Major Research Paper

Canola Disputes in Canada-China Agricultural Trade: A Chinese Policy Perspective

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List of acronyms and abbreviations

AQSIQ	General Administration of Quality Supervision
ASEAN	Association of Southeast Asian Nations
BRI	Belt and Road Initiative
CAAS	Chinese Academy of Agricultural Sciences
CCP	Chinese Communist Party
CERE	China-Europe Railway Express
CLGFEA	The central leading group for financial and economic affairs
CLGs	Central Leading Groups
CPPCC	Chinese People's Political Consultative Conference
DRCSC	Development Research Center of the State Council
EU	Europe Union
FAO	Food and Agriculture Organization
GAC	General Administration of Customs
GMO	Genetically Modified Organism
L.biglobosa	Leptosphaeria biglobosa
L.maculans	Leptosphaeria maculans
MARA	Ministry of Agricultural and Rural Affairs
MMT	Million Metric Tons
MOA	Ministry of Agriculture
NBOCPDP	National Bulk Oil Crops Production Development Plan
NPCSC	National People's Congress Standing Committee
NSL	National Security Law
SME	Small and Medium-sized Enterprise
SOE	State Owned Enterprises
TBT	Technical Barriers to Trade
TSP	Temporary Storage Program
USCC	U.S.-China Economic and Security Review Commission
USDA	United State Department of Agriculture
WTO	World Trade Organization

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Notes

1. ***Canola*** *was bred from rapeseed, but their chemical compositions and nutritional profiles are very different. … To be called canola anywhere in the world, a plant must have 2% or less erucic acid in the oil and 30 micromoles per gram or less of the normally measured glucosinolates in the meal ... About 75% of canola seed, oil and meal produced in Canada is exported to destinations such as the United States, Japan, Mexico, and China* (Canola Council of Canada, n.d.-b, n.d.-a).[1]

2. HS code 1205: rape or colza seeds; whether or not broken. This code covers rape or colza seeds and their varieties.

3. HS code 120510: low erucic acid rape or colza seeds, whether or not broken. This code refers to canola seed that Canada exports to China in this report.

4. HS code1511: palm oil and its fractions, whether or not refined (excl. chemically modified)

5. The word "rapeseed" in this report refers to HC code 1205.

6. Oilseeds: include rapeseed, canola seed and other oil-bearing seeds.

7. Oil crops: include rapeseed, peanut, sunflower, camellia oleifera, etc.

8. WTO ALL AG Lines: contain 270 agricultural products with HS 6 code ranging from 010121 to 510111 classified by WTO.

[1] https://www.canolacouncil.org/oil-and-meal/what-is-canola/canola-faq%27s/

Abstract

Contrary to the narrative that presents the latest round of trade disputes between Canada and China with respect to canola as Chinese retaliation for Meng Wanzhou's extradition arrest, a retrospective and systematic review of China's agricultural policies helps to understand the broader political and economic context behind China's latest decision to block canola imports from Canada. This is not to say that Ms. Meng's arrest does not play a role in the latest dispute; however, as this report makes clear, the dispute reflects deeper structural trends in China's agricultural policy. This means that canola trade between Canada and China is unlikely to resume its previous long-term growth path once the current dispute is resolved.

Based on an analysis of trade data, of two previous canola disputes between Canada and China, and of Chinese agricultural policies, this report offers a Chinese policy perspective on the current Canada-China canola dispute. As such, it explores the domestic socio-economic factors and external pressures underlying China's restrictions on Canadian canola imports in 2009 and 2016. Tracking the evolution of China's agricultural policy, it is clear that China planned to limit canola imports, due to its concerns of food security and self-sufficiency, long before the unexpected ongoing Canada-China tensions. The analysis indicates that China has not only been adjusting it agricultural structure to enhance its food security but it has also been advancing the "Belt and Road" initiative (BRI) to diversify its imported food supply.

This report concludes that the current crisis could have been mitigated if Canadian canola industry had paid closer attention to long-term agricultural policy developments in China. To avoid the same problem repeating itself in the future, it is essential for the Canadian canola industry and governments at the federal and provincial levels to understand what China's long-term policy goals and actions are.

Introduction

Agricultural trade has played a crucial role in Canada-China relations. Sixty years ago, Canada pioneered wheat sales to China that contributed to establishing formal diplomatic relations between the two countries. Since then, Canada has become an important source of agricultural products for China, canola being the most important for last two decades.

In early March 2019, China began blocking shipments of canola from Canada when it revoked Richardson's license on quality grounds (Evans, 2019). A second Canadian exporter, Viterra, saw its license cancelled a few weeks later after Chinese authorities claimed that they had found pests in shipments imported from Canada (Patton and Gordon, 2019). The imposition of strict customs inspections and likely quarantine for Canadian canola shipments led Chinese importers to cancel all canola orders (and those of other agricultural products) from Canada (Vanderklippe, 2019). China's actions vis-à-vis canola shipments from Canada have generally been interpreted as Chinese retaliation for Meng Wanzhou's arrest in early December 2018 by Canadian authorities in response to an extradition request by the United States.[2]

The current canola trade dispute provoked by Chinese authorities also reflects deeper, structural issues with respect to China's agricultural policies. This report argues that China's current restrictions on Canadian imports of canola contribute to its long-term agricultural policy goal, which is to enhance the country's food security through increased domestic production and diversification of its foods imports in order to be less dependent on specific country suppliers such as Canada. Based on an analysis of trade data, of two previous canola disputes between Canada and China, and of Chinese agricultural policies, this report concludes that the current crisis could also have been mitigated if Canadian canola industry had paid closer attention to long-term, agricultural policy developments in China. Instead, the Canadian government's intervention to solve the 2016 canola trade dispute with China through a temporary resolution, which was due to expire in 2020 (Miller, 2017), has given producers a false sense of security that canola exports to China would continue to grow unabated in the long term. Although Canada's immediate task is to resolve the current dispute and find alternative markets for cancelled canola shipments, it is essential for the Canadian canola industry and governments at the federal and provincial levels to understand better what China's long-term policy goals and actions are.

This report is divided into three analytical sections. The first section examines canola's role in Canada-China agricultural trade. In general, the US has a dominant impact on Canada's agricultural trade; however, China is Canada's biggest client when it comes to canola, which

[2] Ms. Meng is Huawei's Chief Financial Officer and daughter of the company's founder, Ren Zhengfei.

makes Canadian producers particularly vulnerable to policy shifts adopted by Chinese authorities. Looking back to the two canola trade disputes between China and Canada in 2009 and 2016, this report suggests that domestic socioeconomic factors and the 2007-2008 global food crisis were the main rationales for China to limit canola imports from Canada. As a result, they shed light on the underlying reasons for the current dispute/crisis.

The second section explains the model of policy making in China and explores new governance trend under Xi Jinping and his administration. If Canada is to have an effective agricultural trade strategy vis-à-vis China, it is crucial that governments and producers understand how policy is generated and implemented in China. After undertaking a detailed analysis of its agricultural policies, this report demonstrates that China was preparing to limit canola imports long before the current Canada-China tensions. China has been upgrading its agricultural policy toolkit based on lessons learned since 2007-2008 global food crises. China has not only been adjusting policies to enhance its food security but it has also been advancing its "Belt and Road" Initiative (BRI) to diversifying its imported food supply.

The third section focusses on China's agricultural policy on oil crops development and agricultural trade under BRI. To enhance food security and raise self-sufficiency rate above 40% for edible oil, the country is striving to use a variety of means to strengthen domestic agricultural development and diversify its sources of food imports in a sustainable way. This section measures how well China has delivered on its policy goals so far.

