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CHINA-BRAZIL AGRICULTURAL TRADE RESEARCH

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1 INTRODUCTION

Since the beginning of the XXI century, the trade relationship between China and Brazil has developed rapidly with an average annual growth rate of 30% in trade value. Brazil is China's largest trading partner in Latin America, while China has become Brazil's largest trading partner in the world for 11 consecutive years.

Possessing rich resources, Brazil is a major exporter of agricultural products and one of the most important food supplier countries in the world. Its exports of soybeans, corn, coffee, citrus, cattle, pigs and poultry rank among the top. With a huge market of 1.4 billion consumers, China has become the world's largest importer of agricultural products. The diversification of consumption and demand of high quality goods stimulate rapid expansion of agricultural trade scale between China and Brazil. The value of agricultural products accounts for more than one-fifth in bilateral trade. There is also a strong demand for bilateral cooperation in agricultural industry chain.

Authorities of China and Brazil are working together to ensure the stability and sustainable development of bilateral trade. For instance, the signing of Authorized Economic Operator (AEO) mutual recognition and Memorandum of Understanding on E-Commerce Cooperation have promoted greatly the facilitation of bilateral agricultural trade. As think tanks, Caitec and Ipea are also committed to exploring a better way for China-Brazil agricultural trade and cooperation.

The covid-19 has caused unprecedented damage to the global economy and world trade. But at the same time, innovation, development of science and technology and close cooperation among countries still make our future hopeful. In the research, we took in consideration the influence of the world's latest changes and made a comprehensive analysis of the current situation and future of bilateral agricultural trade.

This report includes 5 sections following this introduction. Section 2 depicts the current situation of bilateral trade, including a detailed analysis of main trade products, sensitive products for Free Trade Agreement (FTA), comparative advantages and tariffs. Section 3 introduces laws, regulations, administrations and non-tariff measures of the two countries related to the agricultural trade. Section 4 analyzes possible opportunities and challenges for bilateral trade based on the latest world situation. Section 5 discusses the potential areas of agricultural cooperation between China and Brazil. Section 6 provides suggestions for the development of bilateral trade relationship.

2 AGRICULTURAL TRADE BETWEEN CHINA AND BRAZIL

2.1 China's agricultural trade with Brazil

2.1.1 China's main export products to Brazil

China is the main destination for Brazilian exports, source of imports and source of Brazilian trade surpluses. The import and export of agricultural products occupies an important place in the trade between China and Brazil.

Compared to Brazil, the scale of China's agricultural exports to Brazil were limited. According to Comtrade statistics, Brazilian agricultural exports to China in 2019 were $ 27.11 billion, representing 42.8% of Brazil's total exports to China. Although China is one of the world's main agricultural exporters, China's agricultural exports to Brazil are relatively small. In 2018, the trade volume of Chinese agricultural exports to Brazil was 420 million dollars, which represented only 1.2% of total exports to Brazil, accounted for 0.5% of China's total agricultural exports of that year.

The variety of agricultural products exports from China to Brazil are also limited, mainly concentrated in aquatic products, vegetables, livestock products, food and feed waste, fruit and vegetable preparations, other edible preparations, glues and resins. The above products accounted for about 92% of China's agricultural exports to Brazil in 2018. Specifically, from 2014 to 2018, the top 5 China's agricultural exports to Brazil were: Fish fillets and other fish meat (HS0304, approximately 11.7%-26.1%); guts, bladders and stomachs of animals (HS0504, approximately 8.7%-14.6%); fish, dried, salted or in brine, smoked fish(HS0305, approximately 6.9%-11.3%); dried vegetables (HS0712, approximately 4.7%-7.8%) and vegetables provisionally preserved (HS0711, approximately 1.7%-4.8%) (table 1).

In terms of China's worldwide exports of these 10 categories, the share of exports to Brazil is small. In 2018, except fish, dried, salted or in brine, smoked fish (HS0305) and Vegetables provisionally preserved (HS0711), all other products accounted for less than 5% of exports to Brazil, and four of them accounted for less than 1%. In terms of Brazil's worldwide imports of these 10 categories, except guts, bladders and stomachs of animals (HS0504) and dried vegetables (0712), the proportion of other products imported from China was less than 50%, and the proportion of 6 types of products imported from China was less than 30%, two types of less than 10% (table 2).

TABLE 1
China's major agricultural exports to Brazil (2014-2018)
(In US$ 1 million)

HS code	Commodity	2018		2017		2016		2015		2014	
		Trade value	%	Trade value	%	Trade value	%	Trade value	%	Trade value	%
0504	Guts, bladders and stomachs of animals	61.4	14.6	66.7	12.1	56.2	8.7	59.3	10.4	63.5	9.9
0304	Fish fillets and other fish meat	55.4	13.2	88.2	15.9	75.2	11.7	110.8	19.4	167.4	26.1
0305	Fish, dried, salted or in brine, smoked fish	45.1	10.7	62.5	11.3	44.2	6.9	47.9	8.4	71.4	11.1
0711	Vegetables provisionally preserved	20.2	4.8	18.2	3.3	10.9	1.7	13.7	2.4	16.7	2.6
0712	Dried vegetables	19.7	4.7	39.5	7.1	45.6	7.1	44.5	7.8	33.3	5.2
2008	Fruit, nuts and other edible parts of plants	17.7	4.2	18.7	3.4	11.0	1.7	13.5	2.4	12.4	1.9
0307	Molluscs	16.0	3.8	19.7	3.6	12.6	2.0	7.6	1.3	13.9	2.2
1302	Vegetable saps and extracts	12.7	3.0	14.2	2.6	10.7	1.7	13.6	2.4	10.3	1.6
0703	Onions, shallots, garlic, leeks and other alliaceous vegetables	48.8	0.0	103.2	18.7	171.7	26.7	120.2	21.0	87.0	13.5
2309	Preparations of a kind used in animal feeding	47.2	0.0	32.5	5.9	29.1	4.5	28.8	5.0	36.8	5.7

Source: Comtrade. Available at: <https://bit.ly/3w1vkVP>.
Obs.: 1. The 2012 customs commodity code is adopted.
2. % refers to: export value of the product from China to Brazil/export value of total agricultural products from China to Brazil.

TABLE 2
The proportion of imports and exports of ten types of agricultural products in 2018

HS code	Commodity	%[1]	%[2]
0504	Guts, bladders and stomachs of animals	4.5	60.6
0304	Fish fillets and other fish meat	1.2	19.8
0703	Onions, shallots, garlic, leeks and other alliaceous vegetables	2.5	24.4
2309	Preparations of a kind used in animal feeding	2.2	21.7
0305	Fish, dried, salted or in brine, smoked fish	9.2	29.5
0711	Vegetables provisionally preserved	11.7	47.2
0712	Dried vegetables	0.5	60.2
2008	Fruit, nuts and other edible parts of plants	0.6	3.6
0307	Molluscs	0.5	46.8
1302	Vegetable saps and extracts	0.8	7.7

Source: Comtrade. Available at: <https://bit.ly/3w1vkVP>.
Notes: [1] The 2012 customs commodity code is adopted.
[2] %1 refers to: export value of the product from China to Brazil/export value of the product from China to world; %2 refers to: Brazil's import value of the product from China/Brazil's import value of the product from world.

2.1.2 Possible sensitive products in future FTA

Similar to Brazil, Australia and Chile are also important agricultural products exporters in the world. China has signed Free Trade Agreement (FTA) with these two countries. The updated China-Chile FTA, represented the highest level of openness for China in trade. In terms of regulations on agricultural products, China-Australia FTA and China-Chile FTA have reference value for the future FTA between China and Brazil.

In the China-Australia FTA, the staging categories apply to the elimination of customs duties by China are five: A, B, C, Country Tariff Quota and D. Category D means the highest sensitivity level, indicating that the base rate of duty shall apply for products of Australian origin. In the China-Chile FTA, the staging categories apply to the elimination of customs duties by China are also five: Year 1, Year 2, Year 5, Year 10 and EXCL. EXCL is the highest sensitivity level, products belong to which are not subject to tariff elimination. According to the analysis of the D products in the China-Australia FTA and the EXCL products in the China-Chile FTA, China's main sensitive agricultural products in terms of import tariff concessions are cereals (HS10); milling industry products (HS11); oil seeds and oleaginous fruits (HS12); animal or vegetable fats and oils and their cleavage products (HS15); sugar and sugar confectionery (HS17); tobacco and manufactured tobacco substitutes (HS24) and cotton (HS52) (table A.1).

As soybeans and cotton occupy an important position in Brazil's exports to China, these two commodities may be focused on in the negotiations of the free trade agreement. According to data from Comtrade in 2019, the top five commodities with the highest proportion of Brazilian agricultural exports to China are soya beans (HS1201, accounting for 75.4%); meat of bovine animals, frozen (HS0202, 9.9%); meat and edible offal of poultry (HS0207, 4.6%); cotton (HS5201, 3.0%); meat of swine, fresh, chilled or frozen (HS0203, 2.3%). Soybeans and cotton are both classified as the most sensitive products in China's signed free trade agreements, therefore, both of them may become the focus of future negotiations between the two countries.

In addition, sucrose and tobacco, which account for a small proportion of Brazil's exports to China, may also attract attention. The export of Brazilian agricultural products to China mainly concentrates in the top five categories of commodities mentioned above. It also includes cane or beet sugar and chemically pure sucrose (HS1701, accounting for 1.4%); tobacco, unmanufactured, tobacco refuse (HS2401, 1.4%); soya-bean oil and its fractions (HS1507, 0.5%); glycerol, crude, glycerol waters and glycerol lyes (HS1520, 0.2%); ground nut oil and its fractions (HS1508, 0.2%); vegetable waxes (HS1521, 0.1%), which are also classified as the most sensitive products in the FTAs China has signed. They may become sensitive products in the future China-Brazil FTA.

2.1.3 China's comparative advantage

From the traditional perspective of agricultural resource, China is in a disadvantaged position compared with Brazil and other major agricultural exporters in the world. China's per capita arable land and water resources are lower than the world average, and the cost of agricultural labor has also been on the rise in recent years. However, China has advantages in terms of market demand, agricultural technology, cross-border e-commerce, financial support and international enterprises around agricultural trade and agricultural production factors.

Market demand

China's domestic consumer market is huge and the consumer demand is diversified. With a population of more than 1.4 billion, China corresponds to the world's largest consumer market for agricultural products. China has a large demand for grain, and the soybean production and demand gap will continue in the medium and long term. In recent years, with the continuous improvement of Chinese people's income level, residents' consumption concept and diet consumption structure have changed significantly. Quality consumption era is accelerating in China, people pay more attention on food quality. China has more than 400 million people in the middle-income group, they pursue the quality and individualization of consumption. Cherries from Chile, white shrimp from Ecuador and avocado from Mexico have become common foods on their table. In the future, as the middle-income group continues to grow, the demand for high-quality, diversified agricultural products in China will continue to increase.

Agricultural technology

China applies modern technology to help transform and upgrade agricultural production methods. China has a large population and limited land, a shortage of agricultural resources, frequent natural disasters, and insufficient natural conditions for agricultural development. One of the important reasons why China's grain production has been able to increase year after year is that it relies on agricultural technological innovation. China's scientific and technological achievements such as avian influenza vaccine, anti-insect cottons, dwarf male sterile wheat, super rice, and "Double Low" (low erucic acid and low glusosiolate) rape are currently leading the world. The technology of information, biology,

manufacturing, new material and new energy have widely penetrated into various fields of agricultural production. The latest data show that the contribution rate of agricultural science and technology in China has reached 59.2%, the comprehensive mechanization rate of crops has exceeded 70%.[1]

In Huaxian (Henan Province), known as First County of Wheat in China, farmers can click on the "Wheat Services" menu to buy farming, watering, drugging, machine collection and other services with the "Farm Housekeeper" APP on their mobile phones. Farmers also use drones to spread pesticides, which not only increases the operating efficiency by 40 times, but also saves water by 70% and reduces pesticide use by 20%.[2] In the future, cutting-edge technologies such as key gene, new agricultural materials and intelligent acquisition of agricultural information will also be key areas of Chinese agricultural technology research.

Cross-border e-commerce

China's cross-border e-commerce leads the innovative development of foreign trade. Up to now, China has signed e-commerce cooperation memorandums and established a bilateral e-commerce cooperation mechanism with more than 20 countries including Brazil.[3] Silk Road E-commerce has become a new bright spot for China to develop agricultural products trade with these countries. In Latin America, Alibaba has signed a memorandum of understanding with governments of Brazil, Mexico and Ecuador to promote e-commerce in the Latin American and help small and medium-sized enterprises and young people participate in the cross-border e-commerce trade. AliExpress under Alibaba has become the number one cross-border new retail platform in Brazil, Peru and Chile.

At the same time, China is vigorously developing cross-border cold chain logistics. Logistics companies such as SF Express have launched a global layout of overseas warehouse networks since 2014, which can provide cold chain logistics. In the future, with the combination of cloud computing, big data and other technologies in the field of logistics and transportation, the timeliness and traceability of international cargo transportation will be further improved. The problems of long transportation time and high cost in trade between China and Brazil are expected to be addressed effectively.

Financial support

Chinese financial institutions strongly support the agricultural cooperation between China and Brazil. China Development Bank and Export-Import Bank of China have respectively established the China Latin American Industrial Cooperation Investment Fund (Claifund) and the China-LAC Cooperation Fund, which can provide financial support for cooperation between China and Brazil. The first phase scale of Claifund is US$ 10 billion. The total scale of China--LAC Cooperation Fund is US$ 10 billion, with a first phase scale of US$ 1 billion (Wang, 2019). Agriculture is the key investment area of the two funds. In 2017, the Brazil-China Fund was officially launched, with a total investment of US$ 20 billion and China's investment of US$ 15 billion. The fund is expected to help finance the construction of railroads to link Brazilian soy and corn producing areas to ports.[4] In addition, Bank of China, the Export-Import Bank of China, Agricultural Bank of China and China Minsheng Bank also joined the trade finance facilitation project of Inter-American Development Bank. Under the auspices of the Inter-American Development Bank, the financing and guarantee of export and engineering projects in Latin America and the Caribbean, particularly in Brazil, Ecuador, Nicaragua, Peru, Colombia and Costa Rica, could be addressed.[5] The rapid development of financial cooperation between China and Latin American countries provides a strong support for agricultural investment and trade.

