

The Impact of China's Belt and Road Initiative on Farmer's Income : Evidence from Sverdlovsk region

ABSTRACT

The purpose of this study is to Economic impact of the Belt and Road initiative on agricultural business and the role of the Russian government, in the case of the Sverdlovsk region, Russia. This study is based on quantitative research methods where primary data was collected through questionnaires while secondary data was obtained through verified data from a related project. The study was conducted for 6 months in the Sverdlovsk region, Russia, and included 120 participants. The researcher had previously compiled and considered 60 key questions in Russian in Sverdlovsk region. Demographic analysis of agro-entrepreneurs in the Sverdlovsk region shows that the majority are experienced people, mainly women and married, which indicates a family-oriented approach to agriculture. The outcomes also showed the region's attraction to foreign investors which shows Chinese investments in various economic sectors of the Sverdlovsk region, particularly in the machinery and equipment sector, which may have further boosted agricultural growth. BRI has played a crucial role in boosting the agricultural economy in the Sverdlovsk region and Russia as a whole by facilitating productivity, market access, and technological advancement, thereby driving the sector's growth and competitiveness.

Keywords: [One belt and One Road, trade with China, farmer's income, Sverdlovsk region]

1. INTRODUCTION

In 2013, China introduced the Belt and Road Initiative (BRI), which is considered one of the most extensive infrastructure and economic development projects of the 21st century. The initiative spans more than 140 countries and regions, to enhance connectivity, boost trade, and drive economic growth in Asia, Europe, and Africa (Rolland 2017). While the initiative focuses primarily on infrastructure development such as transport networks, energy projects, and telecommunications, its impact on various sectors, including agriculture, continues to be the subject of extensive academic research (Clarke 2017). The agricultural sector is an important part of the global economy, providing food security, employment, and income generation for millions of people worldwide (Clarke 2017; Ohashi 2018). Therefore, it is essential to understand the impact of the BRI on agricultural businesses to assess its broader economic impact. This research aims to examine the economic impact of the BRI on farmers, with a particular focus on the involvement of the Russian government.

The Belt and Road Initiative (BRI), launched by China in 2013, has become a major global economic and infrastructure development strategy. Because the BRI covers wide geographical regions and aims to connect Asia, Europe, and Africa through a network of transport corridors, it promises significant economic benefits to participating countries (Hu 2019). In this context, the possible effects on the agricultural sector are of particular importance. Improved infrastructure, optimized trade routes, and improved market access promoted by the BRI can trigger significant changes for agribusinesses (Clarke 2017). The importance of this study lies in its potential to shed light on how the BRI influences agricultural trade patterns, investment flows, and market dynamics in Russia and its neighboring regions. As a central participant in the BRI, Russia occupies a strategic position geographically, connecting Europe and Asia (Yilmaz and Changming 2020). The country's agricultural sector holds significant growth and development potential, making it an interesting case study for examining the interaction between the BRI and agribusinesses (Pieper 2021).

Both China and Russia have significant agricultural production capacities and highly complementary agricultural sectors due to their large populations and wealth of natural resources (Zhou et al. 2020). The cooperation of both nations in agriculture reflects a strong convergence of interests and is in line with their respective development goals. In the global

market for agricultural products, it is crucial to maintain security and stability. However, due to the long-standing asymmetry in political, diplomatic, economic, and trade relations between China and Russia, agricultural cooperation has not progressed as much as it could have. In a joint statement during a visit to China in early 2022, Putin emphasized the unshakable friendship and full cooperation of both nations. Russia was President Xi Jinping's first foreign destination after his re-election, and the two men signed the Joint Declaration on Strengthening the China-Russia Comprehensive Strategic Cooperation Partnership in the New Era. To strengthen bilateral trade, economic, and agricultural relations, they also signed several bilateral cooperation documents, some of which contained agriculture-related clauses (Ishchukova and Smutka 2013).

Within the broad framework of the BRI, Russia occupies a strategic position. The country's agricultural sector has enormous potential, especially in the Sverdlovsk region, a major producer of wheat, grain, and livestock (Timofeev et al. 2017). However, realizing the BRI's full potential for agricultural development in the region requires a comprehensive understanding of its economic impact and the crucial role of the Russian government (Peyrouse 2017). This research addresses this critical juncture and focuses on the economic impact of the BRI on agricultural businesses in the Sverdlovsk Region. Through a careful analysis of the existing literature, the research aims to identify potential new markets accessible through improved infrastructure and trade routes.