The report's conclusion offers a set of recommendations for Canada to improve its management of Sino-Canadian agricultural relations over the long run.

1. Canola in Canada-China agricultural trade

In general, the United States dominates Canada's agricultural exports, accounting for more than half of the total (Table 1). China is Canada's second largest destination for agricultural products with a market share of approximately 12%; however, exports to China grew rapidly at 14% annually on average between 2014 and 2018 while those to the US remained stable.

Table 1: Canada's top-5 agricultural export destinations (2014-2018, USD billions)

	2014	2015	2016	2017	2018	% share (2014-2018)	average annual growth rate
United States	24.6	23.3	23.1	24.0	24.9	52.9%	0.3
China	4.3	4.4	4.6	5.5	7.2	11.5%	14.3%
Japan	3.5	2.8	3.0	3.2	3.3	7.0%	-0.3%
Mexico	1.5	1.4	1.3	1.5	1.5	3.2%	-0.6%
India	0.8	1.2	0.9	0.7	0.1	1.7%	-20.9%
World	47.5	44.3	43.1	45.4	46.7	100.0%	-0.3%

(Source: Global Trade Tracker, 2019)

For canola, China is Canada's first client, with 41.4% of total exports in the last five years (Table 2). Between 2014 and 2018, Canada sold a total of $9.3 billion worth of canola to China, with an average annual growth rate of 2.7%. Among all agricultural products exported to China in the last five years, canola seed (HS code: 120510) is the most important commodity, representing 36% of all Canadian agricultural exports to China (Table 3).

Table 2: Canada's top-5 canola export destinations (2014-2018, USD billions, HS code: 120510)

	2014	2015	2016	2017	2018	% share (2014-2018)	average annual growth rate
China	2.1	1.6	1.5	2.0	2.1	41.4%	2.7%
Japan	1.1	0.8	0.9	1.1	1.0	22.0%	-1.4%
Mexico	0.7	0.6	0.6	0.7	0.5	13.8%	-3.1%
Pakistan	0.2	0.3	0.5	0.3	0.2	6.9%	20.9%
United States	0.5	0.2	0.2	0.2	0.2	6.2%	-10.1%
World	4.7	3.9	4.3	5.0	4.4	100.0%	-0.4%

(Source: Global Trade Tracker, 2019)

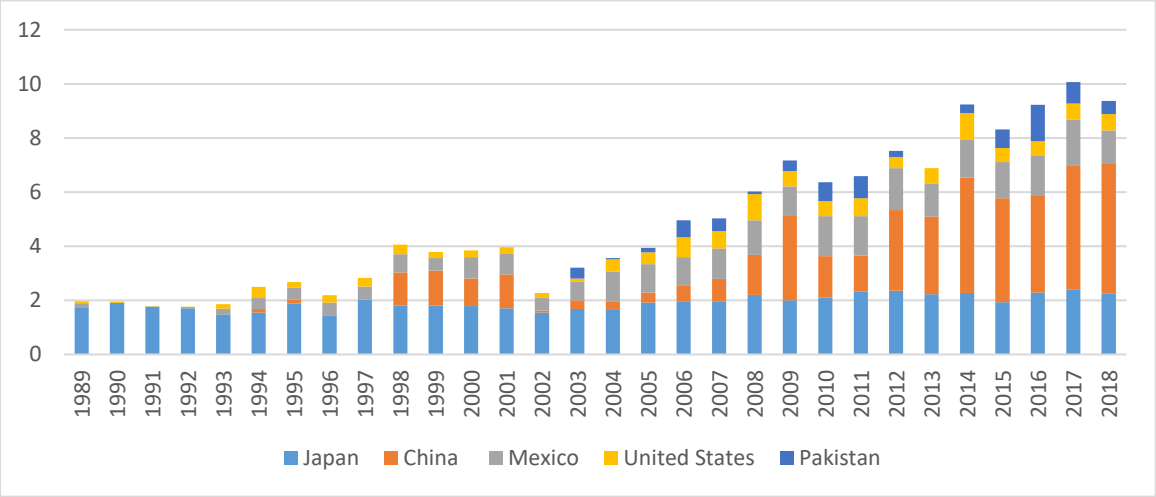
Table 3: Canada's top-5 agricultural exports to China (2014-2018, USD billion)

HS Code	Description	2014	2015	2016	2017	2018	% share (2014-2018)	average annual growth rate
120510	low erucic acid rape or colza seeds	2.1	1.6	1.5	2	2.1	35.70%	2.70%
120190	soya beans	0.3	0.5	0.7	0.8	1.3	13.60%	51.70%
151411	low erucic acid rape or colza oil	0.4	0.4	0.4	0.5	0.8	9.70%	22.00%
071310	dried, shelled peas	0.3	0.2	0.3	0.3	0.6	6.70%	22.00%
100390	barley	0.2	0.2	0.2	0.3	0.4	4.80%	25.70%
WTO ALL AG Lines		4.3	4.4	4.6	5.5	7.2	100.00%	14.30%

(Source: Global Trade Tracker, 2019)

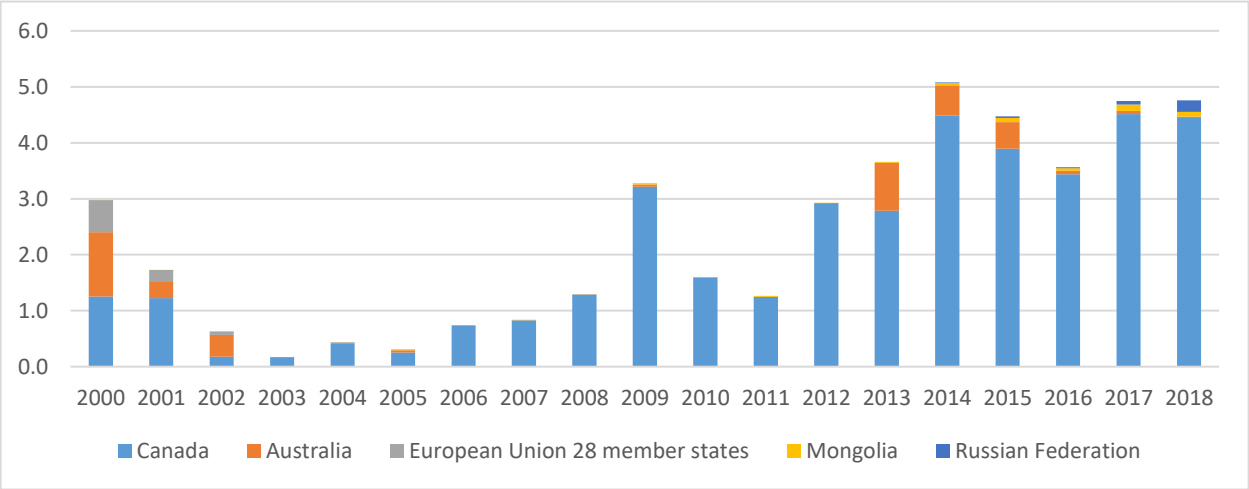
Canola's role in Canada-China agricultural trade has become essential. China was not always Canada's first canola buyer. Japan was Canada's dominant export market for most of the 1990s and 2000s (see Figure 1). In 1998, China started to buy significant amounts of Canadian canola as the Europe Union (EU) reduced its rapeseed exports to China for its own bio-diesel industry development (Wang, 2007). Canada became a vital canola supplier for China in the 2000s (see Figure 2). Since 2012, China has continuously been Canada's biggest canola buyer (see Figure 1). Since 2003, Canada has been China's largest canola supplier and has sold more to China than Australia, the EU, Mongolia and Russia combined (see Figure 2).