Overseas companies

Chinese grain and oil companies have intensively expanded their business in Brazil. COFCO is a leading supplier of agro-products in Chinese market with global distribution, fully-integrated value chain, and agricultural innovations. Brazil is the country where COFCO has the most extensive and deepest operations in Latin America. As of 2018, COFCO has invested more than US$ 1.9 billion in Brazil, with 19 logistics and warehousing facilities and 7 processing plants.[6] By building grain channels between China and other agricultural "superpowers" like Brazil, COFCO has gradually established its own international supply chain system, which makes it easier for Latin American food to reach Chinese tables. ChongQing Grain Group has established a subsidiary in Bahia State, Brazil. In addition to building a soybean planting base of 3 million acres, it also plans to invest more than US$ 290 million to build warehousing and

1. Available at: <https://bit.ly/33CUMFp>.
2. Available at: <https://bit.ly/33IcvLG>.
3. Available at: <https://bit.ly/3s7vwAq>.
4. Available at: <https://yhoo.it/3vajbgL>.
5. Available at: <https://bit.ly/3s8zmcM>.
6. Available at: <https://bit.ly/33BYajF>.

port logistics systems; more than US$ 150 million to build soybean processing and food industrial parks, establish agricultural loans and investment companies.[7] Beidahuang Group, also an important Chinese grain and oil company, has established its branch in Brazil. The vigorous development of these companies in Brazil will lay a solid foundation for the further bilateral cooperation in trade and agricultural industry chain.

2.2 Brazilian agricultural trade with China

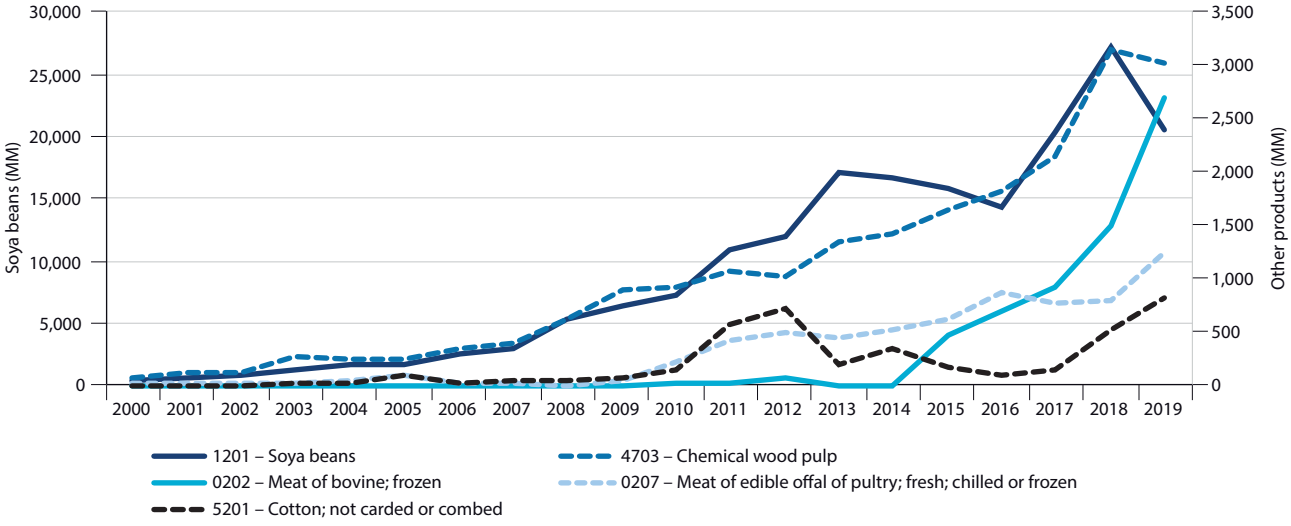
2.2.1 Brazil's main export products to China

We use the 2012 version of the harmonized system commodity nomenclature and to avoid disturbances, most of data refers to the average of 2016-2018. Bilateral flows may differ depending on the reporter. For this reason, Brazilian exports to China may be, and normally are, different from Chinese imports from Brazil. For sake of simplicity, we use Brazilian exports to China, the basis for analysis.

Brazilian exports of agribusiness goods to China increased many fold in the last twenty years. From 2001 to 2019, the average yearly rate of growth of Brazilian agribusiness exports to China is 16.1%. In absolute values, the most relevant growth in the same period was soya beans, whose value increased from US$ 337 million to US$ 20,452 million, after reaching US$ 27,233 million in 2018, or 68% of total agro-exports. But in relative terms, other goods have reached a more astonishing performance. For example, exports of meat of bovine animals, which were near zero until 2014, jumped from US$ 461 million in 2015 to US$ 2,685 million in 2019 (figure 1).

As already noticed, China is the main destination of Brazilian exports of agricultural products and Brazil is the most important supplier to the Chinese Market. As of the average of 2016-2018, imports from Brazil represented around 19% of total Chinese imports of these goods as can be seen in table 3. Brazil, in this period, has been responsible for 58% of total Chinese imports of soya beans, and more than 20% in other goods, like wood pulp, meat of bovine animals, and more than 10% in fish. In second place comes USA, with 16.3% and in a distant third place, Canada, with only 5.6%. Brazil is the biggest exporter to China in soya beans, chemical wood pulp, meat of bovine animals, meat of poultry and cane of sugar among the 50 most important goods. Brazil is the second one in edible offal of animals and tobacco, and the third one in meat of swine. Of course, being an average of 3 years, this list is constantly modified.

FIGURE 1
Brazil: exports of agricultural goods to China – selected products (2000-2019)
(In US$ 1 million)



Source: Comtrade. Available at: <https://bit.ly/3w1vkVP>.
Authors' elaboration.

On the other hand, Brazilian exports (tables 4 and 5) of agribusiness goods amount to US$ 84.9 billion and the Chinese Market accounts for US$ 28.7 billion or 33.9%. In second place comes Argentina, with US$ 26.5 billion and USA comes in a distant third place, with only US$ 4.5 billion. The share of Brazilian exports to China reaches 79% in the case of Soya Beans, 38% in chemical wood pulp and 47% in meat of bovine animals, frozen. But, on the other hand, it must also be noticed that in many other agribusiness goods, Brazilian share is very small or even near zero.

7. Available at: <https://bit.ly/35jQaEI>.

Tables 4 and 5 display different sets of commodities and present the exported value of Brazil to China and to the world. Table 4 lists the commodities where China is considered the main trade partner of Brazilian exports, as table 5 shows the previous amounts for the commodities where China is considered the second or third main partner.

TABLE 3
China's imports of agricultural products by product (HS4-2012) and partners – Brazil first partner (2016-2018)
(In US$ 1 million)

Code	Products	World	Brazil	Brazilian exports (%)	P1	P2	P3
1201	Soya beans	37,252.10	21,770.30	58.4	Brazil	USA	Argentina
					21,770.30	11,588.70	2,178.00
4703	Chemical wood pulp	12,300.60	3,162.80	25.7	Brazil	Canada	Chile
					3,162.80	1,995.50	1,544.80
0202	Meat of bovine animals; frozen	5,231.50	1,920.40	36.7	Brazil	USA	Australia
					1,920.40	695.7	675.2
0207	Meat and edible offal of poultry; fresh, chilled or frozen	2,604.10	1,351.40	51.9	Brazil	USA	China
					1,351.40	442.5	371.4
1701	Cane or beet sugar	1,197.00	432.4	36.1	Brazil	Cuba	Rep. of Korea
					432.4	179.7	145.4
0305	Fish, dried, salted or in brine; smoked fish, flours, meals and pellets of fish	528.2	76.8	14.5	Brazil	Uganda	India
					76.8	58.1	49.8
1507	Soya-bean oil and its fractions	506.9	216.8	42.8	Brazil	Russian Federation	Ukraine
					216.8	105.7	56.2
Total		**158,922.30**	**30,857.20**	**19.4**	**Brazil**	**USA**	**Canada**
					30,857.20	**25,951.20**	**8,950.10**

Source: Comtrade. Available at: <https://bit.ly/3w1vkVP>.
Authors' elaboration.

TABLE 4
Brazil's exports of agribusiness product by product (HS4-2012) and key partners – China as main partner (2016-2018)
(In US$ 1 million)

Code	Products description	World	China	China's imports (%)	P1	P2	P3
1201	Soya beans	26,080.0	20,679.6	79.3	China	Spain	Netherlands
					20,679.6	698.6	565.0
4703	Chemical wood pulp	6,364.6	2,406.4	37.8	China	USA	Netherlands
					2,390.8	969.4	776.5
0202	Meat of bovine animals; frozen	4,177.3	1,972.2	47.2	China	China; Hong Kong, China	Egypt
					1,039.5	932.7	518.8
0206	Edible offal of animals, fresh, chilled or frozen	450.7	366.2	81.3	China; Hong Kong, China	Russian Federation	Angola
					365.4	12.7	9.5

(Continues)

(Continued)

Code	Products description	World	China	China's imports (%)	P1	P2	P3
0504	Guts, bladders and stomachs of animals (other than fish)	362.7	262.9	72.5	China; Hong Kong, China	Russian Federation	Ukraine
					262.6	13.1	11.4
2308	Vegetable materials and vegetable waste, vegetable residues and bi--products	77.0	30.5	39.6	China	Nether-lands	Belgium
					30.4	17.1	6.0
1302	Vegetable saps and extracts;	103.0	21.3	20.6	China	USA	Thailand
					21.1	17.1	14.2

Source: Comtrade. Available at: <https://bit.ly/3w1vkVP>.
Authors' elaboration.

TABLE 5
Brazil's exports of agribusiness products by product (HS4-2012) and key partners – China as second or third main partner (2016-2018)
(In US$ 1 million)

Code	Products description	World	China	Chinese imports (%)	P1	P2	P3
0207	Meat and edible offal of poultry; of the poultry of heading No. 0105, (i.e., fowls of the species *Gallus domesticus*), fresh, chilled or frozen	6,238.00	1,169.90	18.8	Saudi Arabia	China	Japan
					994.1	806.6	779.6
0203	Meat of swine; fresh, chilled or frozen	1,295.30	415.2	32.1	Russian Federation	China; Hong Kong, China	China
					405.7	217.1	198
2401	Tobacco, unmanufactured; tobacco refuse	1,983.00	248.8	12.5	Belgium	China	USA
					414.2	239	210.7
5201	Cotton; not carded or combed	1,386.80	236.9	17.1	Indonesia	China	Vietnam
					249.5	236.9	220.6
1507	Soya-bean oil and its fractions; whether or not refined, but not chemically modified	984.9	195.5	19.8	India	China	Bangladesh
					430.1	194.5	89.5
1521	Vegetable waxes (other than tri-glycerides), beeswax, other insect waxes and spermaceti; whether or not refined or coloured	103.8	15.7	15.1	USA	Japan	China
					28.6	16.8	15.6
0303	Fish; frozen, excluding fish fillets and other fish meat of heading 0304	88.6	7.1	8.1	USA	Vietnam	China
					33.1	7.4	7.1

Source: Comtrade. Available at: <https://bit.ly/3w1vkVP>.
Authors' elaboration.

2.2.2 Sensitive products to Brazilian exports

In order to identify a set of sensitive products where the Brazilian exports can be enhanced, we list a set of goods which the Brazilian share in the Chinese market is small and identify special cases where the Chinese import value is relatively large.

The Brazilian exports of agribusiness goods to China were divided in three distinctive groups, according to the Brazilian share in the Chinese market. The group with the smallest market share is what we refer as strategic or sensitive products. We interpret those as a set of products that are linked with missing trade opportunities of Brazilian exports to China.

Tables 6, 7 and 8 present a comparison between total Chinese imports, the market share of Brazilian exports in China, the value of Brazilian exports to China, the total value of Brazilian exports and the share of Brazilian exports of each good as a percentage of total Brazilian exports of agribusiness goods. By product, average of 2016-2018 and exports to and from China; Hong Kong, China and Macao, China.

TABLE 6

Comparison between total Chinese imports, order by the market share of Brazilian exports in China higher than 20%

Code	Products	Chinese imports from world	Brazil exports to China	Brazil exports to world	Brazilian market share in China (%)
0504	Guts, bladders and stomachs of animals (other than fish)	353.4	262.9	362.7	74.4
1201	Soya beans	37,252.10	20,679.60	26,080.00	55.5
0207	Meat and edible offal of poultry; fresh, chilled or frozen	2,604.10	1,169.90	6,238.00	44.9
1507	Soya-bean oil and its fractions	506.9	195.5	984.9	38.6
0202	Meat of bovine animals; frozen	5,231.50	1,972.20	4,177.30	37.7
1701	Cane or beet sugar	1,197.00	391.8	9,457.80	32.7
2401	Tobacco	1,190.90	248.8	1,983.00	20.9

Source: Comtrade. Available at: <https://bit.ly/3w1vkVP>.
Authors' elaboration.

TABLE 7

Comparison between total Chinese imports, order by the market share of Brazilian exports in China higher between 20% and 10%

Code	Products	Chinese imports from world	Brazil exports to China	Brazil exports to world	Brazilian market share in China (%)
4703	Chemical wood pulp	12,300.60	2,406.40	6,364.60	19.6
2009	Fruit juices and vegetable juices	381	66.8	2,200.40	17.5
0203	Meat of swine; fresh, chilled or frozen	3,371.40	415.2	1,295.30	12.3
5201	Cotton; not carded or combed	2,306.10	236.9	1,386.80	10.3

Source: Comtrade. Available at: <https://bit.ly/3w1vkVP>.
Authors' elaboration.

