Journal of Social Sciences and Economics
Vol. 1(1), 2022, 16-23
ISSN (Online) 2958-1532
https://finessepublishing.com/jsse

Risk Identification from the Perspective of South-South Cooperation—Evidence from China and Mongolia Agricultural Technology Cooperation

Yang Jianguo[a], Baoyin Dureng[a], Su Riga[a]

a. Inner Mongolia Agricultural University, College of Economics and Management, Hohhot, Inner Mongolia Autonomous Region 010019, China

Abstract: Continuous growth, the transformation of animal husbandry, and economic policy offer substantial opportunities for agriculture development, alleviating poverty, food security gains, improving human nutrition, and growing the agriculture economy. In Mongolia, successive governments have brought revolutionary changes to establish the planting industry in the region. The Mongolian government vigorously implemented a "land reclamation" policy three times to promote and develop the plant industry. The plant industry is the only viable livelihood option for the impoverished Mongolian people. Therefore, the South-South Cooperation agricultural technology transfer project is a significant component of China's international agricultural cooperation and assistance. It has carried out many exemplary agricultural projects to improve agriculture development and animal husbandry in Mongolia, positively enhancing agriculture productivity. Therefore, this article aims to analyze the modes, achievements, and risks critically. This introductory article examined the existing difficulties and risks related to the dairy cow, sheep, and freshwater fisheries in China and Mongolia during 2000-2020. It concluded that lack of supply chain cooperation and unsustainability are significant problems. Finally, this study provides guidelines to promote the agricultural economy, technology, and market mechanisms to gain the mutual benefit of economic and trade cooperation. This study suggests transforming the existing single project-driven cooperation mode of government and enterprises into a deep corporation through multiple projects in agriculture, animal husbandry, technological management, metrology, crops, and veterinary medicine. Moreover, to increase renewable energy, the government should support, cooperate, and implement the “One Billion Trees" campaign as part of the "Recovery Policy" to mitigate climate change.

Keywords: South-South Cooperation; Agricultural Technical Cooperation; Risk Identification

1. Introduction:

The study on South-South cooperation is highly questionable. SSC is a crucial organizing concept through a vision of mutual benefit. It conveys a hope that the under-developing countries may achieve development through their mutual assistance. The cooperation efforts among countries' individuals, institutions, and governments are labeled developing countries. That label has brought the enthusiasm to cooperate in the agriculture sector. Sustainable agriculture and animal husbandry are important sources of income for rural households and contribute to developing country economies.

Nonetheless, hundreds of millions of small-scale producers depend on agriculture and animal husbandry. Since the 1950s, the Chinese government has assisted third-world countries with agriculture and animal husbandry, which has positively contributed to these countries' economic development and social progress. Since the 1990s, the Chinese government has incorporated foreign agricultural assistance under SSC, an essential part of China's international agricultural cooperation.

In 1959, 1976, and 2008, the Mongolian government implemented the "land reclamation" policy to promote the development of plant industry, new varieties of economic policy, technologies, and animal feed formula. These steps alleviated the food shortage, eradicated poverty, and promoted the agricultural economy's growth. The plant industry is a pillar industry in Mongolia. It is an essential industry related to people's livelihood. In

[Received] 22 Oct 2022; Accepted 20 Dec 2022; Published (online) 31 Dec 2022]

Corresponding email: buyanolga@126.com
DOI: 10.61363/jsse.v1i1.35

Mongolia, successive governments made efforts to increase the plant industry. China's "One Belt One Road" initiative involves constructing and developing agriculture, industry, and infrastructure in different regions. South-South cooperation is the upgraded version of the One Belt One Road. To participate in the agricultural economic and technological cooperation and competition of various countries on a larger scale and at a higher level, economists proposed that domestic agricultural enterprises take technology, capital, and equipment overseas to rent, lease and purchase land, operate the agricultural and animal husbandry economy, and realize cooperation and win-win results.

At present, the Mongolian market has a massive demand for the development of intensive agriculture. The processing and sales of agricultural and livestock products are in the suburbs of Ulaanbaatar and Dar-Han City, with modern and traditional agriculture coexisting [1]. China's advanced technology, operations and management, ample funds, and natural geographical advantages provided good opportunities for Mongolian agricultural development and helped Mongolia to develop modern agriculture with international competitiveness. Therefore, it is necessary to analyze the current situation, content, existing problems, and agricultural South-South technical cooperation policies between China and Mongolia. This analysis will help policymakers to explore future cooperation trends and gaps. Meanwhile provides some suggestions to promote the long-term, sustainable, and stable development of agricultural technical cooperation in both countries.

