

# Narrative Summary:

## The Deforestation and Depeasantization Under the Two Sides of Global Commodity Chain: A Case Study of China and Brazil Soybean Trade

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### Abstract:

In the study of the emerging national issues resulted from the global commodity chain, we launch our research from three theoretical stances: **The Global Commodity Chain**, **Deforestation**, and **Depeasantization**. With these three theoretical instructions, we will anchor our research on the discovery of how the international agricultural commodity trade related to the environmental issue and urbanization problem. In the 21st century, the emerging powers and trending of urbanization in the BRICS regions play an important role in the global agrarian-urban process. Therefore, we choose **the soybean trade between China and Brazil**, which are the two largest regions in the BRICS region, as our research case. In this case, we try to find out what are these two largest emerging countries' strategies of urbanization in the soybean importing and exporting trade and the two national problems they need to face in this global agrarian-urban process.

### Introduction:

The structure of the research is divided into three parts: (1) the theoretical stance of the research, (2) the emerging global soybean trade research, (3) and the country-based issue of urbanization research. In the global scale, we are going to give a general descriptive and quantitative analysis of the emerging international soybean trade. In the trend of transformation, what are the opportunities they face and the strategies they use when they are engaged into the global market. In the national scale, under the trend of increasement of importing and exporting, these two countries face unprecedented opportunities and challenges in the process on urbanization. In **Brazil**, with heavy investment of the global capital into the agricultural sector, a large amount of money flow into the construction of the national agricultural logistic system, which is helpful for the national urbanization. However, the booming expansion of soybean sourcing also creates serious problem of deforestation in this process. In **China**, the process of urbanization accelerated in these several decades. The upgrade of the dietary structure led to the increase consumption of the agricultural production. Meanwhile, the decline of the arable land due to the process of urbanization make the national food security become the main conflict of China. In this global soybean trade, China solve the national conflict by shifting the consumption out of the country. We want to use the research to reveal this agrarian-urban process.

## I. The global soybean trade research:

The process of urbanization in the developing countries with a large number of population or a large amount of natural resources may face different opportunities and problems. In the BRICKS region, there are two countries, Brazil and China, facing the rapid urbanization from the second half of 20<sup>th</sup> century. (1) In **Brazil**, with the rich natural resources, the national economy is heavily relied on the export of the agricultural commodities. In the development of the primary industry, Brazil attract a large amount of global investment into the agricultural sourcing and logistics system. The global capital play an important role in the surplus of agricultural commodities and the rapid urbanization. However, with the expansion of the sourcing areas, the problem of deforestation become one of the major challenges for the sustainable development. (2) In **China**, the urbanization rate raised from 20% in 1982 to almost 60% in 2018. With its large population base, there are almost 800 million people live in the urban area. The growing GDP and rising income level, the dietary upgrade from the grain-based to the meat or animal protein based largely increase the food consumption in a short term. With the limited area of arable land and the problem of depeasantization, the China become one of the large food importers. (3) With the formation of the global market, the **Brazil-China soybean trade** become one of the catalyzers to accelerate the process of urbanization in the BRICKS region. However, there are some emerging problems should be fixed to pursue a sustainably global supply chain. (4) The live **price of soybean in CME** (Chicago Mercantile Exchange) makes great impact for Chinese companies' ability and strategy to purchase soybean from other countries. Unlike depeasantization or deforestation process, the price changes without discussion or warning and cause great influence of the soybean business globally. (5) **The trade war** between America and China has been the major push for soybean price and market. As the major buyer of American soybean, China did not purchase any soybean in December of 2018 because of the US trading policy and international price. In addition, the trade war has forced China to find another soybean source to feed the billion which has generated quantities of oversea cooperation and infrastructure construction. (6) The Internet, block chain and cargo ship **technology innovation** has fundamentally reduced the cost of oversea shipment, especially for the raw materials and crops, which leads to more ocean transportation and investment.