TABLE 8

Comparison between total Chinese imports, order by the market share of Brazilian exports in China under 10%

Code	Products	Chinese imports from world	Brazil exports to China	Brazil exports to world	Brazilian market share in China (%)
0206	Edible offal of bovine animals chilled or frozen	4,019.50	366.2	450.7	9.1
0901	Coffee, whether or not roasted	508.4	24.2	4,613.50	4.8
1602	Prepared or preserved meat, meat offal or blood	763.8	20.4	1,031.30	2.7
1005	Maize (corn)	680.6	15	4,160.30	2.2
2207	Ethyl alcohol	314.2	5.4	865.2	1.7

(Continues)

(Continued)

Code	Products	Chinese imports from world	Brazil exports to China	Brazil exports to world	Brazilian market share in China (%)
2101	Extracts, essences, concentrates of coffee, tea or mate	427.2	2.2	622.5	0.5
2309	Preparations of a kind used in animal feeding	539	2	256.7	0.4
0303	Fish; frozen, excluding fish fillets and other fish meat of heading 0304	4,150.10	7.1	88.6	0.2
2106	Food preparations not elsewhere specified or included	3,075.60	5.3	354.7	0.2
0306	Crustaceans; in shell or not, live, fresh, chilled, frozen, dried, salted or in brine	3,714.90	4.9	73.8	0.1
1704	Sugar confectionery (including white chocolate), not containing cocoa	420.4	0.5	136.8	0.1
2008	Fruit, nuts and other edible parts of plants	772.1	0.5	75.9	0.1
1806	Chocolate and other food preparations containing cocoa	820.3	0.2	116.7	0
1905	Bread, pastry, cakes, biscuits, other bakers' wares, whether or not containing cocoa	1,298.70	0.2	114	0
2203	Beer made from malt	913.3	0.1	88.4	0
0804	Dates, figs, pineapples, avocados, guavas, mangoes and mangosteens; fresh or dried	629.3	0.1	207.3	0
2301	Flours, meal and pellets, of meat or meat offal, of fish or of crustaceans, molluscs or other aquatic invertebrates	2,228.40	0	72.7	0
0805	Citrus fruit; fresh or dried	966.7	0	100.4	0
1006	Rice	1,956.00	0	321.5	0
0806	Grapes; fresh or dried	1,143.30	0	83.2	0
1001	Wheat and meslin	873.4	0	86.2	0

Source: Comtrade. Available at: <https://bit.ly/3w1vkVP>.
Authors' elaboration.

Chinese imports from Brazil in agribusiness goods represented 18% of total imports of three sets of goods. The first group of goods includes guts, bladders and stomachs; soya bean; meat of poultry; soya bean oil; meat of bovine; cane sugar and tobacco. In all these goods, Brazilian share for the period under analysis is higher than 20%, reaching 75% in the case guts and bladders. The value of Chinese imports varies a lot, from US$ 353 million in the case of guts, to US$ 37,252 million in the case of soya bean. So, in these cases, it is not very credible that Brazilian share can increase significantly, although desirable. Exporters must have a profound knowledge of the market but there are other competitors also with a high comparative advantage in Chinese market. And it must be kept in mind that these values reflect the average of 2016-2018 and may have already increased. In sum, Brazilian exports may eventually increase, along with market share, but they do not represent a real opportunity.

The second group of products is smaller and includes only chemical wood pulp, fruit juices, meat of swine and cotton. these goods present a smaller market share, between 10% and 20%. In all four but fruit juices, Chinese imports amounts are above US$ 2,000 million, or a significant market. Of course, they could very well be increased. But it is reasonable to assume that in these cases too, Brazilian exporters have a very good knowledge of the market and if they do not export a bigger share it must be due to comparative advantages of Brazil and the other suppliers. But it remains to be seen if tariffs and non-tariff barriers may play a role. Anyway, exports of chemical wood pulp have jumped from US$ 1.6 billion in 2016 to US$ 3 billion in 2019.

The third group is comprised of 21 goods. In all of them, Brazilian market share is less than 10%. But there is a very big heterogeneity among them. In some of them, especially coffee and maize, the value of Brazilian exports is relatively high, but exports to China are very small, and Chinese imports are also small. In these cases, even a large increase in the Brazilian market share in China would not represent a big share of total Brazilian exports of them.

Take the case of maize. Even if Brazil could supply half of Chinese imports instead of 15%, the increase would not surpass 8% of Brazilian exports of maize.

In other cases, like Prepared meat, ethyl alcohol, extracts and essences and some others, both Brazilian exports and Chinese imports are of substantial amount, but our market share is very small. In these cases, it is worth analyzing what are the obstacles to a stronger presence of Brazilian exports. This is the case of rice. Brazil exports US$ 321 million to the world and China imports US$ 1,956 million, but Brazilian exports to China are virtually zero. Of course, the biggest rice exporters in the world are located in Asia, like Thailand, but there could be room for bigger Brazilian exports.

Then, there is the case of goods with a high value of Chinese imports and a very small level of total Brazilian exports but in goods where there is a real opportunity of increasing comparative advantage. This is the case of citrus fruit, fish, fruits and nuts and crustaceans. Brazil is a big producer of these goods and there maybe real opportunities in the Chinese market. But it is important to analyze these goods at the six-digit level, as they are very diversified.

2.2.3 Tariffs

In this section, we analyze the incidence of tariff barriers on this restricted list of products. In another chapter, we focus on the incidence of Non-Tariff Measures. Although tariffs can also be considered a fiscal debate, they are usually discussed as an arguably expression of economic protective behavior. The Agreement on Agriculture of the World Trade Organization recommends that governments support agricultural sector through policies that are less harmful to trade. The openness to trade is a key issue of the agreement, as it stands as an institutional reference against trade and import restrictions that characterize as barrier to entry. Mutual agreements with preferential tariffs, on the other side, often come as a way to overcome such restrictions.

We the use the Most Favored Nation Tariff (MFN) level within a product-line to further argue about the existence of restricted trade opportunities between Brazil and China. The logic behind the MFN establish that any tariff benefit should be extended to all WTO members, with few exceptions. As China does not join Brazil in any free-trade agreement or custom union, the MFN can serve as an input to evaluate the impact of tariff barriers to the Brazilian Exports.

This exercise seeks to identify whether there is a tariff gap between the reference applied to Brazil and what is practiced with other key partners of China in the imports of each of the selected products.[8] Finally, we evaluate based on the share of Chinese Imports in the Brazilian exports if there is room to increase exports to China. In the case of small shares, we propose that a reduction in the tariff level might be a possible driver to increase exports.

It is worth mentioning that, during the period of interest, China had free-trade and economic integration agreements with The Association of Southeast Asian Nations (ASEAN),[9] as of this date, a part of the partial cope and economic agreements of The Asia-Pacific Trade Agreement (APTA)[10] and had bilateral agreements with Australia; Chile; Costa Rica; Hong Kong, China; Korea; Macau, China; New Zealand; Iceland; Pakistan; Peru and Switzerland.

Based on the third group of commodities previously qualified as sensitive products, table 9 presents data on the tariffs applied on a subset of 16 products[11] with less expression in the Chinese imports (10%).

Commodities 0901; 2207; 2008; and 1905 have MFN tariffs that exceed 12%, 2207 being the one with the larger tariff-level (37.5%), and four of the key partners have preferential tariffs applied by China. In such products, the Chinese share in the Brazilian exports are quite low. A lower tariff-level can contribute to increase competitiveness of the Brazilian exports face the exports of other key partners.

The remainder of the subset has products with three,[12] two[13] or one[14] of the key partners with preferential tariffs and thus, figure as products where the Brazilian exports might lose competitive advantage. Commodities 0206 and 1806 do not have any of the main partners with preferential tariffs.

8. The key partners are the most important (value) partners which China; Hong Kong, China and Macau, China considered together, import from, what can explain the presence of China as a key partner for some commodity codes.

9. Membership: Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam, Papua New Guinea (observer) and East Timor (observer).

10. Membership: Bangladesh, China, India, Korea, Laos, Sri Lanka and Mongolia.

11. It includes the third group of products previously identified, except the two following sets: i) 2301 and 0805, commodities which tariffs are no updated in the data base; and ii) 1006; 0806 and 1001, commodities which have no tariffs registered in the database.

12. 2101; 0306; 1704; 0804.

13. 1602; 1005; 0303.

14. 2309 and 2106. Commodity 2203, although being part of the group have MFN-tariff equals zero.

TABLE 9
China's MFN-tariff and main partners with preferential tariffs, by sensitive products

Code	Product	Market-share Brazil (%)	MFN-tariff Brazil (%)	Main partners with preferential tariffs
0206	Edible offal of bovine animals chilled or frozen	9.1	13.5	-
0901	Coffee, whether or not roasted	4.8	12.3	Vietnam, China, Malaysia and Indonesia
1602	Prepared or preserved meat, meat offal or blood	2.7	12	China and Thailand
1005	Maize (corn)	2.2	18	Lao PDR, Myanmar
2207	Ethyl alcohol	1.7	37.5	Pakistan, Indonesia, Malaysia and Costa Rica
2101	Extracts, essences, concentrates of coffee, tea or mate	0.5	26.3	Vietnam, China and Malaysia
2309	Preparations of a kind used in animal feeding	0.4	10.4	Thailand
0303	Fish; frozen, excluding fish fillets and other fish meat of heading 0304	0.2	10	China and Chile
2106	Food preparations not elsewhere specified or included	0.2	17.4	Australia and China
0306	Crustaceans; in shell or not, live, fresh, chilled, frozen, dried, salted or in brine	0.1	9.6	Australia, China and New Zealand
1704	Sugar confectionery (including white chocolate), not containing cocoa	0.1	11	China, Thailand and Malaysia
2008	Fruit, nuts and other edible parts of plants	0.1	16.8	Thailand, Rep. Korea, Vietnam and China
1806	Chocolate and other food preparations containing cocoa	0	9.4	-
1905	Bread, pastry, cakes, biscuits, other bakers' wares, whether or not containing cocoa	0	17	Indonesia; China; Hong Kong, China and Malaysia
2203	Beer made from malt	0	0	Rep. Korea
0804	Dates, figs, pineapples, avocados, guavas, mangoes and mangosteens; fresh or dried	0	20	Thailand, Philippines and Chile

Sources: Comtrade (available at: <https://bit.ly/3w1vkVP>); Wits (available at: <https://bit.ly/3KM2NI3>).
Authors' elaboration.

To most products discussed here, there is evidence of a difference between the tariffs applied to Brazil and the tariff applied to at least one of the other key partners. It suggests that some of Brazilian exports may lose competitive advantage due to the existence trade agreements with other partners or the lack of an agreement with Brazil. The subset of commodities which the share Brazilian exports in Chinese Imports is less than 10% is of special interest. First because of the lower share and the embedded potential. Lastly due to the evidence that most of commodities have, even more than one, key partners taking advantage of preferential tariffs.

Lastly, of the 21 4-digit level commodities listed in the third group, we select a sample of products that can be better analyzed at the six-digit level. Table 10 presents the six-digit level commodities with Chinese imports higher than US$ 50 million. As can be seen, in many of them, Brazilian exports are zero or near zero. But in many others, like commodities codes 210690, 030389, 030390, 080450, 200899, 230110, 080550, Brazil exports a substantial amount to other countries but exports to China are virtually zero.

Tariffs will be analyzed only for goods with a clear potential to grow, identified in the previous paragraph.

Goods 030389 and 030390 (fish) have a MFN tariff of 10%, the same as the other major partners, like Russia, USA and Norway. Only Chile has free trade agreement with China, with a zero tariff. In this case, there could be some potential increase in trade between China and Brazil in the case of a trade agreement.

Goods 080450 (fruits) face a difficult scenario, as Brazilian exports have a tariff of 15% and almost all the other major competitors, like Thailand, Philippines and Chile have trade agreements with a zero tariff. Again, these goods could benefit from a free trade agreement.

200899 (prepared or preserved fruits) face a relatively high tariff of around 16%, the same as some of the main competitors like USA and Korea. But Thailand and Vietnam have trade agreements and tariffs near zero.

Goods 210690 (food preparations) face a very high tariff, of 17%, and all the other major suppliers except Australia do not have trade agreements. As Brazil is a big exporter, it could benefit a lot from a trade agreement.

Finally, 230110, face a relatively low tariff, of 4% but some of the major suppliers, like Vietnam and Chile have free trade agreements.

In sum, considering the situation of these 7 goods, with a strong Brazilian presence in the world market, a high level of Chinese imports but almost zero Brazilian exports to China, the level of tariffs, compared with some competitors which have free trade agreements, may be appointed as an obstacle that could be circumvented by a bilateral free trade agreement.

TABLE 10
China's imports higher than US$ 50 million by partners (2016-2018)
(In US$ 1 million)

Code	Products	World	Brazil	Brazilian exports (%)	P1	P2	P3
210690	Food preparations; n.e.c. in item No. 2106.10	3047.3	11.3	0.4	USA	Australia	Japan
					662.5	568.4	198
030389	Fish; frozen, n.e.c. in heading 0303, excluding fillets, livers, roes, and other fish meat of heading 0304	750.4	4.8	0.6	Indonesia	China	USA
					98.4	91.7	85.9
030621	Crustaceans; not frozen, rock lobsters and other sea crawfish (Palinurus spp., Panulirus spp., Jasus spp.), in shell or not, smoked, cooked or not before or during smoking; in shell, cooked by steaming or boiling in water; edible flours, meals, pellets	654.9	1.1	0.2	Australia	New Zealand	USA
					231.9	219.5	63.8
030622	Crustaceans; not frozen, lobsters (Homarus spp.), whether in shell or not, smoked, cooked or not before or during smoking; in shell, cooked by steaming or by boiling in water; edible flours, meals, and pellets	390.7	0	0	Canada	USA	Australia
					220.9	142.5	7.3

(Continues)

(Continued)

Code	Products	World	Brazil	Brazilian exports (%)	P1	P2	P3
030614	Crustaceans; frozen, crabs, in shell or not, smoked, cooked or not before or during smoking; in shell, cooked by steaming or by boiling in water	342.1	0	0	Canada	China	Chile
					121.1	52.8	47.9
130219	Vegetable saps and extracts; n.e.c. in item No. 1302.1	95.3	0.2	0.2	China	Rep. of Korea	France
					38.1	12.4	11.5
030390	Fish; frozen, livers and roes	77.6	0.9	1.1	USA	Russian Federation	Iceland
					23.6	22	10.8
130220	Pectic substances; pectinates and pectates	70.8	20	28.2	Brazil	Denmark	Mexico
					20	14.9	8.8

Source: Comtrade. Available at: <https://bit.ly/3w1vkVP>.
Authors' elaboration.