Existing literature provides insights into the multifaceted dimensions of the BRI and its implications for various sectors. For instance, studies by the Belt and Road Research Institute (Shahriar 2019) have highlighted the BRI's role in promoting infrastructure development and facilitating trade integration among participating countries. However, while these studies offer valuable perspectives on the macroeconomic implications of the BRI, there is a notable gap concerning its specific effects on agricultural businesses, particularly within the context of Russia. By examining these crucial aspects, this research aims to provide a comprehensive understanding of the complex relationship between the BRI, agricultural development in the Sverdlovsk region, and the strategic role of the Russian government. This knowledge will be instrumental in harnessing the BRI's immense potential to propel the region's agricultural sector toward a more prosperous and globally integrated future.

2. MATERIAL AND METHODS

3.2 Research Methodology

This chapter describes the research methodology and the procedures employed in the whole process of the study. It shows the techniques used in data collection and the reasons to use them. The chapter included sections on the study design, types and sources of data, Sample size and sample technique, data collection methods, data presentation plan, data analysis plan, and Ethical Issues.

3.3 Research Design

This study was based on quantitative research methods whereby a study allowed in-depth interviews with key informants. Research designs are the research plans that govern data collection, and analysis. There are several research designs in terms of scholarly research (Bryman 2016). The selection of a research design depends substantially on the research method agreed upon in a study, whether it is a quantitative research design or a quantitative research design (Mackey and Gass 2015). The present study agreed to use the quantitative research method, whereby we employed surveys with standardized questionnaires to collect data from 120 respondents.

3.4 Types and sources of data

In the process of data collection, quantitative data was obtained by using primary and secondary sources to support the findings of the study. Primary data were collected through questionnaires while secondary data were obtained through reviewed data from a related project.

3.5 Study Location

This study examines the economic impact of the BRI on agricultural businesses in Russia, focusing particularly on the Sverdlovsk region. The aim is to understand how the BRI has affected these companies financially and operationally and to analyze the role of the Russian government in facilitating or mitigating these impacts. Sverdlovsk Region as a case study: Sverdlovsk was chosen for its economic importance: As an important industrial center in Russia, it could have potential for agricultural development through BRI. Geographical location: Sverdlovsk's proximity to China, a key BRI player, could affect its agricultural trade.

3.6 Study population

The target populations were all farmers benefiting from BRI projects around the Sverdlovsk Region.

3.7 Sample size

The sample size is the number of cases in the population, and a sample is a group of respondents drawn from a population in which the researcher is interested in collecting information. In this study, the sample size was 120 respondents who involved different small business owners operating in Sverdlovsk Region.

3.8 Sampling Techniques

The researcher used the simple random sampling method in the enrolment process. The main benefit of the method is that it assures a bias-free sampling procedure since every member has an equal chance to contribute to the study (Singh and Masuku 2014). The researcher had full autonomy in the recruitment process and ensured there was no connection between the different participants (Moser and Korstjens 2018). One of the important advantages of using random sampling is the easiness of participant grouping since everyone has the same enrollment chance. Another advantage is the existence of random variables, which increases population representativeness.

3.9 Data Collection

The researcher earlier arranged and considered the important questions to include that covered the key issues that the study intended to study. Similarly, the researcher pursued consent from the management of the small businesses employed for the study. The 60 questionnaires were in the Russian language which is commonly used by many Russians for daily conversation, and after their finishing point by the small business operators and government officials, the researcher translated them into English and sent them back for validation. The information provided by the participants was recorded and transcribed later by the researcher for analysis.