## II. The Opportunity and Conflict in Brazil:

Zooming into the Brazil, the global soybean supply chain starts in Brazil through four different sectors: **Sourcing** (Producers), **Storage** (Warehouse), **Export Port** (Port Operator), and the **Distribution** (Transport Company). In the strategies of national economy development, Brazil choose the idea of Agrarianists, a social philosophy or political philosophy which value rural society as superior to urban society, and prioritize the development of agricultural industries. In order to achieve this accomplishment, the government attract a large amount of investment for the domestic logistics system.

### Sourcing:

Brazil is the world's largest soybean producer since 2018. With the introduction of genetically modified (GM) crop technology in the early 2000s, the production rates of soybean increase multiple times. From 1970 to 2016, the average **productivity rates** have almost tripled from 1.1 tons per hectare to 2.9 tons per hectare. Comparatively, during the same period, the **area cultivated** in this country for soybean grew 24 times from 1.3 million hectare in 1970 to more than 33 million hectares in 2016. From the sourcing map, there are four regions which are producing 68% of the soybean. They are mainly located at the center west and the south part of Brazil.

The soy trade in Brazil has long been dominated by just a handful of major traders. In 2016, the **largest six exporters** traded almost 60% of soybean. Major private infrastructure investments underpin the strong connections of many traders to distinct regions of production. With different levels of vertical integration, they each operate a network of soy related facilities that help mark out their different sourcing regions across Brazil. These include not only silos and warehouses that enable traders to respond rapidly to demand signals, but also large crushing facilities, railroads and port terminals. In recent years, the Chinese food giant **COFCO** has grown rapidly to come alongside these major traders in terms of scale and influence.

### **Logistic:**

With the consideration of the transportation cost, more than half of the soybean produced in Brazil is exported through three largest ports. They are all located at the south-east region, which are the traditional seaport cities with a lot of investment in the infrastructure. In the agricultural industry, **financial actors** are playing an increasingly active and direct role in the manufacturing, storage and distribution of the food. Many major soybean traders build a strong and long-standing relationship with their sourcing regions through the investments in the infrastructure, which taken together with their trading relationships and commercial strategies. The connection between the traders and sourcing regions highlight the key role these companies can play in shaping local development trajectories and distribution infrastructure.

There are 6 largest ports are used to export soybean. 2 of them are take charge of most of the soybean sourced from the center-west region and south region. They are **Santos** and **Paranagua**. In Brazil, soybean in granular form handled as bulk cargo, which is generally transported in large volumes and shipped via **highway, railway, and waterway**. Different with the United States, most of the soybean are transported through highway for the domestic shipping.

In Brazil, due to high flexibility, frequency and speed, **trucking** is advantageous for short-distance transportation of soybean. The disposability of trucks in even distant rural areas and its flexibility with respect to route planning and loading or unloading stations is particularly important for the Brazilian agribusiness as the major soybean production regions are distant to the coastal ports without necessarily having direct access to waterways or railways. Inferentially, road transportation is obligatory for transporting soybeans from farm to warehouse and point of transshipment. Even though highway condition is pretty bad and operation costs are relatively high, the domestic soybean transportation is heavily relied on the roadway.

Approximately, 50% of the **railway** network is concentrated in the south and southeast of Brazil, where agricultural production is strong. However, due to the gauge system (distance between two rail) varies by region, creating difficulties in integrating the system, soybean only cover 5% of the total cargo transported on Brazil's railway.

The country has a **waterway** system of 44,000 km and 29,000 km of navigable rivers, of which only 13,000 km (45%) are used for commercial navigation. Soybean are the second largest commodity with 17% of the total cargo transported (4.24 mmt). For the soybean transportation, The **PARANÁ-TIETÊ shipping corridor** is the most developed waterway of the country in terms of infrastructure and equipment. Beside that, no inland waterway could connect the remote soybean production areas with economic centers. The inter-modality including trucking is necessary to ship soybeans to the seaport.