2. International support for SSC

The Mongolian government has played a positive role in collaborating with international organizations and regional economies. For example, IMF and UNDP have sent permanent representatives to Mongolia since 1991 and 1993. Mongolia became a member of WTO in 1999; ADB, WB, IMF, and FAO have aided Mongolia many times since 1991. The primary support has been provided in enormous capital management training and institutional guarantees to support Mongolia's national economy and enhance foreign economic and trade activities. In 2014, Mongolia joined the Asian Investment Bank (AIB). In 2017, the EU set up a representative office in Ulaanbaatar in Mongolia. International organizations' assistance includes medical education, finance, insurance, food production, supply, security, pastoral cooperatives, agricultural technology, etc. From 1990- to 2016, around 13000 foreign-funded enterprises from 112 countries had a $15 billion direct investment in Mongolia. China, Netherlands, Luxembourg, the United Kingdom, Singapore, Canada, South Korea, and the United States are the primary sources of foreign investment, and 80% of Mongolia's total foreign investment is carried out from 2008 to 2018 [1,3,4].

2.1 Positive and pragmatic foreign trade strategy

The smooth development of Mongolia's foreign economic and trade relations has provided a strong foundation for agricultural technical cooperation. Successive Mongolian governments always pay great importance and actively promote economic, foreign exchange, and trade relations. In addition, the Mongolian government established and actively participated in international and regional economic cooperation. Mongolia's trading partners have spread over 147 countries, including China, Russia, South Korea, the European Union, Japan, the United States, Kazakhstan, Vietnam, Iran, and Turkey. For the last 14 consecutive years, China has become Mongolia's largest trading partner. In the first ten months of 2017, Mongolia's total foreign trade reached $8.7 billion, a year-to-year net increase of $2.2 billion. Among them, the export volume was $5.2 billion, a year-on-year net increase of $1.5 billion; Imports amounted to $3.5 billion, with a net gain of $762 million year-on-year.

2.2 China Mongolia Trade and Investment Cooperation Growth

In the past 20 years, Chinese and Mongolian trade and investment cooperation has been overgrown. In the first half of 2021, Mongolia's trade with China totaled US $5 billion, a year-on-year increase of 66.7%, accounting for 68% of Mongolia's total foreign trade in the same period. Among them, the export to China was 3.7 billion US dollars, a year-on-year increase of 76.2%; The total import trade from China was US $1.3 billion, a year-on-year increase of 52.9%.

In 2020, Mongolia's total trade with China was US $7.4 billion, accounting for 57.5% of Mongolia's total foreign trade in the same period. Among them, the total export trade with China was US $5.49 billion, a year-on-year decrease of 19.15%; The total import trade from China was US $1.91 billion, a year-on-year decline of 7.28%.

On June 30, 2020, China's various investments in Mongolia had increased steadily, and nonfinancial direct investment reached $4.1 billion, accounting for 30% of Mongolia's total foreign investment. Since 1998, China has been the largest investor in Mongolia. The government also provides economic assistance to Mongolia every year [1]. From 2020, China donated anti-epidemic materials to Mongolia many times and provided aid and

Journal of Social Sciences and Economics
Vol. 1(1), 2022, 16-23
ISSN (Online) 2958-1532
https://finessepublishing.com/jsse

vaccines to the Mongolian people. 30,000 sheep donated from Mongolia at the critical stage of China's COVID-19 epidemic prevention and control.

2.3 China Mongolia Agricultural Technical Cooperation under SSC

South-South cooperation began at the Bandung Conference in the 1950s. It is an indispensable part of international multilateral cooperation and an effective way to integrate and participate in the world economy. China is an active advocate and partner of South-South cooperation. SSC content involves the technical and economic cooperation among developing countries. The notation of commitment to strengthening exchanges and cooperation in infrastructure, construction, small and medium-sized enterprise development, energy and environment, human resource development, health education, and other fields. Since 2008, the Chinese government has donated $80 million to FAO to establish a trust fund to support "South-South cooperation" under the "Special Plan for Food Security" framework. This step will improve the agricultural production capacity in developing countries such as Mongolia, Uganda, Congo, Ethiopia, Mali, and other recipient countries. The regional economic gap in Mongolia is widening, especially between Ulaanbaatar and the East and West regions. There are many economic hurdles to promoting sustainable agriculture and animal husbandry. Agricultural technology and management need to be improved, which is not conducive to the sustainable development of social economics [2].