3.10 Data Analysis

The thematic analysis was used to analyze the data collected through questionnaires. Elucidated that the thematic analysis involves the examination of data to pinpoint growing themes and forms in the data to respond to the research questions (Kiger and Varpio 2020). The study appears to classify collective factors and experiences that affect their activities and the role of the government. Likewise, the data should disclose isolated issues and existences that hinder the optimum operation of small businesses during the pandemic. Increased yield calculations were performed using a linear model:

$$y = fc(x) \dots \dots \dots (i)$$
$$fc(x) = aX1 + bX2 + cX3 + dX4 \dots \dots \dots (ii)$$

3. RESULTS AND DISCUSSION

4.1 Socio-economic Characteristics of agricultural businessmen in Sverdlovsk region

Demographic parameters are variables that provide a lot of information about the development of small businesses (Table 1). It was important to find out from respondents their demographic information, including marital status, age, education level, occupation, and number of dependents. These parameters would influence their influence on the study. The results show that the majority of surveyed agro-entrepreneurs in the Sverdlovsk region are between 35 and 55 years old (49.9%). This suggests that the majority of agri-entrepreneurs in the region are experienced and have some level of expertise in the field. The results also show that the majority of agricultural businessmen are female (64.1%), indicating that the agricultural sector in the region is largely dominated by female agricultural businesswomen. In terms of marital status, the majority of the agricultural entrepreneurs surveyed (56.6%) were married. This indicates that farming in the Sverdlovsk region is a family-oriented activity. Furthermore, the majority of agro-entrepreneurs surveyed (48.3%) had only primary school education and only 5.8% of agri-entrepreneurs had university/college education. This shows that the majority of agri-entrepreneurs in the region lack formal training and may not be aware of the agricultural business opportunities available to them. In terms of family size, the majority of the agricultural entrepreneurs surveyed had families between 4 and 7 years old (44.1%). This suggests that farming in the region is a family activity and that the majority of families surveyed rely on farming as their main source of income. Finally, the majority of the agricultural entrepreneurs surveyed (52.4%) have ten or more years of professional experience. This indicates that the majority of agro-entrepreneurs in the Sverdlovsk region have a certain level of experience and expertise in this area.

The results show that agriculture in the Sverdlovsk region is a family-oriented activity and that the majority of surveyed agro-entrepreneurs have experience and a certain level of expertise in this field. The findings also suggest that the majority of agri-entrepreneurs in the region lack formal training and may be uninformed about the agricultural business opportunities available to them. It is also possible that the majority of agribusiness owners surveyed rely on the farm as their primary source of income. Therefore, the government of the Sverdlovsk Region must provide adequate support and assistance to agricultural entrepreneurs in the region so that they can fully exploit the business opportunities presented to them.

The field survey data indicate that livestock breeding (47%) and wheat production (33%) dominate in agricultural holdings in the Sverdlovsk region, while vegetables (27%) and other categories (13%) play a smaller role. Ownership structures are diverse, with private ownership being the most common (45.8%), followed by Sino-foreign joint ventures (30%), collectively owned farms (18.3%), and state-owned enterprises (5.8%). Regarding profitability, a significant proportion of companies (50%) report medium profits, while 16.6% report high profits and 33.3% report low profits. This data provides a basis for understanding the agribusiness landscape in the region before further analyzing the impact of the BRI.

Table 1: Socio-economic Characteristics of agricultural businessmen in Sverdlovsk region

Variable	Frequency	Percentage(%)
Age (year)		
20-35	34	28.3
35-55	60	49.9
55above	26	21.6
Total	120	100.0
Sex		
Male	43	35.8
Female	77	64.1
Total	120	100.0
MaritalStatus		
Married	68	56.6
Single	28	23.3
Widow	16	13.3
divorced	8	6.6
Total	120	100.0
LevelofEducation		
Informal	30	24.9
Primary	58	48.3
Secondary	25	20.8
University/college	7	5.8
Total	98	100.0
FamilySize		
2-4	17	14.1
4-7	53	44.1
Above 8	50	41.6
Total	120	100.0
Experienceof farming (year)		
4-6	25	20.8
6-10	32	26.6
10&above	63	52.4
Total	120	100.0
Categories of Agricultural Business		
Wheat	33	27.5
Livestock	47	39.16
Vegetables	27	22.5
Others	13	10.8
Total	120	100.00
Ownership		
Private	55	45.8
Community	22	18.3
State-owned	7	5.8
Chinese-foreign joint	36	30
Total	120	100.00
Benefits/profits		
High level	20	16.6
Medium level	60	50
Low level	40	33.3
Total	120	100.00