## Storage:

Soybeans are stored in **silos** or **flat storage systems**. Elevators realize the transport between tipping gutter of the transshipment station, where the truck is loaded and unloaded, and storehouse. In Brazil, the **on-farm storage** is not very common yet, only 14% of rural producers have warehouse located on their farms. The **off-farm storage** infrastructure is the major part of the producers depends on. With the principal share of off-farm warehouses being situated in **urban areas (44 %)**, traffic volume of trucks is locally immense during harvest. 36 % of the warehouse capacities are located in rural areas whereas the Brazilian **ports** account for 6% of the total storage capacities.

In general, international recommendations suggest a warehousing capacity of at least 1.2 times of the average production volume. However, the Brazilian warehousing capacities for soybean did not keep pace with the rapid growth of the agricultural production. The country currently suffers **a shortage of storage** capacities for agricultural bulk goods. (around 0.87 time of the average production volume)

## COFCO:

COFCO was the 5th largest exporter of soy from Brazil in 2017, accounting for 5.4 million tons. This is a 14% increase vs the previous year. As an exporter, Cofco sources from 183 municipalities, or 8% of the soy production municipalities. The main destination of the soy exported by Cofco is China, accounting for 78% of the total.

COFCO is the most prominent of the new entrants into the Brazilian market. It distributes a large amount of investment in the Latin-America through COFCO International. As China's largest food and agriculture company, it only entered the Brazilian soy export market in 2014 having acquired two fast-growing exporters, the Singaporean-listed Noble and Dutch based Nidera. According to self-disclosures and official records, its assets include **2 crushing facilities** (approx. 5,200 ton/day), **25 silos** and **2 port terminals**.

## Deforestation:

In the study from the article called "Cropland expansion changes deforestation dynamics in the southern Brazilian Amazon", Morton discover that **Area deforested for cropland and mean annual soybean price** in the year of forest clearing were directly correlated ( $R^2 = 0.72$ ), suggesting that deforestation rates could return to higher levels seen in 2003–2004 with a rebound of crop prices in international markets.

In Brazil, different with the traditional soy sourcing regions, companies sourcing soy from Matopiba, where is the frontiers of the soy expansion, are exposed to the highest deforestation risk. With the **public sector support, new export routes**, and **lower levels of environmental regulation**, Matopiba become the most attractive sourcing region for the new entrants. This region has an **advantageous** position from which to **export to Asia** - the port is 4,000 km closer to the Panama Canal than Brazil's main soy exporting port of Santos - many of the traders most closely associated with the Chinese market are also operating here. But links to Matopiba also mean increased deforestation risk. During the last decade more than **37% of soy expansion** in the Matopiba region was due to direct conversion of Cerrado vegetation. Accordingly, companies with a strong presence in Matopiba have some of the highest relative deforestation rates – in terms of hectare of land cleared of native vegetation per ton of exports – in the country.

Sourcing patterns of trading companies determine exposure to deforestation risk. The top six soy traders – Bunge, Cargill, ADM, Louis Dreyfus, Amaggi and COFCO – make up **58% of total Brazilian soy exports** and were exposed to **68% of deforestation risk** due to soy between 2006 and 2016. **Total deforestation risk** is measured in hectares and estimates a companies' exposure to the risk that the soy it is trading is associated with deforestation in its sourcing regions, with amounts of deforestation risk being allocated to different traders in proportion to volumes sourced from each location.

Deforestation risk exposure associated with soy exports does not end with the **traders** operating in Brazil. **Buyers** like consumer goods companies and big retailers that sell thousands of products that contain soy are also exposed to deforestation risk through their supply chains.

### III. The Opportunity and Conflict in China:

Looking into China, as Brazil's biggest oversea soybean market, China alone has responsible for 85% of all Brazil soybean export. The soybean system in China can be concluded as 5 different parts: **Sourcing** (Producers), **Storage** (Warehouse), **import Port** (Port Operator), **Distribution** (Transport Company), and the **Processing (Soybean compression and Processing)**. As China is developing really fast, and it used to be an agricultural country for over 90% population was agrarian, the transformation of Chinese society has led the shocking immigration that farmers abandoned their farm and move to cities. For the past two decades, the urban population has increased from 5% of overall population to 55%, and over 325 million people had moved from countryside to cities. In terms of the reason for this depeasantization process, for one thing, living in cities means better salary and better living quality, on the other hand, it has become increasingly difficult for individual farmers to rely on their farmland. Due to the rough geography and limited farmland, mechanized farming is not an option for Chinese farmers. The uneven development and salary between city and suburban has contributed to the Depeasantization as well for luring most farmers to leave their land.

