REFEREED ARTICLE

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Corn and Soybeans in the Central Black Soil Region of Russia: A fundamental shift in cropping patterns ahead of us?

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ABSTRACT

Recent statistics show an increase in corn and soy production in the Voronezh region, one of Russia's most important agricultural regions. This paper analyses the background of and the reasons for this development. To achieve this goal, the authors used data from *agri benchmark* typical farms and focus group discussions with farmers in Russia. The resulting analysis discloses the economic drivers of these changes in cropping patterns which clearly indicate a lasting shift in the Black Soil Region towards corn and soybean production.

KEYWORDS: Russia; corn; focus group discussion; cropping pattern; on-farm competitiveness of crops

1. Introduction

Background

The dissolution of the former Soviet Union set in motion the shift from the planned economy to a market economy. This structural modification of the political and, at the same time, the economic system has affected the agricultural sector. Starting in 1991, a significant decline in agriculture was observed; beginning in 2000, the entire sector, but especially crop production, headed toward a rapid recovery (Liefert & Liefert, 2012). The establishment of markets forced farmers to alter crop preferences based on prices and price ratios generated by the markets. New and interesting options were corn and soybeans.

Statistical analysis of Russian crop production reflected a significant rise in the cultivation of corn and soybeans – albeit beginning from a very low level. One of the strongest growth rates, and accounting for a significant share in the national output, can be found in the Central Black Soil Region (CBSR) (UniSIS, 2014). The question arises whether this change is a temporary occurrence, possibly driven by political interventions, or whether it reflects a fundamental change in crop economics which would imply a lasting change in cropping patterns.

When considering global crop production, a comparative example of fundamental change occurred during the past 20 years in southern Canada and the northern United States where corn and soybean production has expanded dramatically (Wright & Wimberly, 2013). Given the fact that there are climatic and agronomical similarities between the Central Black Soil Region and these North American regions, the question is whether the CBSR might evolve in a similar way in terms of cropping patterns. Given the size of the region and Russia's role in global grain markets in the long run this not only would have an impact on the development of the respective input and machinery markets, but also on global agricultural commodity markets.

Aim of the paper

So far, very few articles about the expansion of these crops have been published in the Russian media (Vorotnikov, 2012; Munro, 2013; Doran, 2014). In science, this issue has not yet been addressed. For these reasons, this paper aims to identify drivers of a change in cropping patterns in the CBSR.

To achieve this objective, the first task is to illustrate the production development of the most important crops from 2000 to 2013. Secondly, this paper identifies economic drivers for the increase of corn and soybean production by comparing the profitability of corn and soybean production to the most important crop in the CBSR which is wheat. Finally, the authors draw conclusions regarding the drivers and perspectives for corn and soybean production in the CBSR.

Organization of the paper

This paper is organized as follows: The second section reviews the development of the most important crops grown in the CBSR. The third section discusses the methods used in the paper. The benchmark, with an economic analysis of corn, soybeans and winter wheat is introduced in section four. The last part summarizes main findings and provides some conclusions.

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Table 1: Corn and soybean production in Russia – key parameters (2000 vs. 2013)

Crop	Federal districts	Increase in acreage (% per year)	Increase in yield (% per year)	Share in national output (2000)	Share in national output (2013)
Corn	The Russian Federation	10.2	5.7	100 %	100 %
	Central Federal District	17.3	6.8	19.2 %	32.7 %
	Southern Federal District	5.8	5.7	71.1 %	37.8 %
	Volga Federal District	15.4	-	8.9 %	5.3 %
	Far Eastern Federal District	14.9	7.9	0.7 %	1.3 %
	Other	-	-	0.0 %	22.9 %
Soybeans	The Russian Federation	10.2	3.4	100 %	100 %
	Central Federal District	32.8	6.6	1.9 %	30.9 %
	Southern Federal District	7.9	4.2	20.1 %	20.9 %
	Volga Federal District	29.1	5.6	0.5 %	4.4 %
	Siberian Federal District	17.7	0.9	1.4 %	1.2 %
	Far Eastern Federal District	8.1	2.9	76.0 %	39.5 %
	Other	-	-	0.1 %	3.1 %

Source: own calculations based on official statistics (UniSIS, 2014).

2. Evolution Of Cropping Patterns In Russia And The CBSR

Selection of region for the study

Currently, the leading producer of corn in Russia is the Southern Federal District (see Table 1), a traditional area for corn cultivation, where the growth of acreage and yields was relatively small in the period studied. On the other hand, the Central Federal District has significantly increased its share of the national production; a change due to high growth rates of corn acreage and yield. At the same time, the Southern Federal District suffered a decline in market share.