Figure 1: Canada's top-5 canola export destinations (1989-2018, million metric tons [MMT])



(Source: Global Trade Tracker, 2019)

Figure 2：China’s top-5 rapeseed (HS code: 1205) suppliers (2000-2018, MMT)



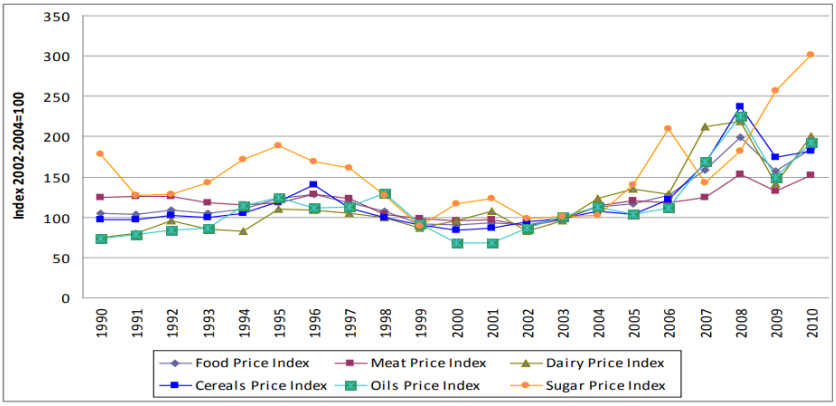
(Source: Global Trade Tracker, 2019)

China’s restrictions on canola imports before 2019

The current canola crisis between Canada and China is a kind of déjà vu. As Figure 2 indicates, China’s imports of rapeseed decreased significantly in 2010 and 2011, which mostly affected Canadian canola exports (see Figure 1). This drop was a result of agricultural policy adjustments undertaken by Chinese authorities in 2007–2008 that led to a surge in rapeseed production and imports in 2008-2009.

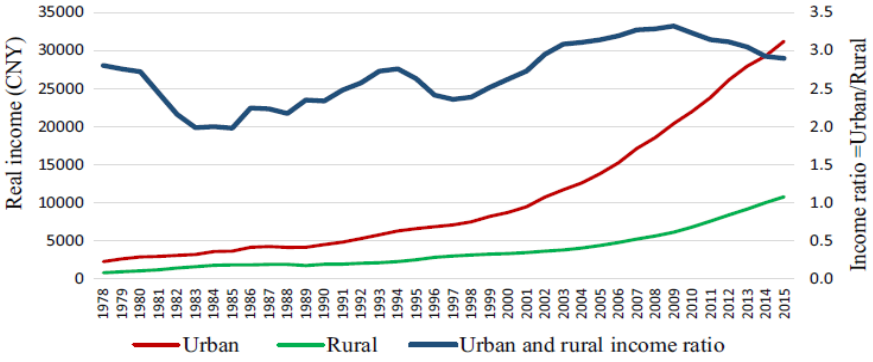
The 2007-2009 global financial crisis caused China’s economy to slow down as a result of a sharp decrease in foreign investment and demand for its exports. In response, the Chinese government embarked on a massive fiscal stimulus program to keep the economy going. At the same time, international food prices increased sharply (see Figure 3). Therefore, to secure its food supply during this period and increase farmer`s income (see Figure 4), China initiated a temporary storage program (TSP) for rapeseed, soybean and maize in 2008 (Huang and Yang, 2017).

Figure 3: Global annual food price indices



(Source: United Nations, 2012)

Figure 4: Per capita real income in Chinese rural and urban areas in 1978–2015



(Source: Huang & Yang 2017)

At that difficult time for China, the purchasing price was set at 4,400 RMB/ton for domestic rapeseed, which was 600 to 700 RMB higher than that of imported canola (Yang, 2009). This policy caused unexpected results:

1) The volume of domestic rapeseed production, imported rapeseed and reserved rapeseed all increased (Shao, 2019). The lower international price encouraged downstream industries like food processing, feed and livestock enterprises to increase rapeseed imports. In 2009, the imported rapeseed reached a record high of 3.3 MMT (see Figure 2).

2) Due to the substantial price gap between the domestic price and the international market price, local rapeseed was unable to compete with imports, mostly from Canada. China's national grain reserve system had to expand its procurement and storage of domestic rapeseed to maintain its targeted minimum purchasing price (Huang & Yang, 2017). This represented a heavy financial burden for the Chinese government. In some instances, rent-seeking (and illegal) activities occurred as lower-priced Canadian imported genetically-modified (GMO) canola was purchased in the name of the high-priced domestic rapeseed for the national grain reserve system (China Grain Reserves Group, 2013). Storing GMO food in the national reserve was, however, forbidden by the state, as the rapeseed oil sourcing from TSP claims to be GMO free (Qu, 2013).
3) 208 out of 220 local rapeseed oil processing enterprises experienced heavy financial losses during that period, such that only 12 companies were able to survive (Yang, 2009). Most domestic rapeseed oil processing enterprises were small and medium-sized enterprises (SMEs) that were too weak to compete with foreign multinational enterprises, such as Cargill, Yihai Kerry and big state-owned enterprises (SOEs) like COFCO. These big players, especially the multinational enterprises, could not only supply more imported rapeseed than SMEs but also had deep experience in supply management so that they could mitigate and transfer risks associated with price fluctuations (Hu, 2009). The SMEs' rapeseed oil production cost was around 12,000 RMB/ton, but their oils were sold at 7,800 RMB/ton, a loss of 4,000 RMB/ton after governmental subsidies (Shao, 2019).

Although the TSP helped stabilize China's domestic rapeseed production (see Table 6 in section 3 below), it did not accomplish its policy goal of protecting the domestic rapeseed industry. Instead, the policy indirectly subsidized foreign rapeseed exporters. To ensure food security and protect its agriculture, the state adjusted its purchasing price to 3,700RMB/ton to limit the import of rapeseed in 2009 (National Development and Reform Commission, Ministry of Finance, State Administation of Grain, Agricultural Development Bank of China, and China Grain Reserves Corp., 2009). Consequently, rapeseed imports declined significantly in 2010 and 2011. They fell to 1.6 MMT and 1.3 MMT respectively (see Figure 2).

The TSP was abolished in 2015. But the national reserve system had accumulated a massive amount of rapeseed since 2008 (see Table 4). The TSP had actually bought 24.2 MMT of rapeseed and had at least 5.2 MMT in stock at the end of 2015.

