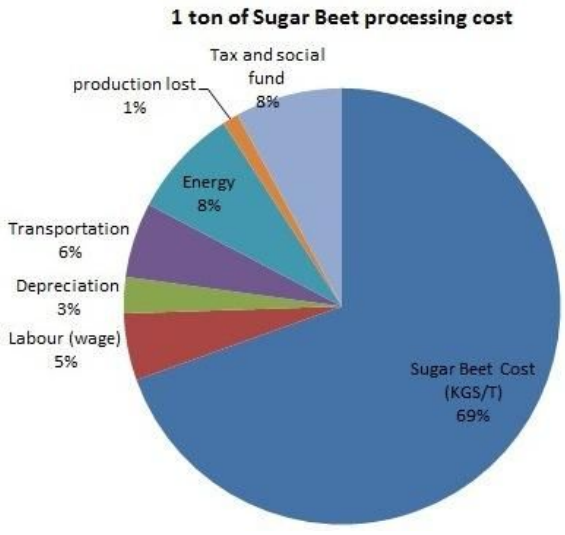
For production of 1 hectare of sugar beet, it's needed 116 thousand KGS = ~1 590 EUR. If all agro-technological recommendations are followed and used on requested time, it's possible to get upto 70 tons/ha, but in calculations below, taken only 50 tons/ha.

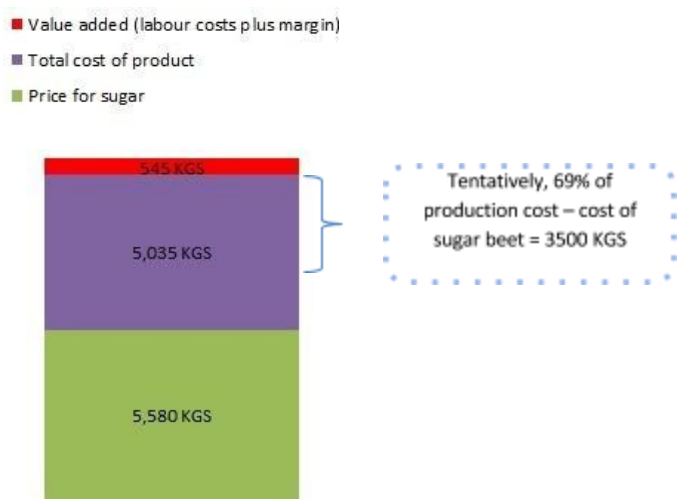







Processing of 1 ton of sugar beet will have following expenses:



Conclusion: The biggest value added is in the primary production. 2/3 of the cost of sugar raw material. Farmers achieve profitability of 50 to 100% of invested funds and 1000 to 1 case of price fluctuations sugar beet farmers can take a part of the risk. This is why sugar b important cash crop for small scale farmers and it is worthwhile to take efforts that ensure their participation in the value chain.

1 tons of sugar beet gives
124 kg of sugar in average.
1 kg of sugar = 45 KGS

# Sustainability issues

## Crop rotation

a) collapse of production due to insufficient rotation – root rot;
b) minimum rotation 3 years with desirably with Herbaceous plants (Lucerne, wheat, barley, corn, etc);
c) monitoring needed by the processor – if root rot would destroy production the whole value chain would collapse – they have the biggest "stake" in the value chain

Conclusion: Crop rotation monitoring is started with some requirements within the supply contract by sugar plant that every farmer interested in growing sugar beet has to demonstrate documents of land with special registration number (16 digits) which is recorded at the database. In further years, if the document with the same registration number will be presented again, sugar plant will refuse signing the contract with the farmer.

The other way of solution of crop rotation issues is cooperation. Given 10 farmers with 3 hectares in average will unite in one group; they will manage territories of sugar beet land and be controlled by sugar plant easer.

## Irrigation water

It is expected that availability of irrigation water will be reduced in future (after 2030) since the glaciers are melting a less water will be stored in the mountains. Increasing yields with the same amount of irrigation water is possible. All key improvements that lead to higher yields (crop rotation, fertilization, improvement of soil fertility, integrated pest management) will also lead to a higher water productivity and ensure that the same amount of sugar beet can be produced with less water (please add some facts from interviews with the key agronomists).

## Labour

Sugar beet is very much labour intensive crop. Usually, small scale farmers cultivate their fields with power of family members, but starting from 2 hectares of plot, they hire workers seasonally. Especially extra hands needed during harvesting time (beginning of September to the end of November). Every field worker gets 800 KGS per day whatever operations he does (digging out the plot, clearing from beet tops, collection and caging, loading the track, etc). To harvest 1 hectare in 1 day, 20 people needed x 800 KGS = 16 000 KGS x 16 000 ha (total expected area in 2017) = 256 mln KGS ~ 3.7 mln USD every year. This harvesting labour is calculated except for mechanization support and its service fee.