Growth rates of soybean acreage reflect a geographical relocation of this crop to the west. In 2000, 76 % of soybeans were produced in the Far Eastern Federal District; its share dropped (despite an absolute increase in production) to 59 % by 2012 and to 39.5 % in 2013 (the latter decrease was in part driven by a massive crop loss as a result of severe flooding). Further increases in soybean plantings in the Far Eastern Federal District seem unlikely, as the share of this crop in the sown acreage already is 58.6 %. In the Amur region (part of the Far Eastern Federal District), which produces the majority of the district's soybeans, this proportion is even higher, at 70 %. Due to the high growth rates both in soybean acreage and yield in the Central Federal District, its share of the national output reached 30.9 % in 2013, while it was only 1.9 % in 2000.

The data cited show that the Central Federal District became a "hot spot" of corn and soybean in Russia. Since so-called "Central Black Soil Region" is a region defined by agro-ecological parameters and 94 % of the Central Federal Districts corn and 97 % of the soybean production takes place in the Black Soil Region this regional unit will be referred to in the remainder of the paper.

Key characteristics of crop production in the CBSR

Natural and geographic conditions

Central Black Soil Region is one of 11 economic areas of the Russian Federation, which includes the regions of the southern part of Central Russia, such as Belgorod, Voronezh, Kursk, Lipetsk, Tambov and Orel (ASVR, 2014). The total sown area of the region in 2013 was 9.6 million ha, which is 12.3 % of the all cultivated land in Russia. The annual precipitation in the region varies between 518 mm and 648 mm and average annual temperatures range from 6.1 to 7.7 degrees Celsius (Climate, 2014).

Acreage and yields of major crops

Agricultural background information of a region requires knowledge about its most important crops. For this task, statistics regarding all agricultural land in the CBSR were analysed. In 2013, the largest share had cereals, with 59 % of the sown land in the CBSR. The largest share of cereals was winter wheat, with 27 % of the total cultivated area. Among non-grains, the largest acreage was planted to sunflowers, with 14 %. Sunflower was not planted by all farms studied. The authors compare winter wheat, so far the most popular crop, corn, and soybeans.

Figure 1 shows that the acreage cultivated with the observed crops is increasing. Because there has been a huge portion of the farm land being idle[3] this growth stems from (a) an increase in total cropped land and (b) shifts in cropping pattern in favour of winter wheat, corn and soybeans.

The 3.7 % average annual growth in land planted to winter wheat is the smallest among the analysed crops. With average growth rates of 17.2 % and 32.8 %, corn and soybeans show the highest annual increase in seeding. Whereas, in 2000, winter wheat was widely cultivated, corn and soybeans covered only 1.4 % of the CBSR's crop land; their growth spurt led to approximately 10 % of the cultivated land in 2013.

One possible explanation for this change in cropping patterns is the evolution of yields (Figure 2). Yields of winter wheat in the first phase of the analysed period were similar to or even better than those of corn. From 2003 onwards, the situation changed: corn yields improved significantly while wheat yields were almost flat. In 2012 corn yielded 2.5 tons per hectare more than winter wheat. Although soybeans in 13 years doubled its productivity, it has not reached the level of 2 tons per hectare.

Compared to the other crops the annual increase in wheat yields is almost flat at 1.5 % while soybeans and

[3] In the post-Soviet economic transition period, much land was abandoned. When analyzing the CBSR from 1990 to 2006 when arable land use was the lowest about 3.5 million hectares or 31 % were not cultivated. Starting in 2007, the trends reversed and in 2013 about 9.6 million hectares were cropped (or 83 % of the level of 1990).