Source:FieldSurveyData,2024

3.2 The agricultural business operations under the Belt and Road Initiative

This section examines how the BRI has affected agricultural business activity in the Sverdlovsk region. The results indicate significant changes in various aspects of agricultural business activity in the Sverdlovsk region before and after the implementation of the Belt and Road Initiative (BRI). First, post-BRI, wheat production volume increased by 10% from 100 tonnes to 110 tonnes, indicating improved productivity and potentially improved market access facilitated by the initiative. Likewise, milk production recorded a significant increase of 42.10% from 568,400 tonnes to 807,700 tonnes, indicating increased efficiency and demand in the dairy sector, possibly due to expanded trade opportunities with China

under the BRI initiative. Furthermore, meat production recorded a notable increase of 29.02% from 40.2 tonnes to 112.4 tonnes, highlighting significant growth in this sector, likely due to increased investments and modernization efforts under the BRI framework (Table 2). The increase in exports to BRI countries from 10% to 25% of total exports reflects the region's successful integration into the global market facilitated by the initiative and opens up new opportunities for trade and economic growth. There has been a notable increase in the adoption of new technologies: the proportion of companies taking advantage of such advances has increased from 20% to 40%. This suggests a shift towards innovation and efficiency-oriented practices, potentially driven by the technology adoption incentives under the BRI. Finally, average investments in agribusinesses increased by 50% from \$1 million to \$1.5 million, underscoring investors' increased confidence and commitment to the region's agriculture sector post-BRI. This capital injection represents recognition of the sector's growth and development potential under the initiative, with implications for job creation, infrastructure improvement, and overall economic prosperity. In general, the results demonstrate the transformative impact of the Belt and Road Initiative on agricultural business operations in the Sverdlovsk Region, characterized by increased production, trade expansion, technological advancement, and increased investment, all contributing to improved competitiveness and sustainable development of the region contribute to the global agricultural landscape.

Table 2: Agricultural business operations before BRI and after BRI in Sverdlovsk region

Aspect of Business Operations	Pre-BRI	Post-BRI	Change
Wheat Production Volume	100 tons	110 tons	+10%
Milk Production	568,400 tons	807,700 tons	+42.10%
Meat production	40.2 tons	112.4 tons	+29.02%
Exports to China	10%	25%	+15%
Adoption of New Technologies	20%	40%	+20%
Investment in Business	\$1 million	\$1.5 million	+50%
Investment in Agricultural Business (million \$)	1	1.5	+50%
Average Farmer's Income (\$)	\$12,000	\$18,000	+50%

Source:FieldSurveyData,2024

3.3 The effect of BRI in agricultural business support on the farmer's economy in Sverdlovsk region.

The economy of a farmer may be significantly impacted by BRI (Table 3). According to our analysis, farmers can boost their income and consequently their overall economic prosperity by utilizing the 89.19% of support allocated to bolster the local economy and raise living standards. The funds are invested in local businesses, services, and infrastructure, all of which have the potential to boost employment and the economy. Furthermore, 81.08% of the funds utilized for land acquisition can support farmers in growing their operations and raising their output. This may result in higher agricultural earnings as well as more regional economic activity. Lastly, farmers can optimize their profits and make the best use of their resources by utilizing the 21.06 % of support utilized to boost productivity and efficiency. Farmers can produce more with less by increasing efficiency and productivity, which raises profits and boosts the economy as a whole. A farmer's economy can generally benefit from BRI for agriculture since it allows them to raise their income, grow their businesses, and make the most of their resources.