#### Depeasantization:

In the article *"Simulation of Urban Expansion and Farmland Loss in China by Integrating Cellular Automata and Random Forest."* Researcher from China has revealed that China has encountered serious land loss problems along with urban expansion due to rapid urbanization. Their study proves that the primary factor of farmland loss in China is rapid urbanization from 2000, and is expected to slow down gradually and will stabilize from 2010 to 2030.

Rapid urbanization in China was at the expense of tremendous amount of farmland, which accounts for most of the farmland loss in China, and is threatening the national food security as well. China has been experiencing unprecedented urban expansion since its "reform and opening up" starting from the late 1970s, the urban area in China has increased about four-fold. The massive agricultural land loss in short "depeasantization" has reduced agricultural land by **34%** in some major cities of the Beijing-Tianjin-Hebei region in China from 1990 – 2000. Approximately 24 of agricultural land was converted to urban land in Changzhou, Jiangsu Province. The depeasantization process is not a Chinese character but a global issue. As in his *Age of Extremes*, Eric Hobsbawm declared that 'For 80 percent of humanity, the Middle Ages ended suddenly in the 1950s ...'. He was referring to peasants: 'the most dramatic change of the second half of this century, and the one which cuts us forever from the world of the past, is the death of the peasantry'.

Depeasantization risk exposure associated with soy trade does not just about reducing farmland, but also about the shrinking farmer population. Over 325 million of rural population (which is equal to American population) has moved into cities in China looking for better salaries and livings. There is even a particular word for these people – “Farmer workers”, which indicates those used to be farmers and now working in the construction site. However, the food security issue is highly relevant to the depeasantization, the soybean story is just a small piece of the story. Although China is importing soybean from other countries, crops like wheat, corn are for Chinese market comes from Chinese farmland, since these are the basic and fundamental food supply of the country, and the food security cannot take any risk. Since soybean and its processed product account for livestock feed and meat consumption, which is an upgrade of living condition, the soybean is allowed to be imported according to the nation’s food strategy. The state-owned companies like COFCO has been the big producer of wheat, corn for the country within the country, and together with other state-owned crop companies, they secured the nation’s food security with oversea investment, infrastructure construction and domestic planting.

Unlike Brazil, the patterns of trading companies determine exposure to depeasantization risk, the depeasantization process in China is executive by millions of individuals, and it is the inevitable as the result of rapid development. As the country has realized the looming food crisis as well as environment issues, the depeasantization speed has slowed down, but as the depeasantization has already made great impact to the nation’s food system, the future of Chinese soybean market is still uncertain.

#### **COFCO:**

COFCO was the 2nd largest soybean processor in the world in 2018, and is one of the major nation-owned crop company of China focusing both on domestic planting as well as foreign investment and crop import.

As one of the oligarch food companies in Chinese market, COFCO distributes a large amount of investment inside China in sourcing, processing, logistics system and market. Domestically, COFCO’s priority is to make sure the market stability by controlling the fundamental crop like wheat or corn. Also, as China is developing rapidly, the need for meat consumption has created the need for soybean, the livestock feed material. Together with companies like China Merchants group who just bought the second largest port in Brazil, COFCO had reached out to find new soybean hinterland for China to feed the billion population, with a powerful nation as backup and a well-developed soybean trade system and billions of investment.