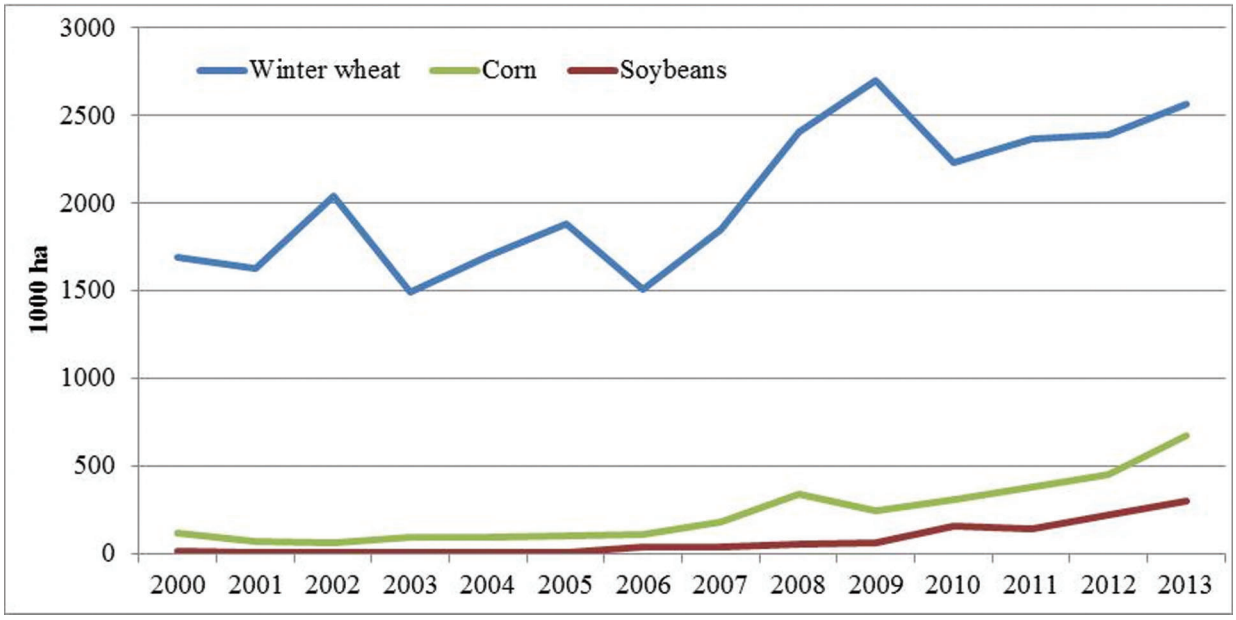

Figure 1: Evolution of selected crops' acreage in the CBSR
Source: UniSIS (2014) and own calculations

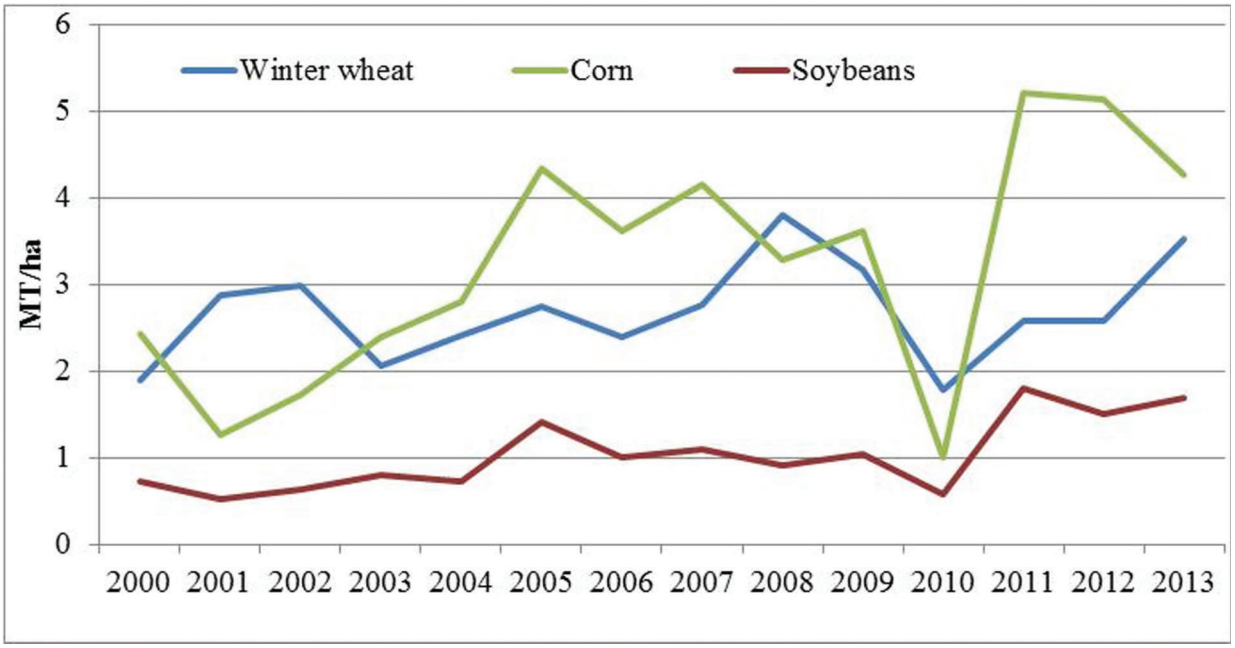

Figure 2: Yield (calculated as the output from the sown area) - evolution of the selected crops in the CBSR
Source: UniSIS (2014), own calculations

corn yields went up by 6.7 % and 6 % respectively. These annual rates were significantly influenced by the drought in 2010, when there was a major crop failure. When comparing the trend yield for 2010 based on a regression to the actual yields it appears that winter wheat yields only reached 64 % of the expected yield, in soybeans the value was 48 % and in corn only 28 %. When looking a production risks this comparison indicates that corn is much more susceptible to unfavourable weather conditions and therefore a riskier crop than the others.

Farming structures

Given the fact that corn and soybeans are somewhat "non-traditional" in the CBSR and expensive, it can be assumed that structural features of farms may have an impact on their willingness and ability to adopt these new options. Therefore, the subsequent section provides insights into the structure of farms and the importance of corn and soybeans for the different farm types.

Russian statistics distinguish three types of farms: agricultural enterprises, private farms and subsistence farms. Agricultural enterprises are large businesses, usually created on the basis of former collective and Soviet farms, often based on external capital and hired labour use. In many cases, such farms are consolidated in agro holdings. Private farms are usually smaller farms run by one person or with the assistance of family members and primarily based on joint labour input. Finally, a

third form of agricultural producers is subsistence farms, predominantly producers who sell only their surpluses. This type of farm is widespread in Russia, but in particular relevant in livestock, fruits and vegetables.