3 AGRICULTURAL POLICIES IN CHINA AND BRAZIL

3.1 China

3.1.1 Laws and regulations

Agriculture is the basis of national economic development. The Chinese government has always attached great importance to agricultural development and food security issues, and has actively promoted the sustainable and healthy development of agricultural trade from legal and institutional aspects.

Laws and regulations

In China, laws related to agricultural product trade mainly include the *Agriculture Law of the People's Republic of China*, *Foreign trade Law of the People's Republic of China* and *Regulation of The People's Republic of China on the administration of the import and export of goods*. According to article 30 of the *Agriculture Law of the People's Republic of China*, the State encourages the development of the import and export trade of agricultural products, and adopts measures to strengthen international market research, provide information and marketing services to promote the export of agricultural products. In order to maintain the order of production and marketing of agricultural products and fair trade, an early warning system is established for imports of agricultural products. When certain imported agricultural products have or may have a significant adverse impact on the production of the relevant domestic agricultural products, the State may take the necessary measures.

In particular, in terms of the import of agricultural products and the inspection and quarantine of animals and plants, the main basis for the measures taken by the relevant departments are as follows.

1) Law of People's Republic of China on the entry and exit animal and plant quarantine.
2) Regulations on the implementation of the Law of the People's Republic of China on the entry and exit animal and plant quarantine.
3) Food safety Law of the People's Republic of China.
4) Regulations on the Implementation of the food safety Law of the People's Republic of China.
5) Law of the People's Republic of China on quality and safety of agricultural products.
6) Regulations on administration of pesticide of the People's Republic of China.
7) Regulations on administration of veterinary drugs of the People's Republic of China.

8) Frontier health and quarantine Law of the People's Republic of China.
9) Law of the People's Republic of China on import and export commodity inspection.

Normative documents

In recent years, the Chinese government has also formulated and issued a series of normative documents in accordance with the actual needs of the development of agriculture and agricultural trade, as exemplified in the following list.

1) Notice of the State Council on Printing and Distributing the Overall Plan for 6 New Pilot Free Trade Zones.
2) Several Opinions of the Central Committee of the Communist Party of China and the State Council on Promoting the Structural Reform of Agricultural Supply Side and Accelerating the Cultivation of New Driving Forces for Agricultural and Rural Development.
3) Notice of the State Council on Issuing the National Agricultural Modernization Plan (2016-2020).
4) Notice of General Administration of Quality Supervision, Inspection and Quarantine on Printing and Distributing the "Thirteenth Five-Year Plan" for the Development of Quality Supervision, Inspection and Quarantine.
5) Notice of the National Development and Reform Commission, the Ministry of Agriculture, the Ministry of Commerce, the Ministry of Transport, the General Administration of Customs of the People's Republic of China, and the General Administration of Quality Supervision, Inspection and Quarantine on Printing and Distributing the "Innovative Action Plan for the Beijing-Tianjin-Hebei Agricultural Products Circulation System".
6) Several Opinions of the Central Committee of the Communist Party of China and the State Council on Implementing New Development Concepts, Accelerating Agricultural Modernization and Realizing the Goal of a Moderately Prosperous Society.
7) Opinions of the General Office of the State Council on Accelerating the Transformation of Agricultural Development Modes.
8) National Agricultural Sustainable Development Plan (2015-2030).

These normative documents have pointed out a clear direction for the development of China's agriculture and agricultural trade in the future. In terms of agricultural development, China is optimizing the industry structure, improving the quality of products and agricultural efficiency. The central government's document clearly pointed out that China will improve the strategic layout of agricultural opening to the world, make good use of both domestic and international markets and resources, and accelerate the formation of a policy system that promotes agricultural foreign trade and domestic agricultural development.

In terms of trade facilitation, China will speed up the access of agricultural products and enterprises from countries joining the Belt and Road Initiative. China will take facilitation measures to expand its imports of urgently needed food, and support industrial upgrades such as deep processing of imported agricultural products. In terms of customs clearance procedures, China is actively promoting the construction of a Single Window to further facilitate the customs clearance of agricultural products.

In terms of agricultural product trade, China will further optimize its trade structure, promote trade transformation and upgrading, and promote the healthy development of agricultural trade. In particular, in terms of agricultural products imports, the above documents pointed out that China will optimize the global layout of important agricultural products imports, promote the diversification of import sources, and accelerate the formation of stable economic and trade relations that are mutually beneficial and win-win. China is constantly improving its agricultural product import control policies and increasing imports of agricultural products that are in short supply in the country. China attaches great importance to creating a good international trading environment for agricultural products, and improving a fair and competitive agricultural import market environment. In the documents concerning the construction of pilot free trade zones, the Chinese government clearly stated that it will use the policies and conditions of the free trade zones to build a batch of agricultural import, distribution and direct operation centers. In the country's newly established pilot free trade zones, the government supports the establishment of designated supervision sites for the import of agricultural products, and will establish a distribution center for the import and export of food, agricultural products and wine.

3.1.2 Administrations

In China the main promotion and supervision agencies for agricultural trade are the Ministry of Agriculture and Rural Affairs, the Ministry of Commerce, the General Administration of Customs and the State Administration for Market Regulation.

The Ministry of Agriculture and Rural Affairs (MARA)

The Ministry of Agriculture and Rural Affairs is the functional department of the State Council that comprehensively manages plantation, animal husbandry, aquaculture, agricultural reclamation, township and village enterprises, and feed industries. It is also the coordinating department of rural economic the macro management. MARA's main functions related to agricultural trade and FTA are as described in the following list.

1) To negotiate and implement bilateral and multilateral fishery agreements.
2) To Regulate and oversee the quality and safety of agricultural products: organize work to monitor, trace and evaluate agricultural products in terms of risk, quality and safety; propose technical measures to trade; participate in formulating national standards on agri-product quality and safety and implement them together with other government departments; and guide the establishment of inspection and testing systems.
3) To ensure agricultural Genetically Modified Organism (GMO) safety and protect new varieties of agricultural plants.
4) To lead international cooperation in agriculture: handle inter-governmental foreign affairs related to agriculture; promote agricultural trade and related exchanges and cooperation; participate in formulation of foreign assistance policies and agricultural trade rules and related negotiations; and implement agricultural assistance projects and honor relevant international conventions and agreements.

The Ministry of Commerce (MOFCOM)

The Ministry of Commerce is the agency in charge of domestic and foreign trade and international economic cooperation of China, having departments and institutions such as Department of Foreign Trade, Department of Outward Investment and Economic Cooperation, Trade Remedy and Investigation Bureau and China International Import Expo Bureau. The Ministry's main functions related to agricultural trade and FTA are as follows.

1) To formulate the strategies, guidelines and policies of developing domestic and foreign trade and international economic cooperation, draft the laws and regulations governing domestic and foreign trade, foreign investment in China, foreign assistance, overseas investment and foreign economic cooperation, devise relevant departmental rules and regulations. To study and put forward proposals on harmonizing domestic legislations on trade and economic affairs as well as bringing Chinese economic and trade laws into conformity with multilateral and bilateral treaties and agreements. To study the development trends of economic globalization, regional economic cooperation and modern distribution patterns and give proposals.
2) To work out measures for the regulation of import and export commodities and processing trade, and compile catalogues of import and export commodities and technologies. To draft polices and measures for facilitating the transformation of foreign trade growth pattern. To organize the implementation of import and export quota plan of important industrial products, raw materials and important agricultural products. To work with other ministries and commissions to coordinate the import and export of bulk commodities, guide trade promotion activities and the development of the foreign trade promotion system.
3) To draft and execute policies concerning trade in technology, export control and policies encouraging the import and export of technology and complete set of equipment; to push forward the establishment of foreign trade standardization system. To supervise technology introduction, equipment import, export of domestic technologies subject to state export restriction, and to issue import and export licenses pertaining to national security issues such as nuclear non-proliferation in conformity with laws.
4) To lead the efforts to draft development plans for trade in services and carry out relevant work, work with other ministries and commissions to formulate and enforce the plans and policies for promoting services export and services outsourcing development. To facilitate the construction of services outsourcing platforms.
5) To formulate multilateral and bilateral (including regional and free trade area) trade and economic cooperation strategies and policies, be responsible for multilateral and bilateral negotiations on trade and economic issues, coordinate domestic positions in negotiating with foreign parties, and to sign the relevant documents and monitor their implementation. To establish multilateral and bilateral intergovernmental liaison mechanisms for economic and trade affairs and organize the related work. To handle major issues in country (region)-specific economic and trade relationships, regulate trade and economic activities with countries without diplomatic relationship with China. In line with the mandate, to handle the relationship with the World Trade Organization on behalf of the Chinese government, undertake

such responsibilities under the framework of the WTO as multilateral and bilateral negotiations, trade policy reviews, dispute settlement, and notifications and inquires and to coordinate trade and economic activities with foreign parties.

6) To organize and coordinate the work pertaining to antidumping, countervailing, safeguard measures and other issues related to fair trade for import and export. To institute a fair trade early warning mechanism for import and export and organize foreign trade investigations and industry injury investigations in compliance with law. To guide and coordinate domestic efforts in responding to industry security inquires and foreign antidumping, countervailing, and safeguard investigations.

7) To launch anti-monopoly investigations on the concentration of undertakings, guide Chinese companies' response to monopoly allegations overseas and carry out bilateral and multilateral exchanges and cooperation on competition policies.

In the FTAs China's signed, MOFCOM is the investigation agency for trade remedy measures. It also cooperates with the counterpart of another party to establish the Free Trade Commission and the Trade and Economic Mixed Commission. The Free Trade Commission shall supervise the implementation of this Agreement; oversee the further elaboration of this Agreement; seek to resolve disputes that may arise regarding the interpretation or application of this Agreement; supervise the work of all committees and working groups established under this Agreement; establish the amounts of remuneration and expenses that will be paid to panelists; and consider any other matter that may affect the operation of this Agreement. The Trade and Economic Mixed Commission shall hear the reports of the Free Trade Commission; provide guidance to the work of the Free Trade Commission; consider any other matter that may affect the operation of this Agreement; and deal with any other issues related to bilateral cooperation in the area of economy, trade and investment.

The General Administration of Customs (GACC)

The General Administration of Customs, the headquarters of China Customs, is a key border agency of the nation with responsibilities of traditional customs, as well as border health checks, inspection and quarantine for imported and exported animals, plants, and their products, imported and exported food safety, and commodity inspection. GACC oversees 42 customs districts which operate through a total of 678 customs houses nationwide. GACC has its Guangdong office located in Guangzhou for regional coordination. GACC's main functions include port management coordination, customs control, anti-smuggling, trade statistics compilation, customs valuation and duty collection. It also performs health checks at points of entry, takes sanitary and phytosanitary measures, protects imported and exported food safety, and inspects imported and exported consumer products and bulk commodities.

To facilitate trade, GACC has streamlined customs procedures, implemented Single Window, digitalized and shared certificates and documents among all ports throughout the country, cooperated with counterparts in trading partners to share information and recognize test results and participated in trade negotiations led by the Ministry of Commerce of China.

In China's signed FTA, GACC receives data of Certificate of Origin and request to verify its validity.

The State Administration for Market Regulation

The State Administration for Market Regulation was formed in March 2018 and its predecessor was the General Administration of Quality Supervision, Inspection and Quarantine. The Administration is mainly responsible for the management of market order, product and food quality and safety, measurement and standardization, technology and information construction, international exchanges and cooperation. It also undertakes work related to technical trade measures as required.

In China's signed FTA, the Administration issues the Certificate of Origin, sends the electronic data of Certificate of Origin and receives the ex-post verification request. It also cooperates with the counterpart of another party to establish the Committee on Sanitary and Phytosanitary Matters and the Committee on Technical Barriers to Trade. The Committee on Sanitary and Phytosanitary Matters seeks to enhance any present or future relationship between the Parties' agencies with responsibility for sanitary and phytosanitary matters, coordinates technical cooperation plans in the field of sanitary and phytosanitary and reviews the sanitary and phytosanitary handling between the competent authorities of the contracting parties. The Committee on Technical Barriers to Trade is mainly responsible for resolving any issues raised by a contracting party related to the development, adoption, application, or enforcement of technical regulations and conformity assessment procedures; enhancing cooperation in the development and improvement of technical regulations and conformity assessment procedures; exchanging information on developments in non-governmental, regional, and multilateral fora engaged in

activities related to standardization, technical regulations, and conformity assessment procedures; and taking any other steps which the Parties consider to assist them in implementing the TBT Agreement and in facilitating trade in goods between them.

3.1.3 Non-tariff measures

Non-tariff measures refer to all policies and methods that can regulate, manage and control foreign trade activities except tariffs. Its purpose is to protect the domestic market and the development of domestic industries through import restrictions. There are many types of non-tariff measures. In agricultural trade, they mainly involve import quota, import license, technical standards and sanitary inspection regulations. According to the Agreement on Technical Barriers to Trade (TBT), WTO members have the right to formulate and implement technical regulations and standards aimed at protecting national or regional security, protecting the life or health of humans, animals and plants, protecting the environment, ensuring the quality of products and preventing fraud. According to the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS), WTO members have the right to take measures to protect the life or health of animals or plants in their territories from pests, diseases, and other risks caused by additives, pollutants, toxins or pathogenic organisms.