Table 4: Domestic rapeseed storage acquisition since 2008

Year	Purchase price (RMB/ton)	Planned purchase volume (MMT)	Actual purchase volume (MMT)	Equivalent to rapeseed oil (MMT)	Auction volume (MMT)	Targeted sale (MMT)	Inventory (MMT)
2008	4,400	1.5	1.5	0.5			0.5
2009	3,800	4.3	4.0	1.5			2.0
2010	3,900	2.3	2.5	0.8	1.4	0.6	0.8
2011	4,600	4.0	3.3	1.4			2.2
2012	5,000	4.2	4.4	1.5			3.7
2013	5,100	5.0	5.0	1.7			5.4
2014	5,100	5.0	3.5	1.1	0.2		6.3
2015	/	/	/	/	1.2		5.2
Total		26.3	24.2	8.45	2.8	0.6	5.2

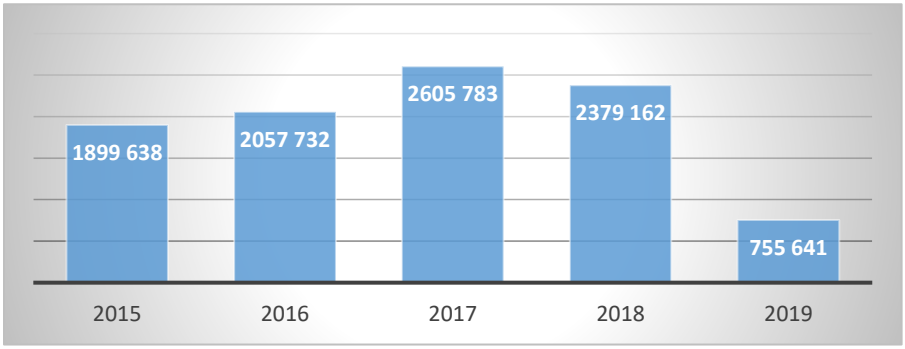
Sources : Dong (2016); Yu (2016)

In early 2016, canola exports to China became a hot topic again in Canada as there were strong pressures for China to reduce its rapeseed stocks and protect rapeseed farmers (Hui, 2016). This meant that rapeseed imports had to decrease. On April 1, 2016, China implemented a 1% dockage, a requirement to limit impurities in canola and minimize the risk of blackleg, a fungal disease contained in canola imported from Canada. This technical measure represented a dilemma for China. On the one hand, the 1% dockage requirement increased the price of imported canola by 20 USD/ton (Yu, 2016), reduced the volume of imported canola, maintained a price advantage for domestic rapeseed, and enabled the national reserve system to reduce its massive rapeseed stock (Li, 2016). On the other hand, the 1% dockage requirement caused domestic rapeseed supply tensions (Dong, 2016). Moreover, the quality of imported canola is better than local rapeseed: the average oil content of Canola No.1 Canada was 44.6% in 2016 (Economic and Commercial Counsellor's Office of the Chinese Embassy in Canada, 2018) whereas the average oil content of newly-harvested Chinese rapeseed was 38.2%, 2.2 percentage points lower than the previous two years (Standard Quality Center of State Administration of Grain, 2016). This domestic dilemma can partially explain why China finally agreed to extend the September 1st deadline of 1% dockage requirement during Trudeau's visit in Beijing in 2016 (CBC News, 2016). However, the 2016 temporary resolution left a shadow for Canadian canola trade with China. Luo Zhaohui, China's then ambassador to Canada, stated that "Canada has been inflexible and unfair in its approach to talks that began about seven years ago over Chinese concerns about rules for the make-up of canola shipments" (CBC News, 2016). He also complained that senior Canadian officials had politicized canola (MinPao, 2016), an economic issue, by making it a precondition for Trudeau's trip to China (Chandran, 2016). He warned that China could diversify its oilseeds supply when necessary (Johnson, 2016).

The current situation

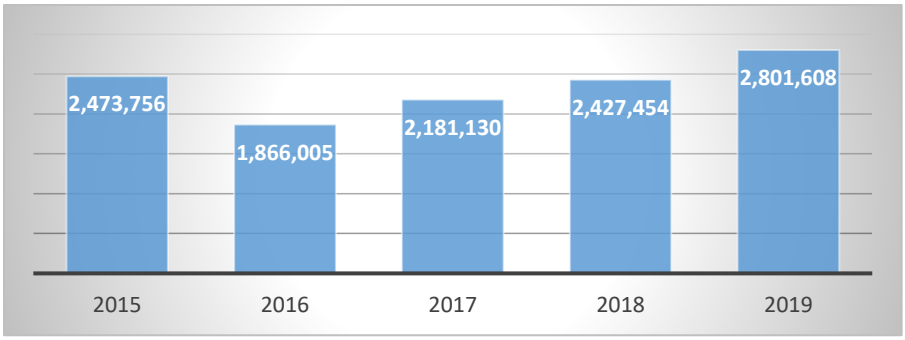
The Food and Agriculture Organization (FAO) predicted, in its newest report, that Canadian oilseeds shipments would decrease because of the ongoing canola tensions with China (FAO, 2019). After China revoked the licenses of two big canola exporters (Richardson and Viterra) in March 2019, Canada's canola exports to China were trending below 2018 levels, with a decline of 68.2% in the first six months of 2019 compared with the same period in 2018 (see Figure 5).

Figure 5: Canada canola exports to China (1st half year, Metric Tons)



(Source: Global Trade Tracker 2019)

Figure 6: China's total palm oil imports (1st half year, Metric Tons)



(Source: Global Trade Tracker 2019)

On the other hand, China's current palm oil imports have grown significantly in the first six month of 2019: an increase of 15.4% compared with the same period in 2018 (see Figure 6). This suggests that China is searching for rapeseed substitutes from other countries like Indonesia and Malaysia (FAO, 2019, p.36-37).

To solve the current canola conundrum, efforts are therefore required to monitor the following: the impact of Africa swine fever in China (Zhong & Tang, 2019) on the reduction of canola seeds demand; China's recent protein reduction for livestock feed (FAO, 2019); the unsolved US-China trade disputes (CBC News, 2019); and oilseeds supply to China from other exporting countries. However, if Canada plans to stabilize its canola trade with China in the longer run, more efforts are required to understand Chinese agricultural policy and development.

2. Agricultural policy in China

It is crucial to understand how policy is generated and implemented in China in order to have an effective Canadian agricultural trade strategy to expand market access and diversity trade, most especially with respect to canola. This section analyzes China's agricultural policy-making and new governance trends under Xi Jinping and his administration. Based on this analysis, the report finds that China had decided to limit canola imports long before the current Canada-China tensions. And complex socioeconomic factors seem to count more than scientific concerns for China to safeguard a set of much more robust and long-term national interests. Current policy moves demonstrate that China has been upgrading its agricultural policy toolkit based on the lessons learned after the 2007-2008 global food crises (United Nations, 2012). China has not only been adjusting policies to enhance its food security but it also been using the BRI to diversify its food supply and reduce its dependence on any particular country.

How policy is made and implemented to limit canola imports

In an era of digitalized mass media, China's governance system is more transparent than before. One can now easily piece up online information such as leaders' activities, governments' policy plans, law proposals and public consultations in order to have an overview of how policy is generated and implemented. Box 1 provides some of the main features of China's policy-making.

Box 1: Characters of policy-making and implementation in China

"The basic party-state dual model of governance and the primary principle that the party is the most critical policy maker moulded the main characteristics of China's decision-making process. This type of decision-making process can be referred to as the Chinese-style elite decision-making model, with collective leadership and consensus decision making in the party committee at each level" (see Annex 1).

(Sources: He, 2018, p.1)

"Development planning in contemporary China is driven by an unceasing process of information gathering, consultation, analysis, document drafting, implementation, experimentation, evaluation, and revision that is better thought of as a recurrent cycle of cross-level, multi-year policy coordination rather than an integrated, unitary plan system. Considering the mix of coordination mechanisms as well as the variation in the effectiveness and credibility of planning efforts across policy sectors, it is clear that China's planning system is not capable of dealing with everything it claims to address at once. Yet, at the same time, the evaluation and updating function it encompasses is useful even where it fails, since issues can move up in priority as policy-makers identify shortcomings".