Figure 3 indicates that, in corn, agricultural enterprises were able to increase their market share while, in the other crops, private farms expanded their market share. A possible explanation for this is that corn is a rather expensive crop. This fact is subject to further analysis, discussed later. Because access to credit and financial issues have an effect on the shift of crop patterns (Rao, 1989), this point might represent an advantage for agricultural enterprises over other farm types. The main reasons for this are the larger scale of production and diversification of the business (Chetvertakov, 2012). Therefore, farms with sufficient financial liquidity, in particular, are modifying their cropping patterns.

The following results from this section can be highlighted:

(1) CBSR is, indeed, a hot spot of Russian corn and soybean production, both in terms of growth in acreage and in yield improvement.
(2) While corn acreage went up by 17 % and soybeans by almost 33 %, wheat acreage increased by only 3.7 %.
(3) Regarding the differences in adopting new crops, agricultural enterprises seem to be more involved in corn and soybean production than the other two types of farms.

The next section illustrates the methodologic approaches and related assumptions used for further analysis.

3. Methods

Economic theory suggests that growers behave as profit maximizers, provided they operate under market conditions. When looking at cropping patterns and land use this assumption leads to the conclusion that profitability should be higher for those crops which have been able to expand their share in total acreage. Therefore, any attempt to identify the economic drivers for changes in cropping pattern requires a rather detailed set of data regarding input expenditures for individual crops.

Furthermore, the profitability of a certain crop is not necessarily a straight function of cost and revenue generated according to a profit and loss account. There may exist some very important economic drivers in grower's decision making which are non-monetary in nature: (a) rotational effects impacting the subsequent crop positively or negatively, (b) crops may differ in their risk profile (both in production risks and market risks), (c) they may have different peak-times in labour and machinery use and thereby creating different opportunity cost for those production factors and (d) sometimes their liquidity requirements are not the same and growers preferences are impacted differently than what results from an enterprise analysis based on P&L data suggest (see Albrecht, 2015).

One approach to gathering information regarding economic drivers is the use of official profit and loss figures reported by farms to local authorities in Russia. However, they cannot be used because of the following limitations:

- The level of information is too general – collected data are summarized at a regional level and do not represent single farms.
- These figures entail an inherent risk of being biased, as they were created for reports to tax authorities, possibly creating a strong incentive for producers to lower profits. Therefore, it is most likely that they do not reflect the true economic conditions.
- The absence of non-monetary data in these existing data makes it impossible to evaluate non-budgetary effects of individual crop choices.

In order to generate a realistic picture about economic drivers for growers' decisions it is therefore necessary to get (a) farm and even crop specific information and (b) growers' expertise regarding the importance and the "mode of action" of non-monetary effects associated with individual crops.

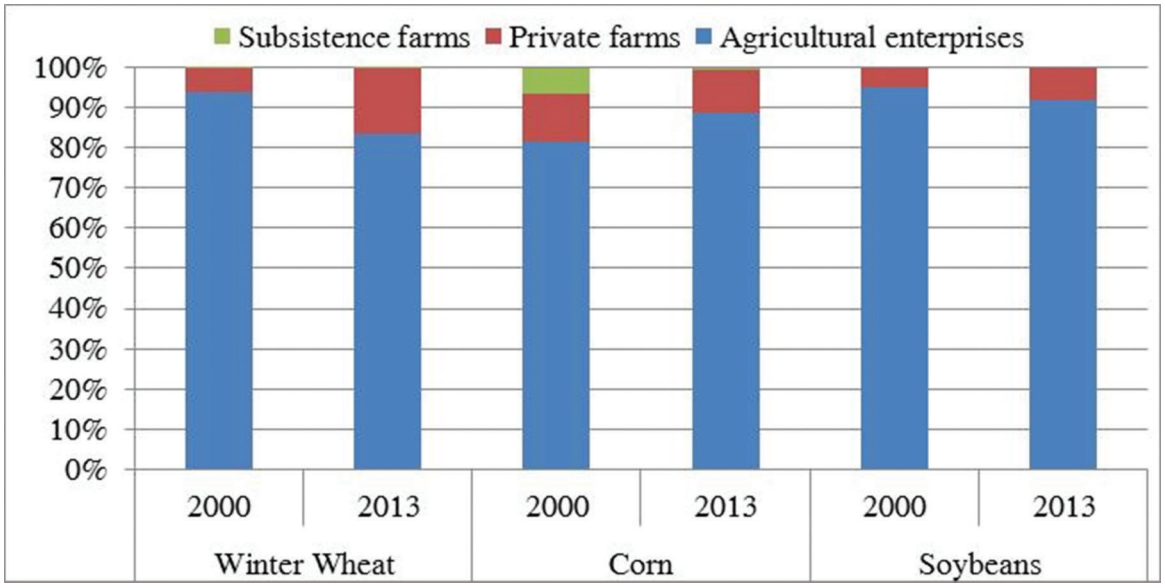

Figure 3: Importance of key crops for Russian farm types
Source: UniSIS (2014); own calculations

When following this approach, the next question arises: Which economic criteria should be used in order to evaluate economics of crop choices? Based on economic theory the ''return to land'' from a total cost and gross revenue analysis per crop would be the prime option. As of today, this figure is only available directly from *agri benchmark* data (see *agri benchmark*, 2015). This data base will be explained in greater detail below. The only shortcoming of this data base is that it does not contain any information on the non-monetary effects.