For China, the adoption of necessary sanitary and phytosanitary measures is crucial to protecting people's health, agricultural ecology and ensuring food security. China has a large population and a large demand for food. The balance of food supply and demand is very fragile. Invasive alien species pose a serious threat to China's food security and agricultural ecological environment. China is one of the countries that suffer the most from invasive alien species in the world. Alien species cause up to US$29.3 billion in losses to China's economy and environment each year.[15] In 2019, *Spodoptera frugiperda* invaded China and quickly spread to 25 provinces across the country. The affected farmland area reached 150,000 hectares. In Guangdong, the rate of damaged plants in corn fields in some areas exceeded 60%, and the rate of damaged plants in corn fields that were not sprayed or prevented was even 100%, almost no harvest. Crops such as sugar cane, peanuts and bananas are also harmed.[16] *Eupatorium adenophorum*, native to South America, spread rapidly after it invaded Yunnan Province. Not only did trees and crops fail to grow, its toxins also caused asthma in cattle and horses, which brought disasters to animal husbandry in the invaded areas. No effective countermeasures have been found yet. Therefore, in order to prevent pests and diseases, China Customs has adopted prudent measures in animal and plant quarantine to build the first line of defense against biological invasion.

On the premise of ensuring the safety of people's lives, health and property, China has taken concrete actions to expand opening up and fulfill its WTO commitments. Since January 1st, 2002, China has cancelled the quota license management for grain, wool, cotton, acrylic, polyester, polyester chips, fertilizer and some tires, and gradually revised and abolished a batch of laws and regulations that were inconsistent with WTO rules. Instead, a series of new regulations that meet the new requirements of foreign trade, such as the *Implementation Rules for Import Quota Management* and *Specific Product Import Management Rules* have been issued. As of 2010, all of China's commitments to the WTO had been fulfilled. An economic and trade system that meets the requirements of the WTO rules has been established, making China one of the most open markets in the world. In 2015, in order to unify national food safety standards, China implemented the new *Food Safety Law*. China also actively participated in the WTO Trade Facilitation Agreement negotiations, signed a series of agreements to continuously improve the trade facilitation in aspects like customs clearance, commodity inspection and quarantine, port management, electronic ports and logistics.[17] As of August 2020, China has signed the Authorized Economic Operator (AEO) agreements with 42 countries (regions) including Brazil, with the number of mutually recognized countries (regions) ranking first in the world. Companies with status of AEO in Brazil and other countries can enjoy convenient measures such as less document review and priority inspection of goods.

During the covid-19 pandemic, China continued to reduce non-tariff measures to defend the free trade. For example, on February 14th, the *China-US Phase one Economic and Trade Agreement* came into effect. During the worst period of the domestic epidemic, China still kept its promises and took multiple actions to reduce trade barriers to American agricultural products. The actions that China had taken include lifting the ban on imports of U.S. poultry and poultry products and lifting restrictions on imports of U.S. pet food containing ruminant material.[18] On February 25th, the U.S. Department of Agriculture (USDA) and the Office of the U.S. Trade Representative (USTR) announced the progress of the implementation of U.S.-China Phase One Agreement, confirming that China had started to fulfill its agricultural-related commitments on schedule and achieved positive results. After, China continued to add four

15. Available at: <https://bit.ly/3p7FCPU>.
16. Available at: <https://bit.ly/3v8WZnm>.
17. Available at: <https://bit.ly/3v6j6e7>.
18. Available at: <https://bit.ly/3sbE4Gk>.

new measures to expand imports: signing a protocol allowing the import of fresh peaches from California; lifting the import ban on beef and beef products over 30 months old; updating the permitted export of dairy products, infant formula products, aquatic products and fish oil; announcing new tariff exclusions for products such as US hardwood.[19]

In addition to reducing trade barriers to the United States, in July, China also issued a joint statement with 12 countries including Chile, Uruguay, New Zealand, and Australia, declaring that during the epidemic, any existing trade restrictions imposed on necessities, especially medical supplies should be removed. China, together with other economies, avoids implementing export controls or establishing tariff and non-tariff barriers to ensure the integrity of the global supply chain and the development of the international trade.

3.2 Brazil

3.2.1 Laws and regulations

There are many laws concerning agriculture and livestock activities in Brazil and it would be nearly impossible to list all of them. But among the most recent laws and regulations deserve attention Decree No. 9,013/2017, and Normative Instructions 34/2018, 35/2018 and 54/2011, both issued by the Ministry of Agriculture, Livestock and Supply (MALS).[20]

3.2.2 Administrations

The Ministry of Agriculture, Livestock and Supply (MALS) has the responsibility for all public policies related to the support to agricultural activities and by regulation of services related thereof. Among the many agencies inside MALS, the Secretariat of Agriculture and Livestock Defense is responsible for managing policies related to animal and public health and has five departments. It puts forth government actions involving official controls for vegetable health, animal and goods of animal origin health and also its inputs produced in the country or imported.

The Department of Inspection of Animal Origin Goods is the agency responsible for inspecting animal origin goods and it is also responsible for the formulation of regulations and policies dealing with these goods. It is also the focal point for conducting external negotiations in many fora like Mercosul, the SPS Committee of WTO and in the Codex Alimentarius FAO/WHO. It has a prominent role on the conquest and opening of new foreign markets, in connection with international agreements, bilateral agreements, especially in the matters of sanitary questions regarding animal origin goods. Its main divisions are: i) General Coordination of Control and Evaluation; ii) Division of Equivalence Evaluation; iii) Division of International Audits; iv) Division of Certification; and v) Division of Imported Goods.

The Department of Animal Health is responsible to formulate policies regarding animal health and surveillance and quality control of veterinary products and goods related to animal reproduction. Among its duties are animal sanitary oversight; prevention, control and eradication of animal diseases; animal transportation surveillance; welfare of animals dedicated to reproduction; register and oversight of veterinary products. This department is also responsible for external technical negotiations related to sanitary exports agreements. Its Coordination of Animal Transit and Quarantine is responsible for all questions related to export and import of animal goods and live animals.

The Department of Technical Services, especially its System of Agricultural and Livestock International Surveillance, is responsible for the oversight of all laws and regulations concerning these goods, especially the ones related to the international transportation of agricultural and livestock goods and related matters.

The Department of Inspection of Vegetable Products has, among its duties, inspecting and oversight of vegetable goods, and is also responsible for the formulations of regulations concerning this subject. It is also the focal point for negotiations at Mercosul, the SPS Committee of WTO and in the Codex Alimentarius FAO/WHO. It is also responsible for identifying the possibility of the opening of new markets related to international agreements, and also in connection with the private sector and Brazilian representations abroad. Its main areas are: i) General Coordination of Vegetable Quality; and ii) General Coordination of Wines and Beverages.

19. Available at: <https://bit.ly/3sRWWcA>.

20. All the information about goods of animal origins may be found in: <https://bit.ly/33LuzVe>.

3.2.3 Non-tariff measures

Here, we analyze the incidence of Non-Tariff Measures (NTMs) in agricultural goods in Brazil, comparing for an average of reporters, using data from the UNCTAD TRAINS[21] and Comtrade.[22] We explore the data using an inventory approach based on three distinct indexes.[23] The frequency index (*FI*) is the percentage of products in the nomenclature exposed to any NTM; the prevalence score (*PV*) is the average number of unique NTM codes applied to a set of commodities; the cover ratio (*CR*) is the percentage of imports exposed to any NTM.

The effort to understand NTMs is linked to the development of the International Classification of non-tariff measures, a nomenclature that classifies each measure using up to a 4-digit code. Table 13 displays a description of the NTM chapters (UNCTAD, 2019). Technical measures are those commonly associated with a higher scientific content in the criteria that supports the respective measure, such as minimum sanitary requirements and it includes the chapters A (SPS), B (TBT) and C (Pre-Shipment Inspections) of the NTM nomenclature. The rest of the chapters are included in the non-technical measures group, which deals with measures of diverse content, some economic-related, such as subsidies or price control. The contrast of the two types is usually followed by an intuition that chapters A, B and C primarily express the "rational requirements" of trade regulation, as the non-technical barriers would function as a platform to discretionary or protective behavior, what cannot always be the case.

For example, import quotas, a type of measure that is included in Chapter E, might be considered an instrument that almost directly imply objections to trade. Still, there is a need to contextualize the previous relation with other key factors, such as the set of products/section of the economy that is of interest. In the case of agricultural goods, by the very nature of most goods, is empirically perceivable the prominence of technical measures, especially chapter A. Hence, it should be expected that this dominance incorporates not just the most rational use of NTMs but also any other arbitrary protocols.

Measures also can be classified according to the country they are applied to: General Measures are those applied to all countries in the economy; Specific Measures are measures applied to an arbitrary set of partners. General Measures can be associated with requirements that should be primarily defined in the reporter context, while Specific Measures highlights case specific needs, that are bilateral by default. The last type of measure can be associated with protective or discretionary behavior. Again, the matter is of intricacy and the previous reasoning can be affected by the institutions of trade regulation in each country.

Table 11 presents the incidence of NTM on Brazil and for a sample of reporters, using inventory indexes, by measure type – all measures, general or specific – and NTM. The table enables us to discuss some stylized facts about the incidence of NTMs in the agricultural sector.

The results regarding the sample of reporters indicates that more than 80% of the selected commodities have, at least, one NTM applied to it (*FI*) what corresponds to more 88% of imports. The distribution between chapters suggests that the most common chapters, using both *FI* and *CR* are chapter A (SPS measures), chapter B (Technical Barriers to Trade – TBT) and chapter P (Export related Measures). Other important chapters for the sample or reporters are chapter E (Non-automatic import licensing, quotas, prohibitions, quantity-control measures and other restrictions not including sanitary and phytosanitary measures or measures relating to technical barriers to trade); chapter F (Price-control measures, including additional taxes and charges); and chapter C (Pre-shipment inspection and other formalities). The results also indicate there is a significant intersection of chapters. One product might have more than one NTM chapter applied to it.

Specifically, for all countries, SPS measures are applied to, approximately, 87% of commodities (*FI*) and covers more than 82% of imports (*CR*), as TBT measures are applied in more than 78% of the selection (*FI*) – 77% of trade (*CR*). Chapter E comes in third covering close to 60% of the selection commodities (*FI*), and 61% of trade.

The prevalence index (*PV*) for the sample of reporters reinforces the prominence of technical measures, remarkably SPS, as the main content of NTMs used in agricultural products. The average of reporters' data show that, on average, each commodity in the selection have more than 10 unique NTM codes applied to it. More than 50% of those unique codes are of chapter A – not only those measures are the most common ones, but they are also more intensively applied.

21. Available at: <https://bit.ly/3JIRY95>.

22. Available at: <https://bit.ly/35hPqj4>.

23. Nicita and Gourdon (2013) and UNCTAD (2017) are key references on the use of inventory approach to describe NTMs. Subsubsection *Methodological note on NTM* provide methodological notes on the NTM classification and on how to compute the measures.

TABLE 11

NTM incidence of non-tariff measures in Brazil and for an average of reporters: frequency index, cover ratio and prevalence score – all measures (2016)

Measures/chapters	Brazil			Average of reports		
	FI (%)	CR (%)	PV	FI (%)	CR (%)	PV
All measures	99.56	97.85	14.41	90.25	88.08	12.29
A	99.23	97.65	6.96	86.91	82.56	8.24
B	99.45	97.85	6.05	78.34	77.07	1.82
C	32.52	41.62	0.33	17.37	15.53	0.20
E	98.89	97.47	1.04	60.48	61.52	0.75
F	0.00	0.00	0.00	14.87	13.84	0.27
G	0.00	0.00	0.00	3.82	7.73	0.04
H	0.00	0.00	0.00	0.75	0.58	0.01
I	0.00	0.00	0.00	0.01	0.00	0.00
P	2.99	0.31	0.04	30.66	25.58	0.95
General measures	99.56	97.85	14.29	88.62	86.56	11.97
A	99.23	97.65	6.84	85.30	81.20	8.03
B	99.45	97.85	6.05	78.23	76.81	1.82
C	32.52	41.62	0.33	15.06	13.04	0.17
E	98.89	97.47	1.04	59.83	60.05	0.74
F	0.00	0.00	0.00	14.64	13.26	0.27
G	0.00	0.00	0.00	3.82	7.73	0.04
H	0.00	0.00	0.00	0.50	0.46	0.01
I	0.00	0.00	0.00	0.01	0.00	0.00
P	2.77	0.11	0.03	28.85	23.42	0.89
Specific measures	20.91	48.54	0.42	12.22	13.40	0.61
A	20.69	48.34	0.42	10.39	10.07	0.40
B	0.33	0.00	0.00	1.33	1.34	0.03
C	0.00	0.00	0.00	3.58	4.21	0.04
E	0.00	0.00	0.00	1.15	2.40	0.01
F	0.00	0.00	0.00	0.23	0.58	0.00
G	0.00	0.00	0.00	0.00	0.00	0.00
H	0.00	0.00	0.00	0.25	0.12	0.00
I	0.00	0.00	0.00	0.00	0.00	0.00
P	0.22	0.20	0.00	4.67	4.57	0.13

Sources: UNCTAD (available at: <https://bit.ly/3Ie81KK>); Comtrade (available at: <https://bit.ly/3w1vkVP>).
Authors' elaboration.
Obs.: 1. The table displays inventory indexes of the incidence of non-tariff measures applied by Brazil and for a sample of reporters. The results are presented by the type of NTM, all measure, general or specific, and chapter of the NTM nomenclature (version of 2012). Not all codes in the nomenclature are covered by the data collection process. FI and PV are based on the number of 6-digit codes of the Harmonized System (2012 version), and CR uses total imports (value), for all chapters.