(Heilmann & Melton, 2013, p. 617)

Chinese leaders see agriculture as the core foundation to ensure stable governance. Since 2004, "Three rural issues"[3] have continuously become the priority of No. 1 Central Document[4] (see Annex 2). In China, the No. 1 Central Document reveals the central administration's annual priorities and serves as an indicator for policy implementation and assessment. In a speech at the Central Rural Work Conference 2013, Xi Jinping said: "Chinese people's rice bowls must be firmly held in their hands at all times [...] Our rice bowl should be mainly loaded with Chinese food" (Zhao, 2019). He continued to emphasize the importance of food security, saying: "Safeguarding food security is an eternal issue for China and cannot be ignored at any time. Historical experience tells us that once there is a great famine, it is useless to have money. To solve the problem of feeding 1.3 billion people, we must rely on the domestic market" (Zhao, 2019). Xi's speech is not his personal opinion, but a consensus built among elites. Officials at

[3] Three rural issues: namely agriculture, rural areas and peasants.

[4] The policy document is issued by the Central Committee of the Communist Party of China and the State Council every year and has been dubbed the "No. 1 Central Document".

different levels (Ministry of Agriculture and Rural Affairs, 2016; Xiao, 2016; Zhang & Wang Di, 2017) all mention the importance to ensure food security by implementing a food crop production strategy based on farmland management and technological application (藏粮于地、藏粮于技战略), which underpin the country's food policy (Bai & Xiao, 2015; Chang and Cheng, 2013). The food security strategy is summarized in 20 Chinese characters: "以我为主、立足国内、确保产能、适度进口、科技支撑", which mean maintaining independence, focusing on domestic production and supply, ensuring production capacity, conducting appropriate import, and relying on science and technology. As the self-sufficient rate of edible oil in China is less than 40%, even Chinese scientists advocate for "firmly held 'oil bottle' in Chinese hand" (Hu, 2016; Zi, 2016). The National Bulk Oil Crops Production Development Plan[5] (NBOCPDP) was formed in this context (NBOCPDP will be discussed in detail in the third section below).

Policy making and policy implementation in China have two directions: top-down and bottom-up. The central government sets up long-term policy goals and guidelines based on the consensus formed by consultation with officials at different levels, scientists, business leaders and other stakeholders. Then, governments at each subordinated level are mandated to achieve expected results and provide feedback to the central government for policy adjustment and assessment. In December 2016, a policy advisory report on rapeseed production from Huazhong Agricultural University (Xiao, 2016) won first prize in the Hubei province's 2014-2015 Development Research Award (Zhu, 2016). The Hubei provincial government adopted and implemented this policy advisory report to boost its rapeseed production. Before winning the prize, Hubei provincial representatives (including officials, scientists and business leaders) had already proposed the policy report to the *Two Sessions*[6] held in March 2016 (China News, 2016; Xiao, 2016). In the letter to the Chinese People's Political Consultative Conference (CPPCC) addressing the report, the Ministry of Agriculture (MOA)[7] mentioned it would strengthen market monitoring and coordinate international and domestic markets to ensure local rapeseed production capacity and secure edible oil supply (Plantation Management Division, 2016). The two concrete steps mentioned in the letter are translated below:

1) Set up a domestic industrial safety-warning line

[5]《全国大宗油料作物生产发展规划（2016—2020 年）》(National Bulk Oil Crops Production Development Plan [2016-2020]).

[6] Two Sessions（两会）refers to plenary sessions of the National People's Congress and national committee of the Chinese People's Political Consultative Conference.

[7] The Ministry of Agriculture (MOA) changed its name to Ministry of Agricultural and Rural Affairs (MARA) in 2018 as a result of institutional reforms.

The increase in rapeseed imports and in local reserves has seriously threatened China's rapeseed industry (as discussed in the first section above). It is necessary to establish a domestic industrial safety-warning line to protect the rapeseed industry. According to the supply and demand situation of rapeseed and rapeseed oil (production and trade situation), China will scientifically set the import threshold (maximum import volume) of rapeseed and rapeseed oil and increase the monitoring and early warning of import damage to the industry. It will strengthen non-tariff measures[8] as well as apply anti-dumping or countervailing duties when the import volume exceeds the threshold, or when imports cause substantial damage to the domestic rapeseed industry.

2) Strengthen import quarantine inspection

Regarding the import of rapeseed, the state strictly enhanced the safety control measures for imported rapeseed, clarified the technical requirements for inspection and quarantine, and enhanced the research cooperation with China's canola suppliers like Canada and Australia to protect the domestic rapeseed industry further. In the next step, MOA will collaborate with related departments to continue to strengthen the quarantine inspection of imported rapeseed. It will strictly control the quality and safety risks of imported grain impurities, and timely report significant import quality and safety issues.

These two steps were based on one of MOA's funding research programs called *Agricultural Industry Damage Monitoring and Early Warning Project of the Trade Promotion Center of the Ministry of Agriculture* (Ministry of Agriculture, 2013). The scholars in this program warned that the rapeseed industry risked being a victim of imports like the soybean industry did, whereby 70% of Chinese domestic processing enterprises collapsed in the 2004 soybean crisis (Harrada, 2018). Since then, almost three quarters of China's soybean-processing capacity has been controlled by global corporations such as ADM, Bunge, Cargill and Louis Dreyfus. So the scholars suggested that China should study and adopt technical barriers to trade (TBT) like other countries (India, Brazil, Japan, EU, etc.) to build China's rapeseed technology protection system (Wang, Zhou, Han and Cha, 2017). They took the example of banning canola imports from Canada in 2009 (as discussed in Section 1 above) as a successful case to safeguard the Chinese rapeseed industry and, thus, supported this practice. But, instead, import restrictions were relaxed, which led to an increase in imported canola from Canada (see Figure 2 above). This increase in imports harmed China's domestic rapeseed production significantly (Wang, Zhou, Han and Cha, 2017).

As explained in the first section, the 2009 canola case mentioned by Chinese scholars was the first time that China restricted canola imports from Canada. In November 2009, the General

[8] Such as safety supervision of genetically-modified organisms, inspection and quarantine etc.

Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) announced the implementation of emergency quarantine measures for imported rapeseed (AQSIQ, 2009). AQSIQ stated that it repeatedly intercepted imported leptosphaeria maculans (L. maculans), a fungus that causes blackleg, from Canadian and Australian rapeseed. After a risk assessment, Chinese experts believed that L. maculans posed a severe threat to the safety of rapeseed production in China. In the announcement, AQSIQ stated it consulted with Canada and Australia, based on World Trade Organization (WTO) rules, to take the following emergency quarantine measures as translated below:

1) From November 15, 2009, traders should apply to AQSIQ for the "quarantine permit" before signing the rapeseed trade contract.
2) For the 2010 new rapeseed production season, the official inspection and quarantine departments of Canada and Australia should: investigate and monitor the epidemic situation of L. maculans in the rapeseed producing areas; establish a classified storage and transportation system for exported rapeseed; ensure that rapeseed exported to China is free of L. maculans; in the issued phyto-sanitary certificate, canola exporters need to prove the product is free of the disease.

Quarantine inspection was relaxed after the first canola dispute but was strengthened again at local ports after the MOA's reply to the CPPCC in 2016. It is reported that the port in Taizhou city, Jiangsu province intercepted 243 kinds of harmful organisms in 29,000 samples from imported soybean in 2017 (Su, 2018). L. maculans was also detected frequently in imported soy and canola in Jiangsu province (Chen, 2017). In 2018, the General Administration of Customs (GAC) set two announcements on inspection and quarantine requirements for rapeseed meal originating in India and Kazakhstan (GAC, 2018a, 2018b). GAC made it clear that imported rapeseed meal should not contain L. maculans, which was not found in China but may cause significant damages to domestic agricultural.