#### **Sourcing:**

Soybeans originated in China thousands of years ago as a major producer and consumer of soy products. Today, soy still serves as a major source of protein, including products such as tofu, soymilk and soy sauce. While domestic soy production is in continuous decline, China today maintains its position as the leading importer and consumer of soybeans, importing 83million tons in 2016 alone. Among all major crops, soy is the most affordable source of protein, thus it plays a pivotal role to ensure a steady supply for food security in the coming decades. However, as the invention of genetically modified crop technology in the early 2000s, and the development of ocean transportation and more efficient Internet trading system, the domestic soybean in China has become less competitive to the

foreign soybean. For instance, as the major soybean production districts in China, “Dongbei” (Heilong Jiang province, Jilin Province, Liaoning Province) the three provinces that locate in the northeast have taken over 40% of all production, and the production ability is 120kg per acre, which is far behind international average production ability, 200kg per acre. Comparatively, the price of international soybean is 3,300RMB/ton, and Dongbei soybean price is 3,500RMB/ton, and used to be 4,500RMB/ton before 2015.

In general the local soybean in China only owns 14% market share, and over 86% soybean comes from America or Brazil. The soybean is critical to Chinese economy development, and the state-owned companies like COFCO are responsible for all the soybean market. In 2018, the overall soybean importation is 68.8 million tons, and Yihai Company had taken 15.26 million tons and COFCO had ranked the second, taken 10.8 million tons.

#### **Logistic:**

The logistics system is critical to soybean market, and in China over 86% of all domestic soybean transportation relies on highway, and for crop companies like COFCO, the reform of the large trade system and the construction of three major platforms of “procurement, logistics, and sales” achieved initial success in combination with the nation’s well-developed highway system and reduced the cost of inland soybean trade. In 2017, the total profit of COFCO Trading reached RMB 1.4 billion. The amount of logistics transfer was 30.46 million tons, a y-o-y increase of 7.56 million tons. COFCO Trading’s market-based trade volume and capabilities have significantly surpassed its history.

#### **Storage:**

Chinese domestic Soybean storage is congested along the sea ports like Pearl Delta and Shandong, and major transportation lines like the railway line from Shanghai to the western part of the country and the water shipping line along the Yangtze river. As most soybean is from ocean shipping, the storage system and transportation system has become increasingly important for soybean distribution and market stability. COFCO along has taken over 10% of Chinese inland soybean storage ability. Another company that is worth mention about soybean storage is Sinograin Grains & Oils Co. Ltd, as one of the largest state-owned enterprises in China involved in the complete supply chains of soybean from trade, production and processing, and mainly focus on crop storage and together with COFCO, they formed a stable soybean storage and transport system to better protect the national food security.

#### **Processing:**

Soybean is a crucial resource of agricultural products. Soybean processing segment connects soybean planting and food industry, which is an important link in the soybean industry chain. In the recent 20 years, the import of soybean to China has been increasing continuously and China has become the largest soybean processing country in the world as well.

However, the layout of China's soybean processing plants and the soybean products consumption areas are inconsistent. In the past 20 years, it has formed a belt-like pattern which takes the coastal port cities as core and takes the Yangtze River and railway as a diffusion path. Raw material supply, transportation cost, the size and potential of soybean meal market, agglomeration, and policy are important factors which affect the spatial pattern of soybean processing plants.

The growth in China's soy crushing industry matches growth in China's feed industry. The crushing industry has an annual increase of 13-15% each year. The total annual processing volume increased from 10 million tons per year at 64,000 tons per day to 90 million tons per year at 300,000 tons per day. By 2012, the total volume per year reached 139 million tons. In 2014, the total volume reached 145 million tons. While the annual crushing capacity in China continues to grow, facilities tend to run at half the capacity.

Wilmar Kerry has been operating in China since 1994 as the Chinese company affiliate of Wilmar International and is the leading soy importer and crusher in the Chinese market. Wilmar operates a joint venture with the multinational company ADM, who has a 22% share of Wilmar, in their soy business in China. Wilmar/ADM operate 36 soy crushing facilities across China for feed and oilseeds. As a major soy trader, Wilmar/ADM crushes its own soy imports, but also buys soy from other traders to process and crush in their own facilities. Wilmar products include soybean oil, soybean meal, soy lecithin, and soy protein concentrate. In comparison, COFCO owns 13 crushing facilities across China including Tianjin and Guangdong Province.