Some of the results for the average of reporters can be applied to the Brazilian case, but other features are forms on how the country apply Non-Tariff Measures. Although Brazil stands out only as a key exporter of agricultural goods, the frequency index and the cover ratio indicate that Brazil covers a broader range of commodities and trade with the incidence of NTMs, when compared to the average of countries. Brazil covers almost all the selection with at least one NTM, 99.56% of all commodities in the nomenclature (*FI*) and 97.85% of all imports (*CR*).

Regarding the distribution of chapters, chapter A and B, as the case of the average of reporter, are the ones most broadly used, covering more than 99% of products in the nomenclature (*FI*). A feature that differentiates the Brazilian case is the greater coverage of chapter E measures. Together with chapters A and B, chapter E measures are

applied to almost 99% of products in the nomenclature and it covers more than 97% of Brazilian imports, as *FI* and *CR* for the average of reporters are 60.48% and 61.52%, respectively. The evidence support that Brazil regulates the agricultural trade extensively, with not only technical measures, but also with measures of economic content (chapter E).

Another distinguishing result of Brazil is related to the intensity in which the country applies non-tariff measures. Brazil applies, on average, more than 14 distinct types of measures to each commodity, compared to 12 for the average of reporters, considering all types of measures. The distribution of prevalence between chapters indicates that, on average, almost 7 different SPS measures and more than 6 unique TBT measures are applied to each commodity. The prevalence score of chapter B in Brazil is quite higher than the intensity in which the average of countries applied TBT measures.

A comparison between the results of *all measures* and *general measures*, both for Brazil and the *average of reporters*, suggests that the overall results are aligned with the incidence of measures applied to the world. Alternatively, *general measures* alone are almost fully responsible for the incidence of non-tariff measures. Specific measures can be considered of marginal use and does not expand the extension of commodities that are covered with NTMs. The diversity of chapters comparing *all measures* and *general measures* are also the same. The last evidence supports that the incidence of non-tariff measures in Brazil is not necessarily discretionary and it is applied to the world economy. Even if a commodity and partner have specific NTMs applied to them, there is already a measure that regulates trade applied.

The diversity of NTM chapters is affected when considering specific measures – less chapters are applied in the case of partner-related measures. Regarding all countries, there is no specific measures applied of chapters G and I. In the case of Brazil almost all specific measures are included in chapter A of the NTM nomenclature – as mentioned before, an expected outcome due to the very nature of most agricultural goods.

The average result for all reporters is that 12.22% of the commodities in the nomenclature have at least one specific measure applied to it, covering more than 13% of trade. And, on average, there is one NTM code applied to each commodity. Brazil overcomes the average result, with a Frequency Index close to 21%, what covers almost 50% of imports of agricultural products, when considering only specific measures. The prevalence score of the average of reporter, on the other hand, is higher than the result for Brazil – at least 1 NTM against 0.42 NTMs for commodity code, on average.

Table 12 presents inventory indexes on the 27 4-digit level commodities that Brazil applies any specific measure to China and compare it to the incidence of General Measures Applied by the country. The table enables us to test if there is any evidence of explicit discretionary behavior with the imports from China.

All the 27 commodity codes listed in Table have at least one General Measure applied to them. Moreover, the frequency index of all products is 100%, which, in this case, means that all 6-digit level codes included in the heading of the harmonized system have General NTMs applied to them. The present result is aligned with previous evidence on how Brazil extensively applies Non-Tariff Measures that regulate trade with all partners in trade. Another way to read the *general measures* results in table 12 is that all commodity codes that have a specific measure applied to China that has already a general measure applied to it.

An analysis of the Cover Ratio of Specific Measures applied to China indicates that more than half are actually not traded – 17 4-digit level codes have a cover ratio of 0%, indicating that there are no imports from China in any of the 6-digit commodity codes included in those headings.[24]

Regarding the subset that is actually traded (Cover Ratio > 0%), tabaco is the one most intensively regulated with NTMs – an average of 3 distinct measures for all the 6-digit level codes. Five of the remaining 4-digit codes with a positive cover ratio are included in the same chapter of the harmonized system (chapter 19 – preparation of cereals, flour, starch or milk; pastrycooks' products). None of the commodities listed in table 12 and imported are relevant products of Chinese exports to Brazil.

The data on how Brazil apply NTMs to agricultural products compare to an average of reporters and on the list of products that are both actually imported from China by the country and specifically regulated with NTMs supports the hypothesis that there is no discretionary behavior of Brazil to restrict imports of agricultural from China. The overall trade conditions applied to the country are like those applied by any other economy and there is no significant contribution of specific measures to extend the coverage of NTMs in agricultural products.

24. Commodity codes that are specifically regulated but not actually traded: 0101; 0808; 0809; 0812; 2105; 0404; 0403; 0401; 0405; 0406; 0402; 1001; 1003; 1004; 1002; 0802; 0901.

TABLE 12

NTM incidence of non-tariff measures applied by Brazil specifically to China: frequency index, cover ratio and prevalence score – 4-digit level commodities, all measures (2016)

HS4	Description	General measures		
		FI (%)	CV (%)	PV
2401	Tobacco, unmanufactured; tobacco refuse	100.00	100.00	9.00
1902	Pasta; whether or not cooked or stuffed with meat or other substance, or otherwise prepared, egg spaghetti, macaroni, noodles, lasagne, gnocchi, ravioli, cannelloni; couscous, whether or not prepared	100.00	100.00	15.00
1904	Prepared foods obtained by swelling or roasting cereals or cereal products (e.g. corn flakes); cereals (other than maize (corn) in grain form or in the form of flakes or other worked grains (not flour and meal), pre-cooked or otherwise prepared, n.e.c.	100.00	100.00	14.00
1903	Tapioca and substitutes therefor prepared from starch; in the form of flakes, grains, pearls, siftings or similar forms	100.00	100.00	4.00
1905	Bread, pastry, cakes, biscuits, other bakers' wares, whether or not containing cocoa; communion wafers, empty cachets suitable for pharmaceutical use, sealing wafers, rice paper and similar products	100.00	100.00	14.83
2106	Food preparations not elsewhere specified or included	100.00	100.00	14.50
2202	Waters, including mineral and aerated waters, containing added sugar or sweetening matter, flavoured; other non-alcoholic beverages, not including fruit or vegetable juices of heading No. 2009	100.00	100.00	12.00
2101	Extracts, essences, concentrates of coffee, tea or mate; preparations with a basis of these products or with a basis of coffee, tea or mate; roasted chicory and other roasted coffee substitutes and extracts, essences and concentrates thereof	100.00	100.00	15.00
1209	Seeds, fruit and spores; of a kind used for sowing	100.00	100.00	13.40
1901	Malt extract; flour/groats/meal/starch/malt extract products, no cocoa (or less than 40% by weight) and food preparations of goods of headings 04.01 to 04.04, no cocoa (or less than 5% by weight), weights calculated on a totally defatted basis, n.e.c.	100.00	100.00	11.67
0101	Horses, asses, mules and hinnies; live	100.00	0.00	15.00
0808	Apples, pears and quinces; fresh	100.00	0.00	15.33
0809	Apricots, cherries, peaches (including nectarines), plums and sloes, fresh	100.00	0.00	10.00
0812	Fruit and nuts provisionally preserved; e.g. by sulphur dioxide gas, brine, in sulphur water or in other preservative solutions, but unsuitable in that state for immediate consumption	100.00	0.00	6.00
2105	Ice cream and other edible ice; whether or not containing cocoa	100.00	0.00	15.00
4004	Whey and products consisting of natural milk constituents; whether or not containing added sugar or other sweetening matter, not elsewhere specified or included	100.00	0.00	10.00
0403	Buttermilk, curdled milk and cream, yoghurt, kephir, fermented or acidified milk or cream, whether or not concentrated, containing added sugar, sweetening matter, flavoured or added fruit or cocoa	100.00	0.00	12.00
0401	Milk and cream; not concentrated, not containing added sugar or other sweetening matter	100.00	0.00	15.00
0405	Butter and other fats and oils derived from milk; dairy spreads	100.00	0.00	14.00
0406	Cheese and curd 100.00	100.00	0.00	10.40
0402	Milk and cream; concentrated or containing added sugar or other sweetening matter	100.00	0.00	15.20
1001	Wheat and meslin	100.00	100.00	14.25
1003	Barley	100.00	100.00	14.00
1004	Oats	100.00	0.00	14.00
1002	Rye	100.00	0.00	14.00
0802	Nuts (excluding coconuts, Brazils and cashew nuts); fresh or dried, whether or not shelled or peeled	100.00	100.00	16.87
0901	Coffee, whether or not roasted or decaffeinated; husks and skins; coffee substitutes containing coffee in any proportion	100.00	0.00	17.00

Source: Comtrade (available at: <https://bit.ly/3w1vkVP>); Wits (available at: <https://bit.ly/3KM2NI3>).
Obs.: 1. Indexes are based on the number and imported values of unique 6-digit level codes included in the HS4 heading of the Harmonized System.

Methodological note on NTM

Equations (1) to (3) define the inventory approach indexes for a given reporter, specifically, the frequency index (*FI*), the cover ratio (*CR*) and the prevalence score (*PV*). For a given reporter *i*: D_i^s is a dummy variable that controls the incidence of any NTM on a commodity *s*; *H* is the number of commodities in the nomenclature; M_i^s is the import value of product *s*; N_i^s is the number of unique NTM codes applied to product *s*.

$$FI_i = \frac{\sum_s D_i^s}{H} \; x \; 100. \tag{1}$$

$$CR_i = \frac{\sum_s D_i^s M_i^s}{\sum_s M_i^s} \; x \; 100. \tag{2}$$

$$PV_i = \frac{\sum_s D_i^s \; N_i^s}{H}. \tag{3}$$

The indexes can be further qualified by manipulating the terms in the equations above. A general solution is to restrict the universe in each of the terms and select arbitrary samples for each variable. For example, it means considering only a selection of NTM codes, such as measures included in specific chapters, restricting to a subset of the commodities in the nomenclature, or to control the type of measure, or applied to whole economy (general measures), or to specific sets of countries. Each criterion can be applied in combination with others and the result is a more diverse number of perspectives that enrich the analysis and take most of the qualitative content of data.

Table 13 presents the organization of the non-tariff measure international classification developed by UNCTAD in a tree structure and provides a description to each chapter in the nomenclature.

TABLE 13
Classification of non-tariff measures by chapter

Trade flow	Type (content)	Chapter	Description
Imports	Technical measures	A	Sanitary and phytosanitary measures (SPS)
		B	Technical barriers to trade (TBT)
		C	Pre-shipment inspection and other formalities
Imports	Non-technical measures	D	Contingent trade-protective measures
		E	Non-automatic import licensing, quotas, prohibitions, quantity-control measures and other restrictions not including sanitary and phytosanitary measures or measures relating to technical barriers to trade
		F	Price-control measures, including additional taxes and charges
		G	Finance measures
		H	Measures affecting competition
		I	Trade-related investment measures
		J	Distribution restrictions
		K	Restrictions on post-sales services
		L	Subsidies and other forms of support
		M	Government procurement restrictions
		N	Intellectual property
		O	Rules of origin
Exports	-	P	Export-related measures

Source: UNCTAD. Available at: <https://bit.ly/3Ie81KK>.
Authors' elaboration.

4 OPPORTUNITIES AND CHALLENGES

For the agricultural trade and investment cooperation between China and Brazil, the external environment in the coming years will have quite some impacts both from good and bad directions, which should be considered by both parties to deal with carefully.

4.1 Opportunities

The agricultural cooperation between China and Brazil is facing some opportunities, which may not only reduce the cost but also make it possible to create more rooms in the coming years.

4.1.1 Oil price helps reduce cost of transportation

In the year of 2020, international oil prices provide good opportunities for long term transportation. Baltic Dry Index (BDI) is an index issued by London Maritime which can reflect the relationship between the demand and supply side. After BDI reached historic high of 2500 in September 2019, it kept on moving downward. On May 14, BDI dropped to 393, less than one sixth compared to the peak time. As an important and authoritative indicator, BDI is especially good for the measurement of dry bulk shipping. The trade between China and Brazil is largely realized by dry bulk shipping. Soybeans, sugar, alcohol, chickens and other agricultural products are the main export from Brazil to China, while seafood, meat, fruits, nuts, and grains are the main agricultural products Brazil imports from China. The distance makes it quite difficult to be ignored for the consideration of transportation cost. Take the soybean for example, the cost of transportation is generally 16.18%-28.35% of all import cost. With cheaper harbor cost in Brazil, the transportation from Brazil has some advantages compared with those from Argentina or U.S. to China. The cost of transportation therefore is more important in the trade between China and Brazil. The inland (including road, rail or river) transportation cost is 42.48%-70.21% of all the transportation cost. While the suddenly drop of crude oil help reduce the cost of shipment, the trade will benefit by lower transportation and better prices of transaction. When the deal between OPEC and Russia was reached on June 6th, both parties agree to extend the period of keeping production of 9.7 million barrels per day less until the end of July, while keeping 7.7 million barrels per day until the end of 2020. Both parties are scheduled to discuss the situations and actions monthly, which will introduce more uncertainty for the sustainable supply to the market. And as the suppliers of crude oil are not only the OPEC and Russia, quite a lot of other non-OPEC members are waiting to provide more oil to the international market. Shale oil producers in U.S. suffered a lot in the shock in April. When the breakeven point of production is reached between 39-48 dollars per barrel, they will actively return to the market. The largest U.S. shale oil producer *EOG Resource* is claiming to increase its production of oil in the second half of this year. And other producer of Parsley Energy decided to recover its production also. When the international environment is still unstable and the 2020 global output decrease 4.9 percent in the prediction of IMF in June, the transportation may be supported by the low oil price further. In its prediction in the world economic outlook of June, IMF believes that the 2020 crude oil price in the international market will be 41.1 percent less compared with 2019. And IMF also see a very gentle rebound of the crude oil price of 3.8 percent in the year of 2021. Also, it may drive some of the maritime companies out from the market with too low freight price, bulk transportation will mainly see support with better fuel conditions in the coming years. In 2021, oil prices are climbing to US $70 per barrel. While when the world is pushing the energy consumption structure changing to more alternative choices, the oil demands will not recover too strong with the recovery of economy. And more shale oil wells would be put in operation as when the oil prices reach more than US $80, which will support the transportation in the middle term.