New agricultural policy trend under Xi Jinping

Since 2012, Xi Jinping has strengthened the Chinese Communist Party's influence (CCP) through the centralization of policy powers. Central Leading Groups (CLGs) emerged as a critical mechanism in policy generation and implementation. As a paper published by the Australian government found, "Given China's economic size, multi-layered administrative system and geographic diversity, policy implementation tends to be complex and difficult, highlighting the importance of the central role of the leading groups as well as their difficult tasks in coordination" (Zhang, 2017, p.52).

Box 2: CLGs under the era of Xi Jinping

"The central leading group for financial and economic affairs (CLGFEA) is the only economic policy-focused CLG within the Politburo. It is where real economic policymaking power at the Party centre resides".

"The key responsibilities of CLGFEA include: 1) the creation of the five-year National Social and Economic Program (Five-Year Plan); 2) guiding the drafting of the government work report prepared by the State Council, which determines the government's annual economic plan; 3) organizing the Central Economic Work Conference; 4) conducting surveys and analysis of economic conditions; 5) making macroeconomic policy decisions."

(Source: Zhang, 2017)

"The CCP's 'top-level design plan indicates Xi's convictions that China needs more powerful institutions if it is to carry out further reforms. Clearly, the cross-system leading small groups are structured in such a way as to be conducive to achieving this goal. Furthermore, it is obvious that Xi Jinping simultaneously is using leading small groups to expand his own power … Although multiple rivalries between the various departments have been weakened, the new framework is overly hierarchical and has hampered the execution of everyday business … the promotion and implementation of other important matters can be easily pushed aside and excluded from the agenda."

(Source: Tsai & Zhou, 2019)

Between April 17, 2013 and July 17, 2017,[9] 16 major issues were discussed within the CLGFEA, led by Xi Jinping. It is the CLGFEA that led the national food security strategy in 2013 and the BRI in 2014 (Feng, 2018). The two policies have significant impacts on China's agricultural trade. Local versions of leading groups on financial and economic affairs were also formed from provinces to counties (even at some townships) to ensure policy coordination and implementation across the country (Li, 2014).

[9] This is the latest summary of CLGFEA meetings, which was authorized to report publicly on 31st March 2018.

After the United States lifted sanction against technology group ZTE (Ballentine, 2018), Xi Jinping took a three-day inspection tour to the northeast of China calling for deeper "self-reliance" (Ballentine, 2018; Yue & Zihui, 2018). Like Deng Xiaoping's south China tour in 1992, Chinese leaders' field investigations usually have symbolic significances (Chen, 2012; BBC News, 2012). China's traditional industrial base and national food production powerhouse are located in the northeast provinces, which is why they were strategically selected for Xi's visit in the face of long-term competition with the U.S. The meaning of Xi's visit was threefold. First, American sanctions against ZTE forced China to accelerate its high-end manufacturing in a more determinant but moderated way (e.g., it stopped advocating "Made in China 2025" publicly). Second, agriculture was selected, in the name of food security, to fight back American trade sanctions (i.e. China imposed retaliatory tariffs on US agricultural goods such as soybeans). Third, China would make more efforts to revitalize its northeast region through economic cooperation with the neighboring countries such as Russia, Japan, North and South Korea, and Mongolia.

Scientific evidence and socioeconomic complexity

After Xi's visit to the northeast, the US-China Economic and Security Review Commission (USCC) published its 2018 annual report. The report stated that China frequently applied unfounded TBT, in the name of food safety, to targeted products to protect its own economic interests (USCC, 2018). However, as Box 3 explains, China's approach to TBT does not rely solely on scientific evidence, as it might in Canada and the United States. Socioeconomic factors also play a role.

In the case of canola, Canada argued in 2016 that research had shown China's dockage restriction on canola imports did not help to prevent the spread of blackleg and L. maculans,[10] which did not exist in China (Miller, 2017). And "admixture"[11] is more likely to be a major source of inoculum than infected seeds during the spread of the disease" (Fernando, Zhang, & Amarasinghe, 2016). As Annex 3 shows, scientists from China, Canada, Australia and other countries found that there are many factors to determine the epidemiology and severity of

[10] Both L. biglobosa and L. maculans can cause blackleg disease.

[11] According to the authors, dockage includes seed and admixture and "admixture includes small pieces of crop debris and parts from pod sheath and branches, etc. …admixture carried higher level of blackleg infection, mainly L. maculans than seeds "

blackleg in canola, a fungus disease that can cause high damage to rapeseed's yield. However, other researchers[12] (see Annex 3) found that, although L. maculans was not identified in China, it was detected from Canadian canola imported into China (Chen et al., 2010). As such, there were worries that Chinese rapeseed cultivars and other vegetables were vulnerable to L. maculans detected in imported canola from Canada (Van de Wouw et al., 2016). This is because L. maculans was considered more adaptable than leptosphaeria biglobosa (L. biglobosa), which is found in major Chinese rapeseed planting areas (Pan Lingling et al., 2018).

Box 3: Chinese concerns behind phyto-sanitary barriers to trade: original testimony by William W. Westman [13]

"Although we often complain about our trading partners' trade restrictive practices, we must recognize that the United States has also used this tactic from time-to-time to inhibit trade for reasons other than science or food safety concerns."

"In seeking to understand China's concerns about use of and standards for hormones, beta-agonists and other livestock production technologies, one must consider China's cultural, social and economic perspectives."

"This explains why last year, following the Codex adoption of maximum residue levels (MRLs) for Ractopamine, China wanted to have additional research on feed additive residues in pig lung tissues. This is not an issue for us in the United States because we do not consume this product. This explains the "different science" and why we must be aware of potential cultural differences which, in the end, impact trade or are considered trade barriers. In some respects, the U.S. has much to gain by developing and maintaining open channels of communication, exchange of technical information and cooperative technical assistance programs to develop a greater understanding of the means to facilitate trade. Technical assistance and market development are not mutually exclusive but are complementary, even in China."

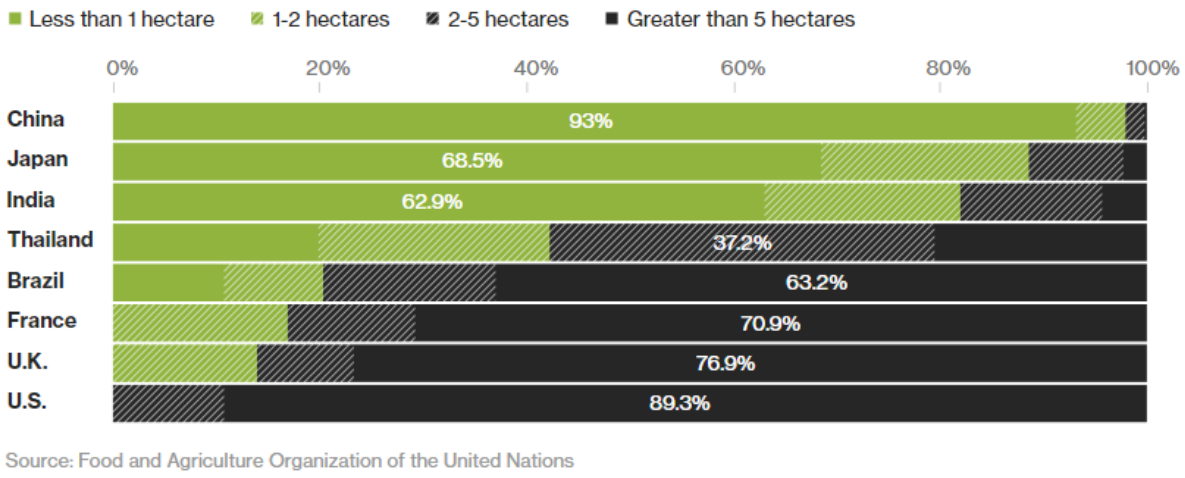
(Reinsch & Shea, 2013)

[12] Including Chinese researches from local entry-exist inspection and quarantine bureaus, state key laboratories and other institutional affiliations

[13] Westman was at the time Vice-President, international trade for the American Meat Institute.