Given the shortcomings in official economic statistics, in theory the best option would be to collect complete farm and enterprise data on the individual crop level. Given existing budget restrictions for this project this was not a feasible option. Therefore, it seems reasonable to look for additional data sources from a case study in a so-called focus group discussion with a group of growers. The prime goal of this approach will be to (a) double-check key economic figures from the *agri benchmark* data set and (b) to evaluate the non-monetary effects associated with the crop choices. Details of the approach will be developed in more detail below.

Typical farm approach

Data from typical farms generate in-depth insights regarding the economics of corn and soybean production in Russia. This method is used by *agri benchmark* Cash Crop, a non-profit global network of agricultural economists, advisors, producers and specialists in key sectors of crop value chains (*agri benchmark*, 2014).

The typical farm approach has the following characteristics:

- It represents the origin of a major share of crop output in a given country/region;
- Data are created by using available statistics as much as available;
- Information is usually gathered by local experts and growers;
- It contains data about quantities and prices for outputs, inputs, and production systems;
- The data are available for several years.

The database of *agri benchmark* contains information about one typical farm in the CBSR that will be used. However, it should be noted that establishing a typical farm in countries such as Russia faces some specific issues:

(1) Potential participants for the establishment of a typical farm are rare. There is a challenge in getting them together for focus group discussions and convincing them to speak openly because there is no culture of economic exchange.
(2) A typical farm cannot be established just with the help of an advisor – which is called a pre-panel typical farm - because they are not accessible. Simply substituting the pre-panel with an additional focus-group discussion of farm decision-makers probably also would not work as the necessary information is spread over many specialists, who, moreover, often do not know the required information off-hand. Such a focus group discussion would take too long and require too many people.
(3) The less developed expertise of growers and decision makers regarding the economics of their own businesses and the whole sector may cause uncertainty about the quality of the data obtained in the panel process (Walther, 2014).

Against this background the existing typical Russian farm in the *agri benchmark* data base reflects primarily the situation of one particular farm belonging to a large modernized holding.

Focus group discussion

Despite the critical framework conditions experienced in previous work (see Walther, 2014) for the purpose of this study a focus group ''light'' approach has been designed and applied. Rather than trying to accomplish a total cost of production analysis the aim is to (a) generate a detailed variable cost analysis as well as a gross margin comparison for corn, soy and wheat and (b) to identify possible non-monetary effects of respective cropping decisions of growers or decision makers.

In order to do so one of the authors participated in the annual meeting of soybean growers of the Voronezh region in which the offer to more discuss economics of corn and soybean production was made to the participants. The resulting group consisted of five farmers, growing all three crops: wheat, corn and soybeans. All participants are responsible for their own agricultural business or are executive managers. Representatives of agroholdings did not attend and the participants therefore represented relatively small-scale farming for Russian conditions (fewer than 10,000 ha per farm).

The focus group discussion took place on November 12, 2014 in Voronezh. It was divided in two parts. The aim of the first part was creating an interest for crop economics comparison and generating a trustful and constructive atmosphere. For this part, the author presented analysis about the respective crop economics of a typical *agri benchmark* farm in the USA in North Dakota, where there is a lively competition between wheat and corn.

The second part of the meeting was devoted to the topic of typical production systems for corn, wheat and soybeans in the Voronezh region. In the course of a joint discussion among participants and the moderator a spreadsheet with all key cost elements as well as yield and product prices was completed (see Table 2). Even though there is not a culture of exchanging economic data among Russian growers a rather lively and open debate took place; it lasted for about 1 hour. This method made it possible to achieve the following:

(1) With a group of growers, it is easier to compare the whole range of figures and to find a representative type of operation/management for the given natural and economic framework conditions.
(2) Individual farmers might be reluctant to share sensitive individual economic data such as costs of production. Since the aim was to identify typical data for the region this obstacle could be overcome.

Given the different background of participants compared to the existing typical *agri benchmark* farm, which belongs to a large and relatively well equipped holding, it should be expected that results will be different.

In the next section, the results from the application of aforementioned methods will be presented.