4.1.2 Favorable interest rate provides easier financial support

International trade depends on the credit very much. Buyer's credit can give the importers power to buy before they can really afford them. Investors need more supports from the financial institutions to acquire land, recruit employment, building infrastructure and related facilities. In this regard, the financial conditions will be important for the transactions to be accomplished or realized. U.S. Federal Open Market Committee lowered the target range for the federal funds rate to 0 to 0.25 percent, which they did the same after the 2008 global economic crisis. Fed has sent signals in the past months that they will not raise the interest rate before the end of 2022. Also, inflation has put strong pressure to the decision of Fed, the consideration of avoiding shocks on employment may still support Fed to keep the interest rate in a low level for quite a while. As Fed Reserve has strong impact on the international financial market, investors may trade if there is fairly wide interest gaps, which will impact more on other countries. And people may have less willingness to deposit with lower interest rates. For the agricultural trade and investment between China and Brazil, the trend of lowering interests may make it much easier for the buyers or investors to do business. Agriculture-related investment is different from other industries, which needs quite some patience waiting for the harvest and can be seriously affected by the weather or other natural disasters. Risks could come from the external environment and affect the agricultural seriously. Financial support means a lot to the borrowers. The banks tend not to lend loans to the agricultural borrowers because of the risks. When interest rates drop, land owners or businessmen in the agriculture sectors may find it easier to borrow money from banks. Brazil's interest rate has been in the decline trend. And Chinese benchmark interest rate is stable while the financial environment more friendly and relaxed. In the coming years, the financial environment may be in good conditions for expansion of economic activities. The financial condition is not only important to the new financial transactions, but also crucial for the existing loans or other debts.

Lower interest rates give the borrowers breath before they would go bankruptcy due to the debts they have either by borrowing money from the domestic or foreign entities. Although the abilities of both China and Brazil are stable, it's still possible for the individual entities bearing more pressures. For the long term loans, favorable interest rate may alleviate the burden of borrowers and make it more comfortable to operate and have more profits in the period. In this regard, interest rate can not only support the importers, exporters, farmers and producers, but also good for the businesses along the supply chain and industrial chain, encourage the investment on the related areas, facilitate the cooperation among the corresponded parties, and make it more smoothly for the flow of factors. When the farmers are wishing to plant more crops, they can access to better equipment to support the different parts of practice. As for the transportation, it's normal for the shipping companies to borrow loans to build the ships. The process of ship-building may last for years. Lower interest rates will make the process easier to be finished no matter in the way of buying a ship or financial leasing.

4.1.3 Technology development creates better ways for agriculture

China and Brazil are large developing countries and agriculture are important for both countries. Technology development has played important role in the history and will play even more important role in the future. First, the improvement of technology can provide more and more advanced agricultural equipment, machinery, transportation tools and infrastructure. 5G is making it possible for the operators to dealing with the situation in real time. Internet of Things (IOT) can be achieved by the rapid telecommunication like 5G, while big data and artificial intelligence (AI) could help dealing with complicated situation to recognize important patterns for better agricultural process. Auto-pilot vehicles can be also used in the agricultures, which will not only reduce the hardship of the operators, but also protect them from being harmed by the environment or even some dangers. Second, the development of technology will increase the productivity of land and the quality of agricultural products. New agricultural materials, including fertilizers, can help manage the crops, poultries and livestock. Biotechnology is expected to play more important role in improving the ability of agricultural products to survive the bad environment or pests, which is becoming more and more effective to reduce the labor intensity of the farmers. Third, technology can improve the efficiency of using the resources and increase the economic income. It is extremely important for China with such huge population and so few resources. With these technologies, less waste will do good for the environment protection. Chinese enterprises have more experiences in maximize the usage of land, while Brazilian companies have more specific experiences on the tropical agriculture. The cooperation and exchange of experience with the support of internet-based communication tools would make it more efficient on the condition of so far away from Brazil to China. Fourth, the villages and the villagers living conditions need to be taken care of. With the involvement of technology, the farmers can benefit by acquiring more knowledge and skills from different platforms. Compared with the past, there are much more free resources of knowledge and skills that people can acquire from the internet, which make it possible for the agricultural practitioners to reduce the ability gaps compared with those in other sectors. In recent years, the development of e-commerce facilitates the farmers to find potential customers before they make decisions on the agricultural activities. Technology plays vital role in this process. While more technology is involved to make the whole process stable from planting to harvest, from processing to transportation. In China, the people are always ready for trying or experiencing new things and the innovation can have enough market in China. For example, the e-payment has almost replaced all other payment ways in the daily life and cash can be rarely to be found in people's life. Even China and Brazil have different and special characteristics each, the technology has made it not impossible to borrow the idea and way of improving the efficiency of agriculture and adapted accordingly. As for the operation in the harbors, the competitiveness can be strengthened with better technology, which may add more score to the bilateral trade between China and Brazil.

4.2 Challenges

In the coming years, there are quite some challenges for the development of agricultural trade and investment cooperation between China and Brazil. Some of them are from the trade regime, and others may come from the more diversified and related areas.

4.2.1 Pandemic impact breaks the balance between supply and demand

Covid-19 pandemic has affected the world economy in an unprecedented way by blocking the flow of economic resources and make people panic when they are communicating with others. As vaccination is progressing fast in many countries, trade is increasing again. Especially demand from China is turning back to past levels, provoking a strong increase in many commodity prices. The pandemic will be an important factor to both countries in the coming years. It will change the ability for the enterprises and individuals to work. Agriculture is an industry needing stable environment and more patience. When farmers cannot decide the planting plan, irregular supply of agricultural materials disturb the process of planting, the harvest may not be a certain result in the harvesting season. It's natural for the

government to prioritize food supply. Some restrictive measures may be enforced to reduce the export volume. Uncertainty also increases in the demand side. When the manufacturing activities slow down, the need to import more inputs also drops. The income of consumers shrinks to reduce import of agricultural products while more substitutes would be the choices of consumers instead. Pandemic exhausts the resources of the government and medical system, also harming the agricultural sector. More emphasis of the government will be put to keep the enterprises alive, to prevent the spread of virus and to protect the weakest group in the society. Policies would be concentrated more on the safety of economy, instead of improving the infrastructure. But what is happening during the course of 2021 is a steady recovery around the world and agricultural international trade increasing very fast.

4.2.2 More practices of protectionism distort the international market

It's usually for countries taking more protectionist policies when the economy in bad conditions. In the weak cycle of economy, there are not enough demand in the domestic market. Governments may prefer to limit imports to leave more room for its industries while helping the export sector. After the 2008 financial crisis, quite some countries decided to use more restrictive measurements on the trade and investment fields. G20 is one of the most important forums where the main economies in the world discuss and cooperate the topics in the governance area. It has been more than 10 years for the economies gradually reduce their protectionism. And the reason is that their economy recovery instead of good will. This round of economic recession was caused by the disease, which impact almost all economies together. Without time windows among different partners in the economic crisis, the protectionism can be more popular no matter in developed or developing economies. When countries deny their promises of keeping low tariff and using few policies to limit competition, the international trade will be difficult to continue. As agricultural products are one of the most affected categories by protectionism, it will be more challenging to continue the trade in agricultural products with quite some protectionism. Not only the international trade suffers from the protectionism, the transnational investment will be much harder in the time of more protectionism. The critics may accuse the government not protecting the intellectual property, employment, or other valuable resource of its national enterprises, neglect the complementary cooperation with foreign partners and push the parliament institutions to establish stricter and more complicated rule system for the administration of foreign investment. With more protectionism, companies can only choose the place to operate or partners to do business with passively. In most cases, the decision will have less efficiency. Supply chain may have to be reconstructed to adapt itself to the new restrictive conditions. The function of market for the allocation of economic factors will be much less effective. Trade transfer will happen when the protectionism blocks the trade or input more uncertainty in the trade relationship. China and Brazil are both exporters and importers. When there is more pressure in the agricultural products from other countries' protectionism, which leading to more trade transfer to these 2 countries, it is not quite stable or sustainable only on this base, more factors would make the trade relationship fragile. Even in China and Brazil, there are quite some people worry about the opening policy may lead to worse results with more involvement of foreign companies or professionals.

4.2.3 Malfunction of DSU in WTO limits the ability to deal with disputes

Companies intend to treat the international trade as what they are doing domestically. But there are so many different systems, cultures, preferences in different countries, which make it necessary for the international trade participants to deal with the differences. When WTO was established in 1995, there was a common consensus that a stable and transparent environment for all its members should be available to all. The dispute settlement utility is regarded as the jewelry on the crown of WTO, where WTO members give authority to WTO for deciding the right way for the practices. After 25 years, there are not further development in WTO, which bring some civisms on the mechanism of WTO. While most of WTO members agree to improve it instead of discarding it. In 2019, with the blocks from appointing judges by U.S., the dispute settlement mechanism cannot continue its function as designated by the members, which bring quite some challenges on the binding commitments of the members. Although the expert panels can still be established as per the request from the members, the decision of Dispute Settlement Utility would not be necessarily followed by the related members. They may choose to appeal to the Appellate Body where there is no response. In WTO, there are quite a lot of rules for limiting its members willingness for setting unfair barriers or limit others from competitions. The TBT and SPS are special parts to regulate the related trade practices. Agricultural products have their nature of being special and unstable. The weather or other natural factors can change the quality a lot. Some members are setting measurements to prevent the spread of dangerous pests or disease. It is not easy to tell from the case directly and convince others their arguments. The DSU had been one of the most important and feasible mechanism to deal with these undefined trade disputes. Although China and Brazil both are the members of the newly established temporary appeals system, its position is still in question and some other members keeping questioning its legal status. Actually, the dispute mechanism of WTO had been overloaded even before 2019. When more members are having better understanding about the dispute mechanism, they would like to use it to tackle the trade disputes. As the largest platform of trade in the world, the disputes continuously increase in the past. Too many

disputes were queuing for settlement. Lack of input of experts and other resources has gradually driven the members away from pursuing settlement from WTO. As there are more development on the agricultural products and more specific requirements from the administration, the disputes in the agriculture would increase. As China and Brazil are both important developing countries with large trade volume and diversified industry structure, the disputes are quite natural. Without proper ways to deal the disputes, not only the related transaction or activities will be stalled, confidence of developing better trade relationships will not be easy.

5 POTENTIAL AREAS OF AGRICULTURAL COOPERATION

5.1 Agricultural trade

China has become the world's largest importer of agricultural products, with the growth of China's population and the upgrading of residents' consumption, China's domestic demand for food and other raw materials of agribusiness origin, like cotton and wood pulp will continue to expand, and the demand for imported agricultural products will remain strong. There is huge room for growth in agribusiness trade between China and Brazil.

Brazil's soybean, corn, and rice exports to China have growth potential. Meat exports are expected to become a new bright spot in bilateral trade. As the Sino-US trade friction continues, Brazil will occupy an important position in China's soybean imports. Brazil is an important corn and rice exporter in the world. China imports a large amount of corn and rice every year, but imports from Brazil are very limited. These two agricultural products have growth potential in bilateral trade. In addition, China's income growth and the adjustment of dietary structure have also stimulated the demand for meat imports. Taking beef as an example, China has transformed from a net beef exporter to a net importer. Since China officially opened up beef imports to Brazil in 2014, Brazil's beef exports to China have grown rapidly, making Brazil the largest source country for China's imports of this product. In 2019, China imported 399,000 tons of beef from Brazil, accounting for 24.1% of total beef imports.[25] Brazil is also the largest source of Chinese chicken imports. According to data from the Brazilian Association of Animal Protein (ABPA), China imported 585,300 tons of chicken from Brazil in 2019, increasing by 34% year-by-year. As China gradually issues new import licenses to Brazilian meat companies, Brazilian meat exports to China may achieve considerable growth. Other goods, like coffee, fish and fruits also have good opportunities in the Chinese market.

The expansion of China-Brazil trade also provides opportunities for China to export products related to the industrial chain such as fertilizers and veterinary drugs. The strong demand for Brazilian agricultural products in the Chinese market has stimulated the increase in crop planting, livestock and poultry breeding in Brazil, as well as the demand for agricultural inputs in Brazil. China is an important supplier of Brazil's pesticides, veterinary drugs and feed additives, and related export companies are expected to benefit from the expanding trade of agricultural products between the two countries.

5.2 Investment cooperation

Brazil is China's largest investment destination in Latin America. The average annual growth rate of China's investment in Brazil in the past ten years has been as high as 30%. The continuous expansion of China-Brazil agricultural trade will further promote the bilateral investment. The structural reforms and privatization that the Brazilian government is promoting also provide favorable conditions for the two countries to carry out investment cooperation.

Brazil has investment potential in food production, processing and livestock farming. China's investment structure in Brazil's agricultural sector depends largely on its agricultural import demand. Currently, much of the Chinese investment in Brazil is concentrated in soybean production and soybean oil processing. With Brazil's prominent position in China's soybean import, there is room for further growth in China's investment in Brazil's soybean industry chain. The expansion of China's imports of beef and chicken may bring more funds to the field of livestock and poultry breeding. Corn and cotton, as Brazil's potential products, are also important areas for attracting Chinese investment.