Complex socioeconomic reality is another reason why China is reluctant to accept Canadian research evidence. Dr. Fernando, one of the Canadian scientists who were called upon to provide scientific research to resolve canola disputes before 2019, said to the media that the probability of blackleg outbreak was very low in China (Hui, 2016). His argument would be right, if China had an effective regulation enforcement system to prevent the potential risk of blackleg spreading in China. But such a condition is absent in China. As mentioned in the first section, imported GMO canola was able to flow into national reserves under the TSP regulation, even if this behaviour was strictly prohibited by the state. As the numerous food and drug scandals (Medical Xpress, 2018) demonstrate, it is highly doubtful that China can fully enforce its regulations (Fu, 2016) to minimize the risk of blackleg introduced by imported canola.

Figure 7: Farm size comparisons



Note: in Canada, 93.2% of farm is great than 4 hectares (Source: Bloomberg News, 2017; Statistics Canada, 2017b)

And let's not forget that China's rural structure is not the same as in Canada (see Figure 5). China is a country that accounts for almost 50% of the world's small-scale farms: around 98% of peasants-owned farms have less than 2 hectares (Rapsomanikis, 2015). In comparison, the average size of a Canadian farm was 332 hectares in 2016 (Statistics Canada, 2017a). From this perspective, Japan's agricultural protectionism (OECD, 2015) and disputes with the US (Reuters, 2019) could help us understand why China follows similar approaches to protect its agriculture.

As the two neighboring Asian countries both have a large portion of small scales farms, they defend their agriculture in the name of food security (Harner, 2011).

Food security

Food security, a persistent consideration in Chinese agricultural policy, is another rationale for China to impose TBT on canola (see Box 4). China's new legislative action – the "Food Security Law" (粮食安全保障法), which is expected to be promulgated before 2023 – could also serve to explain the country's actions. The basis for this law was prepared in 2005 (Wang, 2005), which was then added in the *Outline of the medium and long-term planning for national food security: 2008-2020* (Central People's Government, 2008). Food security was also inserted into chapter 2, article 22 of China's National Security Law (NSL) passed in July 2015. NSL states that the "State shall improve the food security system, protect and improve the comprehensive grain production capacity, improve the grain reserve system, circulation system and market regulation mechanism, improve the food security early warning system, and ensure food supply and quality safety" (Standing Committee of the National People's Congress, 2015). In November 2018, it was reported that the "Food Security Law" had been included in the class 1 project[14] of the 13th National People's Congress Standing Committee's (NPCSC) legislative planning (State Food and Stratregic Reserves Administration, 2018). NPCSC has confirmed it planned to review this law before the end of its term in March 2023 (Zhang, 2018).

[14] Class I Projects: Draft laws for which the conditions are relatively mature, and which are planned to be submitted for deliberation during the term

Box 4: Chinese self-sufficiency and food security: original testimony by Frederick Gale [15]

"China seems to have a strong preference for self-sufficiency which may reflect the heritage of being a country of peasant farmers who live off the land and are themselves self-sufficient, and they view it as it's a very nuanced notion which they see themselves as being under threat from if they become reliant on imports."

"They're also worried about domestic industries being wiped out by specifically multinationals. In one industry after another, there's warnings about that Chinese industries will be wiped out by multinationals. They always give soybeans, soybean crushing as the example. So in the Chinese news media, there's often a lot of rhetoric, a lot of alarmist rhetoric, about foreign plots to wipe out Chinese industries and the threats to food security."

"China's food security and related "industry security" concerns are a primary driver of its agricultural policies. These concepts are nuanced and difficult for outsiders to understand. Chinese government and industry officials assert that the volume of potential Chinese demand is so large that the country's imports would outstrip the capability of world markets to supply the country. They also express strategic concerns that reliance on imports of any particular commodity will leave the country vulnerable to global price fluctuations and manipulation of prices by other countries or multinational companies."

"The national agricultural policy reflects food security concerns. China's price supports and subsidies are focused on preventing declines in production of staple food grains—rice and wheat. The "industry security" concern is reflected by authorities' hesitancy to reduce the support price for cotton during the last two years.".

(Testimony before USCC: Reinsch & Shea, 2013)

The Food Security Law is a part of Chinese agricultural policy's continuous moves to enhance its food security (see Table 5). These policy moves have also played a role in the 2016 Canada-China canola dispute and must be taken in close consideration for the current canola dispute. Looking through Table 5 and Annex 3 helps to understand the implications of the Chinese Foreign Ministry's statement regarding imported canola from Canada: "it is the Chinese government's responsibility to protect the safety and interests of the Chinese consumers and the agricultural production and ecological security of the nation … measures taken by the Chinese

[15] He gave his testimony before USCC as the senior economist, Economic Research Service, U.S. Department of Agriculture

customs … are scientific and reasonable and fully conform to relevant Chinese laws and regulations as well as international practice" (Lu, 2019).

Table 5: Chinese agricultural policy moves and goals (content translated from original documents)

Date	Document name	Goals
2010	Agricultural Industry Damage Monitoring and Early Warning Project(MOA, 2010)	Applying Big Data to establish monitoring and early warning network for the agricultural industry, providing excellent technical support for agricultural trade promotion and agricultural industry protection. The project will promptly carry out trade remedy investigations and trade friction response work for damaged domestic industries and create a "protective wall" for local industries through anti-dumping, countervailing and safeguard measures to protect rural development (Wen, 2018).
2013	National food security strategy	Maintain independence, focus on domestic production and supply, ensure production capacity, conduct appropriate import, and rely on science and technology.
2015	National Security Law	The state shall improve the food security system, protect and improve the comprehensive grain production capacity, improve the grain reserve system, circulation system and market regulation mechanism, improve the food security early warning system, and ensure food supply and quality safety
2016	Letter of Ministry of Agriculture (MOA) on the Reply of the Proposal No. 1672 (Agricultural Water Conservancy Class No. 149) of the Fourth Session of the 12th National	1) Set up a domestic industrial safety warning line to set the import threshold (maximum import volume) of rapeseed and rapeseed oil, increase the monitoring and early warning of import damage to the industry.

	Committee of the Chinese People's Political Consultative Conference	2) Strengthen import quarantine inspection. MOA will cooperate with relevant departments to continue to strengthen the quarantine inspection of imported rapeseed. It will strictly control the risks of imported grain impurities, and timely report major import quality and safety issues.
2018	Rural Revitalization Strategic Plan[16] (2018-2022)	Improve the food security guarantee mechanism: Deepen the reform of the central reserve grain management system, scientifically determine the reserve scale, strengthen the supervision and management of the central reserve grain, and promote the coordinated operation of the central and local reserves…Strengthen food quality and safety. Accelerate the improvement of the modern grain logistics system and build a safe, efficient and integrated grain logistics network.
2023[17]	2005 Proposal of Food Security Law	Strengthen macroeconomic regulation and control in the areas of collection, storage and circulation. Improve the national tiered reserve system and improve the reserve operation mechanism ... food imports should be subject to the macro-control of the domestic market … establish flexible and effective food import and export adjustment mechanisms. Build food security monitoring and warning systems, and formulate food risk prevention plans (Wang, 2005).