Table 2: Typical direct cost, yields, prices and gross margin of wheat, corn, soybeans

Key elements	Units	Wheat	Corn	Soybeans
Seeds	USD/ha	69.9*	114.0	54.7*
NPK cost	USD/ha	71.3	99.8	34.2
Amount of pure nutrients applied	kg/ha	65 N, 10 P	94.5 N, 13 P	20 N, 12 P, 12 K
Herbicides	USD/ha	34.2	42.8	34.2
Other crop protection	USD/ha	28.5	14.3	8.6
Drying	USD/ha		147.2	
Yield	MT/ha	4.0	6.5	1.8
Market price	USD/t	203.5	169.6	418.3
Direct cost	USD/ha	203.9	418.1	131.7
Revenue	USD/ha	814	1102.4	752.9
Gross margin	USD/ha	610.1	684.3	621.2

*seed cost count 1/3 seeds as commercial and 2/3 as farm saved

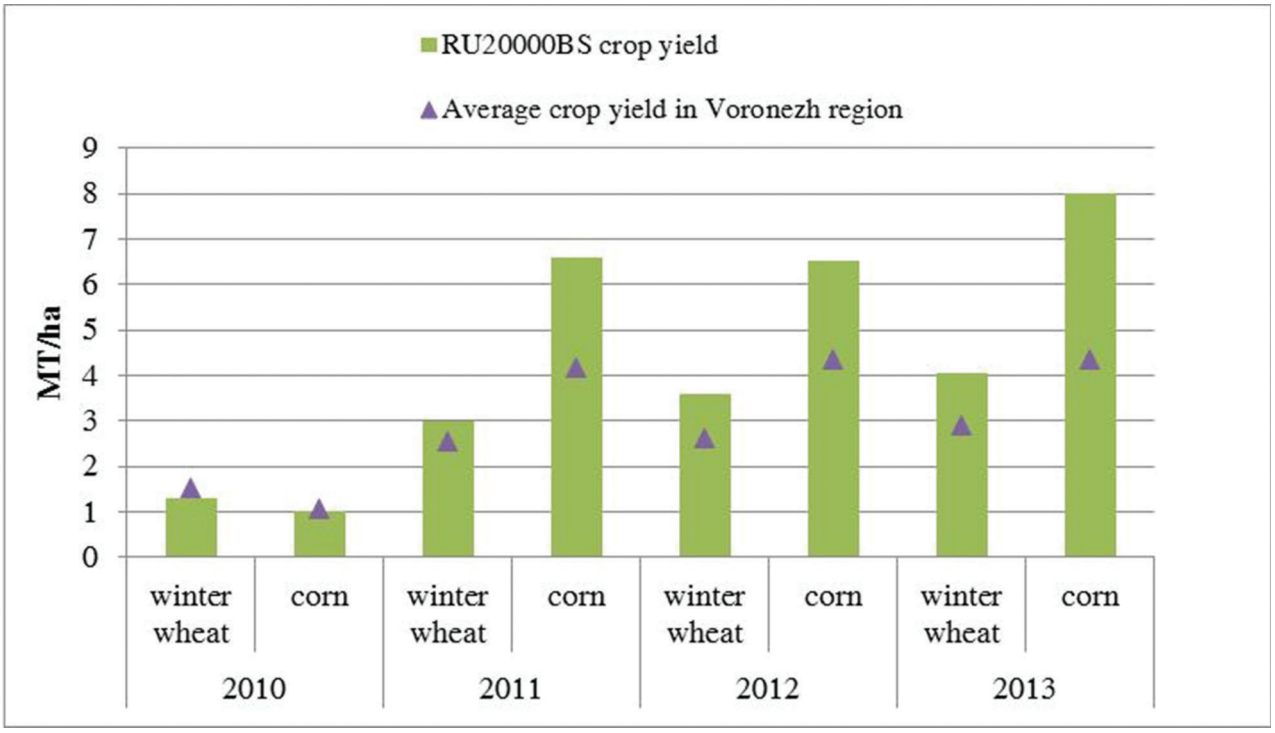

Figure 4: Winter wheat and corn yield for RU20000BS and the average in Voronezh region
Source: own calculations based on agri benchmark database and UniSIS (2014)

4. Economics And Farming Conditions Of The Major CBSR Arable Crops

As already mentioned, the most important crop in the CBSR is winter wheat. This is the only crop grown on all analysed farms and will therefore be used as a benchmark for the economics of corn and soybeans

Typical farm

The review of economic indicators starts with a typical *agri benchmark* farm (abbreviated to RU20000BS). It has 20,000 hectares of arable land. Crops rotated there are winter wheat, spring wheat, winter rye, corn, spring barley, peas, and sunflower. Unfortunately, this farm does not grow soybeans. Key indicators for the analysis are shown in Figures 4 and 5.

In order to understand the performance of the agri benchmark farm and its position relative to its regional peers, Figure 4 shows the wheat and corn yields for this farm and the regional average. On the one hand it is remarkable that regional averages are significantly below the farm achievements. However, when looking at the subsequent figures from the focus group discussion (see Table 2) it appears that also under these circumstances actual yields are significantly higher than the regional averages based on official statistics. The poor yield in both data sets in 2010 can be explained by a severe drought. It should be noted that the yield of corn under these adverse conditions was less than the yield of winter wheat. In the other three years' corn yields were almost twice as high as wheat yields.