Conclusion: The main labour effects in on primary production level. Processing contributes less than 10% of the total employment.

## Achievable Impact

The total value of sugar imports is estimated to be around 39.2 mln USD per year (based on the high 2016 yield). This estimation does already assume that Kyrgyzstan can increase sugar production to a level slightly above 85.000t/year.

Given the positive yield dynamics and the further opportunities to sustainably increase production area make possible to achieve self-sufficiency. Perhaps accomplish even exporting opportunity of sugar in the long run. In this situation, import substitution has higher potential and easier to achieve than other agricultural commodities that are already being exported.

As compared to beans (important export cash crop) sugar beet production offers similar return on investment and a similar labour productivity. Both crops could be fully mechanized. In certain areas beans and sugar beet could be even produced in rotation. In this sense, expansion of sugar beet production in Talas oblast could be most possible options. In 2016, 500 hectares in Talas oblasts have been cultivated by people who starting struggling with beans.

An increase in sugar beet production is expected to substitute the production of lower value crops – mainly wheat on irrigated land (biggest crop by area).

## CONCLUSION:

Above stated suggestion on creation of informal cooperation in between of farmers has been dictated by the situation occurred in 2016. In 2016, a sharp increase in the cultivation areas could be observed. The main reason for this was the accession of Kyrgyzstan to the Eurasian Economic Union (EAEU), which led to cheap imports of vegetables from Kazakhstan and other countries. Taking into account the persisting price incentives, the profitability of the crops shifted back into the sugar beet and many farmers "fled" into the sugar beet. At the same time, revenues were particularly high in 2016. This was, on the one hand, weather-related (it rained more than usual); on the other hand, the efforts of the German side contributed to this in form of training modules and consultations to farmers.

This clearly exceeded the processing capacities of the factory. It led to considerable waiting times for the delivery of the sugar beet and the annoyance of farmers. Economically, however, farmers did not suffer from overproduction. The sugar factory withdrew all sugar beet at the agreed price, in order not to push back farmers for the coming years. This took the factory full risk in this situation. In order to limit financial losses, the factory had to sell about 65,000 tons of sugar beet to Kazakhstan factories under a purchase price. Processing lasted until the end of February. The factory had to bear the storage losses as well.

**Conclusions and perspectives**

Over the last few years, this year, special incentives for agricultural prices and agricultural services have led to a significant increase in production. However, in order to coordinate primary production and processing capacities, the business relationship between farmers and the factory must be changed.

The shareholders of Kaindy Kant possess a second old sugar factory, Koshoi. It is to be ready for use up to the processing period 2017. However, in this year 2017 the seed sale was limited to the quantity for 15,500 ha, although already pre-orders of farmers were presented for over 18,000 ha. In its pessimistic scenario, the factory expects a yield of only 30 T/ha. In this case Kaindy Kant would process 300,000 tons and Koshoi 165,000 tons. The optimistic scenario assumes a 45 t/ha yield, of which Kaindy Kant would process 448,000 tons of beet and Koshoi 250,000 tons.

The NaWi program is planning to advise the sugar factory more intensively in this adaptation period than in the past. The factory is to be supported in developing a purchasing system which adapts the purchase of sugar beet through cultivation contracts, the sale of seed and price incentives to the production capacities. The price incentives should include serves to motivate the farmers to cooperate so that the factory has fewer contacts to coordinate delivery dates. In addition, the delivery period is to be extended over 90 days (September to November) to 120 days (September to December) through price incentives in order to avoid expensive storage. The commissioning of the second factory in 2017 will also help to ease the delivery.

**Needs for value chain improvement:**

- Better contract relations – fair distribution of risks (including the risk of over-production);
- Better contracts – ensure a more regulated supply (not all farmers – including small scale farmers can deliver when they want due to the nature of those capacities at collection points are limited);
- Decrease unit costs. Make the value chain resistant to lower prices on the sugar market;
- Minimize the disadvantages of small scale producers. Assist them to get organized well, cooperative in between and ensure better access to good quality mechanization (especially prior planting preparation and planting on time). Develop suitable framework conditions;
- Ensure stable market prices for sugar. One of solutions warehouse receipt approach;
- Force large scale producers to sustainable production. Monitor crop rotation and ensure that no beets are bought that are produced without a sound rotation. Monitoring might be done with the State Registration Office: pinning declared territory of land with identical numbers while requesting seed provision for given plot;
- Improve communication between the processor and the suppliers. Develop trust and mutual understanding reduces the total number of contract partners of the supplier and improve the communication and mutual understanding between suppliers and the procurement of the processing company.