Table 3: The effect of BRI in supporting on farmer's economy

Sources of information	Frequency(n)	Percentage(%)
Purchasing new equipment	14	18.92
Stimulate local economies and improve overall standards of living	66	89.19
Investing in new technologies	2	2.70
Creation of jobs	7	9.46
Purchase additional land	60	81.08
Improving infrastructure	5	6.76

Access new markets	5	6.76
Increased productivity and efficiency	16	21.06
Expand their operations	7	9.50

Source: Survey data (2024)

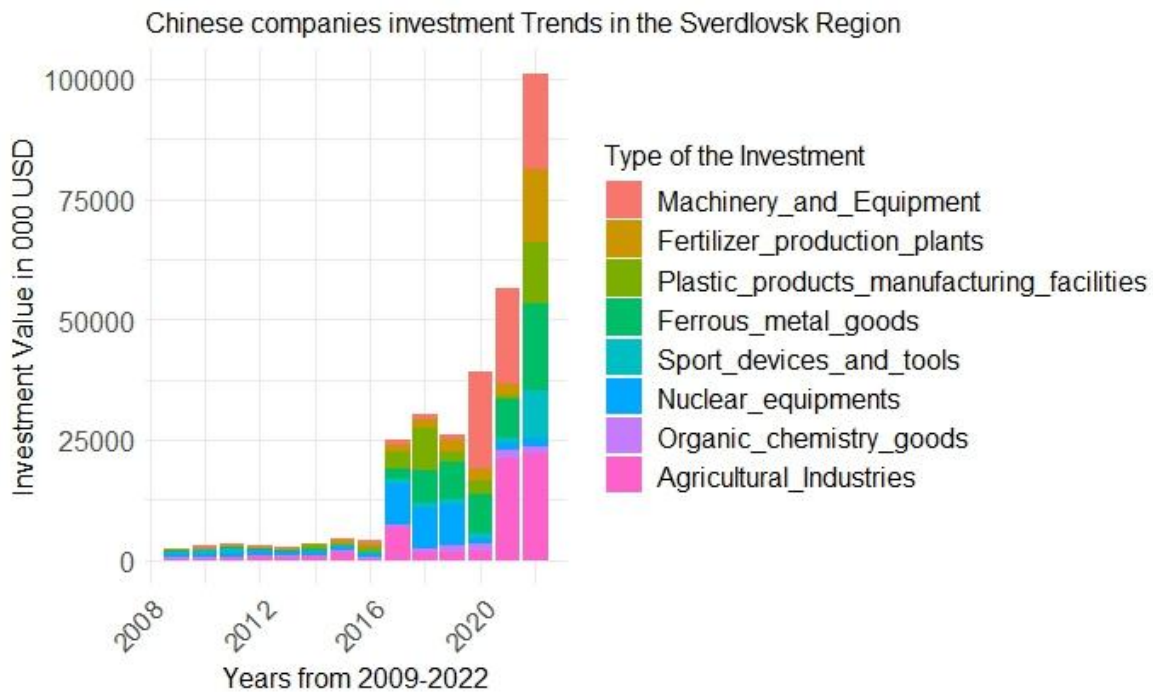


Figure 1. Chinese capital in the economy of the Sverdlovsk region

Figure 1 shows the total value of investments made between 2009 and 2022 in eight investment sectors, expressed in thousands of US dollars. Throughout the period, machinery and equipment proved to be the most tempting investment target for Chinese citizens wishing to invest in the Sverdlovsk region. According to the “Fluctuation in Investment” graph, Chinese investments may fluctuate over time. Unlike plastic product production facilities, whose investment value is constantly increasing, investments in fertilizer production facilities appear to have peaked in 2016. The graphic shows that several important economic sectors in the Sverdlovsk region are the focus of Chinese capital. Keep in mind that this data may not fully reflect the extent of Chinese investment in the region. The industries indicated in the figure correspond to the industrial strength of the Sverdlovsk region, which makes it a major industrial center in Russia.

Table 4: Yield difference before 2013 and after 2013 of different crops produced in Sverdlovsk region

Crop type	Yield (qt/ha)		
	Total yield (2009-2013)	Total yield after (2014-2022)	Increased yield (%)
Wheat	107.5	171.6	59.62
Oats	69.7	93.3	33.85
Barley	45.8	67.1	46.50
Millet	56.2	99.3	76.69
Legumes	38	78	105.26
Fruits	256	331	29.29

Source: Survey data (2024)

The Belt and Road Initiative (BRI) between China and Russia is the primary cause of the higher yield based on the data shown in (Table 4). While the data in the table shows data from both before and after 2013, the establishment of the BRI in 2013 raises the possibility that crop yields in the Sverdlovsk region are also impacted by other factors. The yields for all six crops (wheat, oats, barley, millet, legumes, and fruits) have increased since 2013, as the table illustrates. This implies that agricultural practices in the Sverdlovsk region have generally improved. The crops' respective percentage increases in yield varied widely. The table shows that all crops significantly increased from 2013 to 2022.