3. Achievements of China Mongolia “South-South cooperation

In 2010, under the South-South cooperation framework of FAO, China and Mongolia officially established a bilateral cooperation project in agriculture and animal husbandry. Two phases have been implemented by supporting and developing local herders and farmers' production capacity, technical operations, and management level. Resultantly, decrease in imports from abroad of milk, eggs, honey, feed, and fish. These two phases focus on improving livestock variety, feed, crop planting, layer feeding and management, greenhouse vegetable planting, bee production, fishery, etc.

3.1 Livestock breeding technology education and training

Since 2010, China has selected the animal breeding sector as a significant sector to provide training and technical education to the Mongolian people. In addition, it includes the supply of artificial insemination and embryo transfer technology for dairy cows and sheep, corresponding machinery, equipment, and semen. It involves 8 Aimags (18 Sumu) and Ulaanbaatar, Darhan city. During the two phases of this project, 258 cows were examined for pregnancy, 252 times for artificial insemination, and embryos transferred 248 times, whereas the success rate was 98.4%. At the same time, the artificial insemination project was carried out for more than 600 basic ewes, and the pregnancy rate reached 99%. The semen of 9478 breeding rams was taken out and deeply frozen in a liquid nitrogen tank to establish the sheep gene bank.

Table 1: Livestock Breed Improvement in Mongolia under "South-South Cooperation" Project

Project	Quantity (per head)	technique	Success rate	growth rate
cows	258	pregnancy test	98.4%	6-7%
	252	artificial insemination		
	248	Embryo Transfer		
sheep	600+	artificial insemination	99%	19%
		artificial insemination		

3.2 Popularization and localization of feed planting and processing technology

From 2012 to 2016, two Sumu areas were selected in Tuv Aimag and Selenge Aimag for the field experiment. The field investigation was conducted on plant silage corn, feed, alfalfa, and Sudanese grass. Feed crop seeds, cultivation, and irrigation technologies were introduced and harvested by China. Field surveys were conducted during the reclamation, sowing, fertilization, irrigation, intercropping, harvesting, and other operations. Experimental work trained local cooperatives and agricultural companies to learn basic farming and irrigation techniques of feed crops. In addition, during the testing process, verities of silage and foraged maize were screened according to the local climatic and geographical conditions. The harvested silage, forage, corn, and hay are mainly used to feed and manage dairy cows and beef cattle. These feeding plants can improve the nutritional status of dairy cows and beef cattle, which would increase the milk production and economic situation of local households.

Table 2: China-Mongolia "South-South Cooperation" Feed Planting and Processing Projects

planting Sumu	**Variety**	**2015**	**2016**
Bayan Hangai	silage	6 tons/ha	6.27 tons/ha
Djibhulang	a new variety of corn	2.3 tons/ha	—
	”North-South No. 1" corn	—	7.7 tons/ha
Bayin ulan	alfalfa	7.054 tons/ha	—

China introduced different verities of silage corn with the cooperation of Mongolian agricultural enterprises, such as "Neidang 205", "Judan 37", "Donglingbai", "Nanbei No.1" and "Fengzhao 303" and "Jingkono 2000", "CainuoNo.1", "Hailin" and "Bergen" are introduced in Elton Sumu experimental base in central Aimag. Different types of six forage maize varieties were planted in the field to experiment with the localization problem. The final experimental result confirmed that "Nanbei No. 1" and "Bergen" varieties are more suitable and can be planted in a large area.