The total cost depicted in Figure 5 includes direct costs (seeds, fertilizers and crop protection) and operating costs (labour, machinery, contractor and diesel), building cost, land, and miscellaneous cost. The market revenue was calculated as gross yield multiplied by ex-farm prices. The difference between the market revenue and the total cost is the profit.

Due to the high cost and lower market revenue of corn compared with wheat, the unfavourable weather

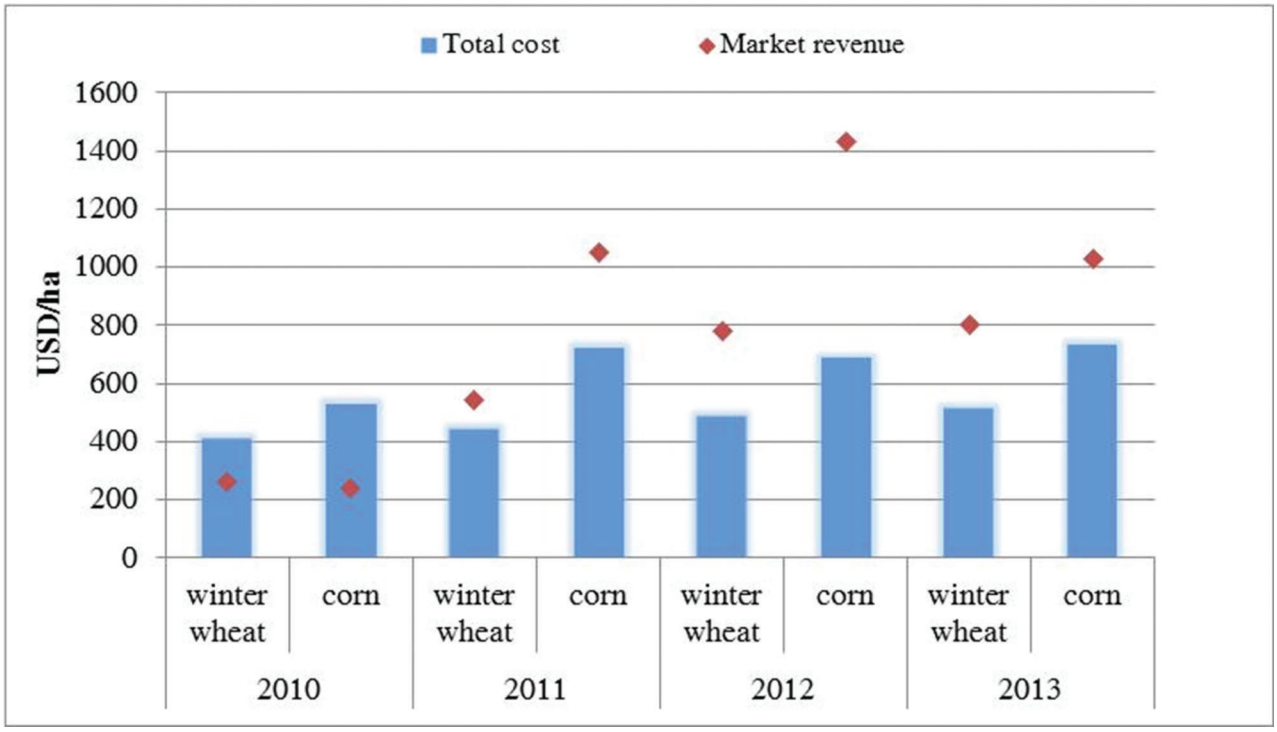

Figure 5: Winter wheat, corn revenue and total cost for RU20000BS
Source: agri benchmark database and own calculations

conditions in 2010 caused much higher economic losses for corn (287 USD/ha) than for wheat (148 USD/ha). However, for the other three years in this comparison, the profit per hectare of corn was higher than per hectare of wheat: 234 USD/ha in 2011, 452 USD/ha in 2012 and 7 USD/ha in 2013. The reason for the significant decline in the advantage in profit of corn over wheat was a sharp reduction of relative corn prices in 2013. However, all in all one can conclude that there is good reason to assume that in recent years' corn tended to be more profitable than wheat and thereby the economics were indeed a key driver for the rapid expansion of corn acreage in the CBSR.

The focus group discussion

The focus group discussion resulted in a compilation of direct cost, yields, and prices for selected crops, as presented in Table 2. To understand the method of calculation, some details have to be explained. Costs and prices are given on a factual basis for 2014; whereas yield figures are based on multi-annual expectation of growers participating in the focus group discussion (not factual).