In addition, as Brazil's agricultural transport conditions need to be improved, transport infrastructure is another potential field. With a huge gap in Brazil's domestic transportation infrastructure, insufficient capacity has severely restricted the trade of agricultural products. At present, the annual transportation demand of Brazil's agribusiness reaches 10 billion tons, the logistics system is under tremendous pressure. It is expected that the transportation demand will increase by a quarter in the next ten years (Jank, Guo and Miranda, 2020, p. 274). The Brazilian government hopes

25. Available at: <https://bit.ly/3h7sXrR>.

to attract foreign investment to improve the present state of domestic infrastructure and increase exports of soybeans as well as other grains and food. Chinese companies have a global comparative advantage in terms of technology, operational management and costs to support Brazil's transportation infrastructure.

5.3 Technology and innovation

China and Brazil have respective advantages in agricultural science and technology. Bilateral cooperation will be helpful in the development of agribusiness and the increase of farmers' income in both countries.

Brazil has rich experience in improving ecological environment. As a major producer and exporter of agricultural products in the world, Brazil has always attached importance to the application of scientific and technological innovation in the agriculture. The book *Agriculture and industry in Brazil: innovation and competitiveness* by Ipea pointed out that 69.7% of the steady expansion of Brazilian agricultural output should be attributed to technological innovation. Brazil has successfully developed the tropical savanna through the "tropical agricultural revolution" into fertile fields suitable for growing soybeans, coffee and tropical fruits, increased the production of soybeans, beef cattle and other animals and plants by establishing a tropical crop and livestock production system, carrying out grass and legume breeding programs and animal breeding programs. Since hybrid breeding enables soybeans to adapt to tropical climate, the savanna has become an important soybean production area. Brazil's experience in experimental farming, soil improvement, selection and breeding is of great significance for China to improve the ecological environment and increase food production (Meng, Yujiao and Mei, 2018).

China's hybrid rice technology ranks leading position in the world. As Brazil is dominated by tropical climate, the two countries can cooperate in rice cultivation technology. China is also committed to increasing production and farmers' income through technological innovation. Through the scientific and technological information network, governments at all levels, science and technology organizations, leading enterprises have promoted the production and processing of agricultural products in the main grain producing areas and surrounding areas to extend the industry chain and increase the added value of agricultural products. China has also applied cloud computing, Internet of Things, big data, remote sensing and artificial intelligence to agricultural production. The real-time monitoring of crops and soil from macro to micro has effectively reduced the rate of pests and diseases, and improved the yield and quality of crops. China and Brazil can exchange experience and cooperate closely in promoting the development of agricultural science and technology.

5.4 Low-carbon and sustainable development

Agriculture is one of the major sources of greenhouse gas emissions and environmental pollution. Low-carbon agriculture is the future direction of agriculture in China and Brazil. Biomass energy, three-dimensional planting and breeding are typical models of low-carbon agricultural development. China and Brazil have great potential for cooperation in these areas.

Brazil and China have complementary advantages in experience and resources in the development of biomass energy. Brazil is one of the leading countries in the industrialization of biomass energy. Its technology for producing ethanol from starch and sugar has reached the world's top level. Brazil is the largest producer of sugarcane ethanol, and half of global ethanol exports come from Brazil. At present, China is actively adjusting its energy structure, renewable resources such as biomass energy are important directions for the future development of the energy industry. Compared with Brazil, China's biomass energy research started late, related technologies still needs to be improved. China can learn a lot from Brazil's development experience.

At present, Brazil's biomass energy raw material is mainly sugarcane, which belongs to the first generation of biomass energy technology. There are doubts about the greenness and cleanliness of the first generation of biomass energy. Firstly, the development of biomass energy may increase food consumption or encroach on arable land, thereby threatening food security; secondly, it may aggravate natural forest logging and increase carbon emissions; thirdly, the production process (such as cleaning, incineration, etc.) will also cause environmental pollution. Compared with the first-generation biomass energy technology, the second-generation biomass energy technology, which uses straw, grass, wood and other agricultural and forestry wastes as the main raw materials, is more environmentally friendly and will not pose a threat to food security. China is one of the countries with the richest straw resources in the world. With a production of billions of tons of crop straw every year, China has broad prospects for the development of second-generation biomass energy technology. At present, the second-generation biomass energy technology is still in the laboratory stage. China and Brazil can complement each other in terms of resources, capital, experience, and technology, and jointly promote the commercial application of the second-generation biomass energy technology.

Three-dimensional planting and breeding can effectively alleviate the pressure on resources and environment caused by agricultural production. China has accumulated rich development experience in three-dimensional planting and breeding. A classic case of three-dimensional planting is the farming of foundation ponds created by farmers in the Pearl River Delta region of China. They dug low-lying land with potential flooding hazards into pond to raise fish, and pile up the earth around the pond to make a dyke, where mulberry trees, fruit trees and flowers are planted Mulberry leaves are used to raise silkworms, silkworm manure and crop residues are thrown into ponds to feed fish, and the silt in the pond provides fertilizer for mulberry and fruit trees, thus forming a complete ecological microcirculation system. In addition to base pond agriculture, Chinese farmers also use high crops, short crops and different production times for intercropping, mixed cropping, and polyculture based on local conditions. Three-dimensional planting and rearing have greatly improved the utilization rate of land, effectively protected the ecological environment, and increased the benefits of farmers. With the continuous expansion of agricultural production, Brazil is facing problems such as over-expansion of agricultural and pastoral land, the deforestation of the Amazon Forest. Three-dimensional breeding can be used as an effective measure to alleviate this dilemma.

5.5 Food safety

The quality of agricultural products is an important aspect of food safety. As the world's major producing and trading countries, China and Brazil have broad space for cooperation in Capacity-building for food safety governance.

It is important for the two countries to strengthen exchanges in standardized production, product traceability management, inspection and quarantine. China is the largest export destination of Brazilian agricultural products. Strengthening exchanges between China and Brazil in agricultural production, inspection and quarantine will help reduce bilateral agricultural trade frictions, promote trade expansion and high-quality development in the two countries. At present, China is accelerating the revision of the *Law of the People's Republic of China on Quality and Safety of Agricultural Products* and improving the food safety source guarantee mechanism. China is actively promoting the integration of food nutrition standards with international standards and has initially established a framework for agricultural product nutrition standards. Relying on advanced technologies such as big data and the Internet of Things, the Ministry of Agriculture and Rural Affairs, the Ministry of Commerce and other relevant administrations are speeding up communication to establish a traceability management system for the entire chain: planting, processing and circulation to consumer terminals. China has also strengthened its control over agricultural inputs such as pesticides and veterinary drugs, and guides farmers to conduct green production. Product traceability has achieved full coverage of the veterinary drug production link. It is conducive for Brazil to learn in advance about China's new developments in standards, rules and regulatory technology in order to reduce export risks and promoting the smooth flow of trade. In addition, as important powers in Asia and Latin America and the WTO, China and Brazil should enhance their cooperation in the fields of agricultural development and food safety, which is conducive to further enhancing their voice in trade rule-making and global governance.

Due to covid-19, it is also important for the two countries to enhance cooperation in risk alert and emergency response. In 2020, the global outbreak and spread of the epidemic gave new connotations to food safety. The epidemic not only impacted the economic and social development of China and Brazil, but also brought severe challenges to the safety of agricultural trade. The increasing number of worldwide infections has increased the hidden dangers in import and export, all countries are facing unprecedented challenges of food safety assurance. Since agricultural products transported between China and Brazil have to go through a long process with several transit links, it's important for the two countries to set up a more efficient information exchange and consultation mechanism, which will be helpful to reduce the adverse impact of the epidemic on agricultural trade and may also contribute to the global food safety governance.

6 PROPOSALS

Strengthen the communication and dialogue on agricultural policies between China and Brazil. Brazil, as an important global exporter of agricultural products, and China, as an important global importer of agricultural products, both have a common policy stance on maintaining the stability of the agricultural product market and ensuring the quality and security of agricultural products, as well as differences in domestic support policies and border measures. The two countries should strengthen communication and enhance understanding of their respective agricultural policy positions. It is necessary to further improve the communication mechanism of the Agricultural Subcommittee of Cosban, promote comprehensive and in-depth pragmatic cooperation in various fields such as agricultural science and technology, production, processing, and trade, and actively promote the negotiation of the China-Brazil Free Trade Agreement. China and Brazil should strengthen the strategic mutual trust of the interdependence of supply and demand between the two countries, and actively exert the influence of the major supplier and consumer countries.

Gradually develop the growth potential of Brazil's agricultural production and bilateral trade to avoid big ups and downs. Brazil's farms are large in scale and highly market-oriented, and respond more sensitively to market demand stimulus. China's short-term rapid growth in its imports of agricultural products can easily lead to excessively rapid release of Brazilian production capacity, resulting in a "big rise", but if China increases agricultural products import from other countries, imports from Brazil will inevitably lead to a short-term sharp decline, which is not conducive to the steady development of bilateral trade. China and Brazil should take a long-term view and gradually release the growth potential of agricultural imports from Brazil.

Promote the integration and collaboration of the entire agricultural industry chain between China and Brazil. Strengthen the layout of the Brazil's agricultural material supply, grain source procurement, storage, transportation and marketing, and agricultural product processing. On the basis of China's existing investment in different links of Brazil's agricultural industry chain, China can provide technical support and services for Brazilian farms by strengthening its supply of seeds, pesticides, and fertilizers. China can also cooperate with Brazil to solve the sales problems of Brazilian farm products with Chinese enterprises' capabilities in purchasing, transporting and processing. China and Brazil can cooperate in the construction of agricultural science and technology research and development centers, agricultural processing demonstration parks, and agricultural investment development zones to establish an affinity and trust relationship between Chinese and Brazilian companies.

Actively carry out cooperation between China and Brazil in Brazilian agricultural product transportation infrastructure, and build Brazilian grain source channels and logistics channels.

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APPENDIX A

TABLE A.1
Sensitive agricultural products for China in China-Australia and China-Chile Free Trade Agreement

HS Code	Commodities
03057100	Shark fins
10011100	Seed
10011900	Other
10019100	Seed
10019900	Other
10051000	Maize seed
10059000	Maize excl. seed
10061011	Long grain seed, in husk (paddy or rough)
10061019	Other rice seed, in husk (paddy or rough)
10061091	Long grain, in husk (paddy or rough)
10061099	Other rice, in husk (paddy or rough)
10062010	Husked (brown) long grain
10062090	Other husked rice
10063010	Semi-milled or wholly milled long grain
10063090	Other semi-milled or wholly milled rice
10064010	Broken long grain
10064090	Other broken long grain
11010000	Wheat or maslin flour
11022000	Maize (corn) flour
11029011	Rice flour of long grain
11029019	Other rice flour
11031100	Wheat, meal
11031300	Maize, meal
11031921	Long grain, meal
11031929	Other rice, meal, nes
11032010	Wheat pellets
11042300	Other worked grains of maize (corn), nes
12019010	Yellow soya beans
12019020	Black soya beans
12019030	Green soya beans
12019090	Other
12051090	Other low erucic acid rape or colza seeds
12059090	Rape or colza, nes
15071000	Crude soya-bean oil
15079000	Soya-bean oil (excl. crude) and fractions
15081000	Crude ground-nut oil
15089000	Ground-nut oil (excl. crude) and fractions
15091000	Virgin olive oil and fractions
15099000	Olive oil and fractions (excl. virgin)

(Continues)

(Continued)

HS Code	Commodities
15100000	Other oils and their fractions, obtained solely from olives, nes
15111000	Crude palm oil
15119010	Palm oil (excl. crude) and liquid fractions
15119020	Palm stearin
15119090	Other palm oil and its fractions, nes
15121100	Crude sunflower-seed and safflower oil and fractions thereof
15121900	Sunflower-seed and safflower oil (excl. crude) and fractions thereof
15122100	Crude cotton-seed oil, whether or not gossypol has been moved
15122900	Cotton-seed oil (excl. crude) and fractions thereof
15131100	Crude coconut (copra) oil and fractions thereof
15131900	Coconut copra oil (excl. crude) and fractions thereof
15132100	Crude palm kernel or babassu oil and fractions thereof
15132900	Palm kernel or babassu oil (excl. crude) and fractions thereof
15141100	Crude low erucic acid rape oil
15141900	Other low erucic acid rape oil
15149110	Crude rape oil
15149190	Crude mustard oil
15149900	Other rape oil and mustard oil and its fraction, nes
15151100	Crude linseed oil
15151900	Linseed oil (excl. crude) and fractions
15152100	Crude maize (corn) oil
15152900	Maize (corn) oil (excl. crude) and fractions
15179090	Edible mixtures preparations of fats and oils, nes
15180000	Animal or vegetable fats and oils and fractions thereof chemically modified, nes, incl inedible preps of fats and oils
16042091	Shark fin
17011200	Raw beet sugar, in solid form
17011300	Cane sugar specified in Subheading Note 2 to this Chapter
17011400	Other cane sugar
17019100	Cane or beet sugar, chemically pure sucrose, containing added flavouring or colouring
17019910	Granulated sugar
17019920	Superfine sugar
17019990	Other cane or beet sugar, chemically pure sucrose, in solid form, nes
24011010	Flue-cured tobacco, not stemmed/stripped
24011090	Tobacco other than flue-cured, not stemmed/stripped
24012010	Flue-cured tobacco, partly or wholly stemmed/stripped
24012090	Tobacco o/t flue-cured, partly or wholly stemmed/stripped
24013000	Tobacco refuse
24021000	Cigars, cheroots and cigarillos containing tobacco
24022000	Cigarettes containing tobacco
24029000	Cigars, cigarillos, cigarettes, etc, of tobacco substitutes
24031100	Water pipe tobacco specified in Subheading Note 1 to this Chapter
24031900	Other
24039100	Homogenized or reconstituted tobacco

(Continues)

(Continued)

HS Code	Commodities
24039900	Other manufactured tobacco, tobacco extracts and essences nes
52010000	Cotton, not carded or combed
52030000	Cotton, carded or combed

Source: World Trade Organization (WTO). Available at: <https://bit.ly/35UhxFK>.
Authors' elaboration.

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