Table 3: The results of the introduction of new varieties to test whether they are localized

Experimental site	Type	Variety	Result
Elton Sumu, Tuv Aimag	silage corn	205	
		37	
		aventurine white	
		"North and South One"	√
		chicken feet	
	feed corn	Jing Kenuo	
		Cainuo No. 1	
		"Golden Age Gold"	
		"Ougui"	
		"Hailin"	
		"Bergen"	√

Journal of Social Sciences and Economics
Vol. 1(1), 2022, 16-23
ISSN (Online) 2958-1532
https://finessepublishing.com/jsse

3.3 Training of layer feeding and management technology

Layer production is an intensive technology in the animal husbandry industry. Under the South-South cooperation project, both countries initiated cooperation with the large companies in Mongolia "Tumen Xiutan" and "TSAT" and implemented a joint project of 80000 chicks and 140000 laying hens. During the project, assistance, training, and education were provided about avian influenza prevention, veterinary drugs, and laboratory testing. At the same time, this project provides the basic feeding formula, rapid detection technology, and critical points of chicken breeding (including lighting, ventilation, and disinfection). Furthermore, different opportunities were provided for raw materials in Mongolia, which reduced the import of raw materials and enormously reduced the feeding cost.

3.4 Greenhouse vegetable planting technology and screening experiment of local varieties

In the suburbs of Ulaanbaatar and Darhan City, an experiment was carried out on local cucumber, tomato, grape, and strawberry greenhouses with "Tumen Suhe" and"Sengid" companies, respectively. The experimental results showed that the adaptability and performance of the "Netherlands 971" Cucumber was outstanding. During the experiment, "Netherlands 971" Cucumbers were Planted in a 2000 m2 greenhouse. The experiment results showed that the cucumber yield increased significantly (Tables 4 and 5).

Table 4: Test results of introducing new varieties of greenhouse vegetables

Cooperative company name	Varieties of vegetables and fruits	Is it localized
"Tumen Suhe" company	"Dutch 971" Cucumber	√
"Sengide" company	"Taiwan Fairy", "5 Colors" Tomatoes	
	"Golden Swallow" Grape	
	"Hongyan" strawberry	

Table 5: Yield of "Dutch 971" cucumber greenhouse

Project Company	Planting area	years	Yield	growth rate
"Sengid" company	2000 m^2	2014	7000kg	—
		2015	8530kg	↑ 21%
		2016	13247kg	↑ 55%

3.5 Technical guidance of bee and fishery breeding

In the Eastern Aimag of Mongolia, the bee industry has a certain scale. Under the South-South Cooperation project, an initiative has been taken to carry out a two-year experiment with the cooperation of local beekeeping associations in the "Hasumu" bee breeding base in Eastern Aimag. A new breeding technology introduced the bee family inbreeding "queen bee". As a result, honey output was increased from 20 kg to 30 kg for every household, and productivity increased by 50%. There are 200 queen bees bred, increasing from 35 to 130 bee farmers. At the same time, the technology of 1000g extracting milk and 50kg wax from honey was also provided, and introduced new technology to produce honey products. In addition, two practical experiments were conducted on fishery breeding methods and the prevention of fish diseases. In Selenge Aimag, technical training courses for aquaculture fisheries included fish species, growth and development, disease prevention, etc.

4. Risk of agricultural technical cooperation between China and Mongolia

4.1 Uncertainty about Mongolia's agricultural policy

Agricultural production and operation have a complex nature, markets, and policies. Moreover, it has a long industrial chain, and it is vulnerable to the Impact of the natural environment, climate, market demand, price fluctuation, and other factors. However, it is an industry with high investment risk. Especially in Mongolia, the lack of investment guarantees, the political instability of local government, uncertain policies, and the game of political parties' interests bring multiple risks to agriculture investment and SSC projects. In 2017, Chinese enterprises invested in coal, copper, oil, gold, molybdenum, and other mineral fields with considerable profits. Chinese companies have less direct investment in agriculture and animal husbandry. On the contrary, enterprises from the European Union, Canada, Turkey, South Korea, Japan, and other countries have given considerable support and assistance to Mongolia's production, processing, and operation of agriculture and animal husbandry. Chinese agricultural enterprises should learn from those countries about investment experience and risk assessment methods in the agricultural field.