In 2014, the Russian rubble experienced a significant devaluation, which caused a conversion issue. Of course, in an ideal situation one would use the exchange rate for the day the transactions took place, but these dates are not available. To minimize inaccuracies and to present a most realistic picture, an average exchange rate to the US dollar was used. For costs, the average exchange rate was calculated from January 1, 2014 to May 31, 2014, the time span during which the bulk of input purchases takes place. For output prices, the exchange rate was calculated for the period October 29, 2014 to November 11, 2014, the two weeks prior to the focus group discussion. However, it should be noted that any imperfection of the approach does not affect the comparison between the different crops.

Seed cost in the table result from one third of wheat and soybeans seed being commercially bought while the remainder is farm saved seeds. This reflects the actual practice of the growers participating in this focus group discussion. The figures presented in Table 2 therefore are comprised of the two sources: farm saved seed where valued by its opportunity cost; the price of commercial grains and commercial seed.

The gross margin is calculated on the basis of direct cost (which is the sum of seed, fertilizers, herbicides, other pesticides, and drying of corn) and revenue (calculated as market price multiplied by yield). It appears that corn generated the highest margin, USD 74 more than wheat. Growing soybeans yields USD 11 more than wheat. When looking at the details for cost in corn it can be seen that the majority of direct cost is drying cost. This figure indicates an elevator charge for this service for a corn crop with an initial moisture content of 25 %; the elevator's profit is included. Given the lack of on-farm drying capacities this figure represents the current economic conditions for most growers in the region.

However, in the long run this picture might change with on-farm investments in drying equipment. Therefore, we also calculated the corn gross margin with on-farm drying. Since there is no data available for on-farm drying cost in Russia a respective calculation from an official crop budget from North Dakota (USA) (Crop budgets, 2014) is used as a first approximation. This source estimates the on-farm drying cost (fuel, depreciation, finance, labour) at about USD 70 per ha for the corn conditions in the table. When using this figure for the calculation instead of the service fees charged by elevators, the advantage of corn over wheat margin increases to approximately USD 150/ha. Such an increase would most likely strengthen the trend to produce corn. Another factor playing in favour of corn is the recent decline in oil prices. Due to the massive

drop in global, and subsequently Russian oil prices, drying cost should have gone down significantly as well. Therefore, the competitiveness of corn has increased even more.

However, gross margins are not the only factor considered by farmers. Different crops have different effects on subsequent crops, they have different risk profiles and they differ regarding labour and machinery use during peak times. To identify properties of the analysed crops that are not reflected in the crop budget, the group was asked for effects that have an influence on their decisions. There was also an open question for additional effects that could have been missed by the authors.

Answers revealed that farmers do not consider special risks of individual crops; all crops are assumed to be risky. Moreover, neither agronomic complexity nor other issues (marketing, timing, trusted partners) influence the crop decision. An additional economic stimulus that can influence farmers' crop decision is subsidies. According to the farmers, there can be more subsidies for one crop than for another, but the differences are rather insignificant and usually are not taken into consideration when taking cropping decisions. When asked about their future plans regarding cropping patterns, none of the participating farmers had a specific inclination to increase the corn ratio in their rotations. The main reason: adding more corn acreage would imply the need to make additional investments in equipment for seeding, harvesting and storage. Regarding soybeans, some farmers expressed an interest in increase acreage. This willingness in favour of soy can be interpreted as a result of a smaller threshold between wheat and soybeans in comparison to corn.

5. Conclusions

Economic analysis of farm data suggests that the strong growth in corn and soybean production in the CBSR in Russia is indeed driven by rather high profitability when compared to wheat. An advantage of more than 100 USD/ha in profit or gross margin is considered to be a very strong incentive to shift cropping patterns. The outcome from the focus group discussion reinforced the results generated through the existing typical agri benchmark farm, even though as expected actual data were different.

Given the high importance of drying cost and the fact that currently many producers in the CBSR rely on rather expensive services from elevators there is room for an additional increase in corn margins compared to wheat. Of course this is subject to significant additional investments at the farm level, which are subject to the availability of loans and interest rates. Taking into account trends in yield for corn vs. wheat in the CBSR it has to be assumed that in future the fundamentals will develop even more in favour of corn.

Even though theoretical considerations do suggest a higher economic risk to produce corn compared to wheat, growers participating in the focus group discussion were not concerned about this issue. They also did not mention any rotational effects or other non-monetary effects associated with these crops. Whether this means those effects do not exist at all in the CBSR or whether growers participating in the focus group discussion were not yet as sophisticated operators as their colleagues in the West remains to be seen.

Despite these results the growers participating in the focus group discussion were not considering significantly expanding their acreage seeded to corn but were eager to increase their soybean acreage. When looking at increasing corn, they were concerned about the associated need for additional investments needed in equipment. Given high interest rates this does reflect the current situation but of course it does not exclude a mid- to long term shift. It also does not mean that new growers will not start to produce corn.

With regard to the methodology it turns out that in principle the globally applied focus group approach did work in Russia as well. However, it should be noted that this first test of the concept was done with a less sophisticated version by only asking for gross margin figures.

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