China-Russian agricultural product trade is said to be growing steadily and exhibiting cooperation, according to recent reports. Bilateral agreements and trade partnerships have expanded as a result of both nations' growing recognition of the strategic significance of agricultural trade (Nikitina et al. 2020). Due to its sizable population and rising need for a wide range of agricultural goods, China has grown to be a major market for Russian agricultural exports, which include meat, grain, and soybean products. On the other hand, China now sources a significant amount of agricultural products from Russia due to its large area of arable land and potential for increased agricultural output (Hutson 2019). There are encouraging signs for continued collaboration and trade growth in the agricultural sector between the two countries, as evidenced by the completion of numerous trade agreements and initiatives as well as ongoing efforts to upgrade logistical infrastructure. From the current study, demographic analysis of agro-entrepreneurs in the Sverdlovsk region shows that the majority are experienced people, mainly women and married, which indicates a family-oriented approach to agriculture. However, a significant proportion have only primary education, suggesting a lack of formal farm training. Nevertheless, most entrepreneurs have extensive professional experience. Livestock raising and wheat production are the predominant agricultural activities, with private ownership being the most common ownership structure. Profitability varies, with half of companies reporting medium profits, highlighting the region's diverse agricultural industry landscape. These findings highlight the importance of targeted government support and assistance to enable entrepreneurs to effectively exploit available agricultural business opportunities.

When the BRI was put into effect, there were definite improvements in the agricultural business activity in the Sverdlovsk Region compared to before (Kuznetsova and Kuznetsov 2024). Increases in wheat, milk, and meat production were notable after the BRI, suggesting that the initiative improved productivity and facilitated market access. A notable rise in export volumes to the BRI nations is indicative of the countries' effective integration into the world economy (Parks et al. 2023). An increasing trend toward innovation and efficiency-focused practices is evident in the average investments made in agribusinesses and the adoption of new technologies (Das 2024). These findings demonstrate the BRI's revolutionary effect on the region's agricultural enterprises, boosting their competitiveness and promoting sustainable growth as they establish the area's place in the world's agricultural system.

According to the data and information provided, the BRI between China and Russia has a significant impact on agricultural yields in the Sverdlovsk region. According to the table, which compares the yield differences before and after 2013, wheat, oats, barley, millet, legumes, and fruit are among the crops with significant increases. This implies an overall improvement in agricultural practices in the region after 2013, around the time the Belt and Road Initiative was established. The results showed the yield increase of all crops; For example, a yield increase of 105.26% was recorded for legumes. This shows how effective new technologies or practices implemented through programs like the BRI can be. In addition, the region's attraction to foreign investors is underscored by the accompanying (Figure 1), which shows Chinese investments in various economic sectors of the Sverdlovsk Region, particularly in the machinery and equipment sector, which may have further boosted agricultural growth. However, the way investment values change over time highlights potential complexities and difficulties in sustaining agricultural growth and requires continued focus on maximizing agricultural productivity and leveraging programs such as the Belt and Road "Initiative for Sustainable Development. These findings are similar to (Mohamad & Zainuddin 2021) and (Menhas et al. 2019) who both found the positive effect of BRI in Asia and Pakistan respectively.

4. CONCLUSION

In conclusion, the symbiotic relationship between China and Russia in agricultural trade highlights the strategic importance of their cooperation, as evidenced by the expansion of bilateral agreements and trade partnerships. Demographic analysis of agri-entrepreneurs in the Sverdlovsk region shows predominantly experienced workers with a family-oriented approach to agriculture, although a significant proportion lack formal agricultural education. Nevertheless, the region has a diverse agricultural landscape, with livestock farming and wheat cultivation predominant. The BRI has significantly improved agricultural business activity in the Sverdlovsk Region, reflected in an increase in production and exports, as well as a trend towards innovation and efficiency-oriented practices.

Consent

As per international standards or university standards, Participants' written consent has been collected and preserved by the author(s).

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