4.2 Superficial market-oriented cooperation

Due to superficial market-oriented cooperation, it is not easy to maintain sustainable development. Any enterprise's investment behavior will consider the rate of return. Agricultural projects should have the perfect infrastructure, stable cash flow, good market prospects, and a rate of return for sustainable agriculture growth. Under the framework of South-South cooperation, very few state-owned agricultural enterprises start from planting, field management and other production, policy funds, and financial support; therefore, it is difficult to sustain in the market. The application process of financial funding is complex, while the actual cost and pressure of the capital chain of operation are high. In addition, the asymmetric information among the Ministry of Agriculture, banks, and agricultural enterprises makes it difficult for agricultural enterprises to apply for funds. Besides, it is much more difficult for banks to find a suitable policy for projects, while government institutes do not play their role correctly.

4.3 Poor supply chain system

Between China and Mongolia, the supply chain system of agricultural products is not adequate. Since ancient times, the exchange and integration between farming and nomadic economy and culture have never been interrupted. The vision of the One Belt- One Road initiative is to cooperate and exchange more smoothly and flourish a new era in both countries. The production technology and management experience of breeding, vegetable, fishery, honey, forestry, and animal husbandry were transferred and prompted in Mongolia. However, a transnational and cross-regional supply chain system of agricultural products with modern Internet of things, information networks, e-commerce platforms, and transportation networks has not been established. Specifically, the "food chain" network is not developed in the upstream, midstream, and downstream participants areas, and members in the production and circulation of agricultural and livestock products are not developed. It does not meet the needs of various enterprises and government departments. The government should pay attention to funding policy, support the infrastructure, and construct foreign-related agricultural enterprises. In addition, supports the processing, warehousing, and logistics of agricultural and livestock products. These steps would consolidate the foundation for overseas project development of enterprises in the form of whole industry chain assistance.

4.4 The Impact of Climate Variation

The influence of climate variation, water resources, and cultural customs on agricultural technical cooperation is an essential factor that cannot be ignored. Technological progress is vital in promoting agriculture and animal husbandry's economic growth and development. The level of science and technology directly affects the productivity of agriculture and animal husbandry and determines the output and quality of agricultural and livestock products. The intensive agriculture and animal husbandry in the “Ulaanbaatar- Darhan –Selenge” region needs to be transformed and upgraded, involving farmland irrigation, chemical fertilizers, pesticides, animal husbandry technology, vegetable feed planting, etc. Chinese agricultural enterprises are far better than Mongolia regarding technical level, labor productivity, and mechanization. However, the regional characteristics of crop varieties and the adaptability of agricultural technology must be taken seriously. Due to the differences in rainfall, water resources, customs, and culture, there are many risks in agricultural and animal husbandry technical cooperation. Both countries should support and cooperate to increase renewable energy

and successfully implement the "One Billion Trees" campaign as part of the Mongolian government's "Recovery Policy" to mitigate climate change.

5. Prospects of agricultural technical cooperation and suggestions

5.1 Breeding technology, feed crop planting, and agricultural machinery

In Mongolia, most people belong to animal husbandry. The traditional grazing animal husbandry accounts for a considerable proportion, and the planting industry is not developed. However, successive governments have recently paid great attention to intensive agriculture and animal husbandry in Ulaanbaatar and its surrounding Aimags. A modern agricultural area of "Ulaanbaatar- Darhan -Selenge" has been constructed. The introduction of new breeding technologies, feed, agricultural and livestock production technology (including quality inspection and traceability), new methods, facilities, and machinery can promote agriculture and animal husbandry in Ulaanbaatar and its surrounding areas to move towards large-scale. At the same time, agricultural enterprises and agricultural scientific institutes analyzing the agricultural demand of Mongolia have carried out extensive and long-term cooperation in the fields of pesticide and chemical fertilizer production technology, farmland water conservancy construction, water-saving irrigation, crop sowing, field management, crop harvest and storage, and agricultural product processing and storage. Domestic agriculture enterprises lack good judgment and estimation on the capital operation in Mongolia. In addition, commercial banks face difficulties in providing vital support to enterprises in the short term, and overseas agricultural enterprises need a clear policy about finance and fund equity investment.

5.2 Docking of agricultural technical standards, measurement, health, and laws and regulations

Mongolian beef, mutton, potatoes, wheat, and other agricultural and livestock products are organic, high-quality, and pollution-free, which can meet the needs of China's high-end consumer groups. However, the international trade of agricultural and livestock products faces many problems in both countries. Technical policies and standard obstacles restrict the supply chain of agricultural and livestock products between China and Mongolia. The scientific research institutions, colleges, universities, and government should investigate, sort out, and analyze Mongolia's agricultural policies, technical standards, animal epidemic prevention, and measurement standards, and determine the differences and gaps. It is imperative to provide services for both sides' international trade of agricultural and livestock products. It can also develop agricultural equipment, water-saving irrigation facilities, and standardized breeding machinery for animal husbandry to meet local technical standards and local planting production needs. Relying on domestic fiscal and financial policies, it encourages agricultural enterprises and scientific research institutes to set foot in Mongolia's agricultural and animal husbandry industry and engages in local breeding, animal product processing, and technical services. And combine their technologies and ideas with Mongolia's comparative advantages to drive the development of Mongolia's agricultural industry and related technologies. The potential of organic green food in Mongolia can provide safe and stable agricultural and livestock products to Chinese end consumers. These measures guide local agricultural and livestock companies to explore new markets in Mongolia according to their local consumer.

5.3 Livestock and Crop Provenance Development

Provenance engineering guarantees the quality of animal and plant production and reproduction systems. It plays a vital role in realizing high-yield and high-quality agriculture and animal husbandry. Based on bilateral trade agreements, the government should adopt new policies such as tariff reduction and exemption, which would support the agricultural and animal husbandry science and technology departments and scientific research institutions on both sides to cooperate in exporting provenance resources for crop and animal husbandry to Mongolia and occupy the market through high quality, good services. On these bases, the cooperation will be upgraded, and more extensive bilateral and international multilateral cooperation in genetic engineering and improved seed breeding will be carried out.

5.4 Emergency response system for livestock diseases and natural disasters

In terms of joint early warning of natural disasters and joint epidemic prevention and control of livestock, the work started late in Mongolia. Hardware schemes that need to promote the connection of natural disasters and animal disease prevention and control systems between China and Mongolia, including transportation

infrastructure (railway, highway, and aviation), logistics, storage, distribution system, ports, and other schemes. Moreover, there is a lack of cooperative research on disasters and animal diseases between both countries. Government should create and support the opportunities to construct farms and animal products under "One Belt One Road". The policymakers should provide solutions to dredge the institutional barriers related to trade between China and Mongolia. Furthermore, the government should optimize the institutional environment of agricultural and livestock products between the two countries for trade. In addition, both governments should create policy and food safety standards and clarify the technical process of epidemic prevention and quarantine of agricultural and livestock products.

Funding

This research work was supported by the National Key Research and Development "Intergovernmental International Co-operation in Science and Technology: Key Project Sino- Mongolian Agriculture and Animal Husbandry Supply Chain Collaborative Research (Grant No.: 2021YFE0190200)

6. References

Baoyindureng, Qileger.Agricultural Industrial Agglomeration and Regional Differences in Mongolia Based on Spatial Economics [J] Inner Mongolia Social Sciences. 2017 (38) 01: 184-189

Zhang Xiujie.Mongolia's Foreign Economic and Trade Strategy and China Mongolia's Economic and Trade Cooperation. Heilongjiang Social Sciences [J]. 2006 (96) 3:132-136

MLASU.WURITAOKETAOHU.The dilemma and outlet of animal husbandry in Mongolia since the transition of the economic system Journal of Inner Mongolia Normal University Nov. 2015 Vol.44 No.6: 9-17

http://mn.mofcom.gov.cn/ Economic and Commercial Counselor's Office of the Chinese Embassy in Mongolia

Zhu Zidong, Li Qian. China's Participation in Multilateral South-South Cooperation in Agriculture Enter a New Stage of Development [J] World agriculture. 2014 (12): 4-7

Feng Yong, Yu Haomiao. Strategic Research on China's Agricultural South-South Cooperation in the New Era [J] World agriculture. 2017 (01): 194-197

Wang Qi, Yin Yanfei. Present Situation, Problems, and Suggestions of Investment and Finance for Agriculture. World Agriculture[J]. 2017 (5)

Zhang Xiujie. Mongolia's Economic Slowdown and New Ideas for China Mongolia's Economic and Trade Cooperation. Inner Mongolia Social Sciences [J]. 2015 (36) 2:191-196

Baoyindureng Hadabateer. Analysis of Production and Livelihood of Herdsmen in Mongolia. World agriculture[J]. 2014 (417) 1:95-99