[16] There is a Rural and Revitalization law currently under discussion (http://lianghui.people.com.cn/2019npc/n1/2019/0309/c425476-30966513.html).

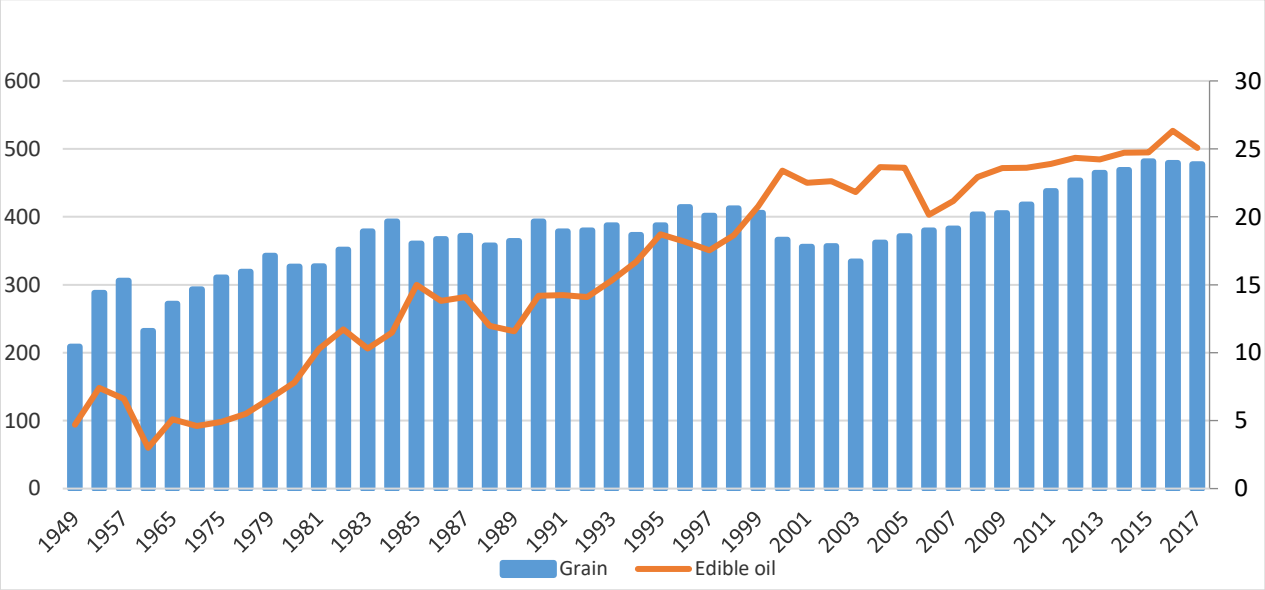
[17] 2023 is estimated deadline to review the "Food Security Law" by The 13th National People's Congress (NPC) as the13th NPC ends its term in 2023.

3. Oil crops development in China

Over the past 70 years, Chinese agriculture has significantly increased its production capacity and has ensured the national food security. According to the latest national statistical report, the country's grain output increased from 113.18 million tons in 1949 to 657.89 million tons in 2018; the total power of agricultural machinery risen from 180,000 kilowatts in 1952 to 1 billion kilowatts in 2018; and the irrigated area of arable land was expanded from 1996 million hectare in 1952 to 6810 million hectares in 2018(National Bureau of Statistics of China, 2019).

The pattern of food consumption has seen a revolution as today's Chinese people intake more meat and vegetable and less grain than before (P. C. C. Huang, 2016). From 1949 to 2017, the edible oil per capita production grown faster than grain per capita production (figure 1). The grain per capita production is doubled (from 209kg to 499kg) while the edible oil per capita production is quintupled (from 4.7kg to 25.1kg).

Figure 8: Grain and edible oil per capita production 1949-2017 (kg)



(Source: National Bureau of Statistics of China, 2019)

To enhance food security and raise the self-sufficiency rate above the target of 40% for edible oil, China is striving to use a variety of supports to strengthen domestic agricultural development and

moving globally to diversify the source of the food it imports. This section measures how well China has done with respect to the first policy goal. The second policy goal will be addressed in the next section.

Overall development in the past ten years

Limited domestic oil crops and animal feed production capacity, increasing edible oil consumption, booming demand for animal protein driven by a growing middle class have made China the world's largest importer of edible oils and oil crops. Consequently, China has been unable to meet the self-sufficiency rate of edible vegetable oils of 40% (Ni, 2014).

As Table 6 shows, the development of oil crops in China has improved in the past ten years but growth has been slow. The total planting area for oil crops declined from 13.4 million hectares in 2009 to 12.9 million hectares in 2018; however, oil crops production increased from 31.4 MMT in 2009 to 34.4 MMT in 2018. And the output per unit area went up from 2310.2kg/ha in 2009 to 2567.1kg/ha in 2016. To raise the self-sufficient rate above 40% (see Annex 5), China has implemented a series of specific policies to stimulate domestic oil crops production.

Table 6: Oil crops development in China 2009-2018[18]

Planting area (million hectares)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Oil crops:	13.4	13.7	13.5	13.4	13.4	13.4	13.3	13.2	13.2	12.9
Peanut	4.3	4.4	4.3	4.4	4.4	4.4	4.4	4.4	4.6	
Rapeseed	7.2	7.3	7.2	7.2	7.2	7.2	7.0	6.6	6.7	
Sesame	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4		
Sunflower	1.0	1.0	0.9	0.9	0.9	0.9	1.0	1.2		
Production (MMT)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Oil crops:	31.4	31.6	32.1	32.9	32.9	33.7	33.9	34.0	34.8	34.4
Peanut	14.6	15.1	15.3	15.8	16.1	15.9	16.0	16.4	17.1	
Rapeseed	13.5	12.8	13.1	13.4	13.5	13.9	13.9	13.1	13.3	
Sesame	0.5	0.5	0.5	0.5	0.4	0.4	0.5	0.4	0.4	
Sunflower	2.0	2.3	2.3	2.3	2.4	2.5	2.7	3.0		
Output per unit area (kg/ha)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Oil crops:	2310.17	2325.57	2386.67	2467.21	2508.1	2497.7	2520.2	2567.1		
Peanut	3411.07	3460.48	3528.97	3588.5	3658.35	3638.87	3639.55	3678.03	3709.55	
Rapeseed	1887.77	1747.97	1826.67	1864.78	1879.95	1943.86	1972.42	1982.25	1995.21	
Sesame	1295.16	1293.04	1366.04	1439.45	1459.59	1442.93	1495.03	1529.27	1609.67	
Sunflower	2039.12	2335.29	2459.75	2614.12	2606.8	2626.7	2603.5	2592.9		
Woody oil production (MMT)	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Camellia oleifer seed	1.2	1.1	1.5	1.7	1.8	2.0	2.2	2.2	2.4	

(Source: National Bureau of Statistics of China, 2018)[19]

In August 2016, the Chinese central government issued the National Bulk Oil Crop Production Development Plan (NBOCPDP) to improve the domestic oil production capacity and maintain a certain level of self-sufficiency. The NBOCPDP highlighted five significant constraints to achieve its targets (translated below), as they are indicated in Table 7:

[18] See Annex 4 for oilseeds development in Canada.

[19] The table is created based on data from Statistics of China: http://data.stats.gov.cn

Table 7: Targets set in the NBOCPDP

Indicators	2014	2020	Increased by 2020 compared to 2014
Planting area（ million hectare）			
Rapeseed	7.6	8.0	0.4
Peanut	4.6	4.8	0.2
Soybean	6.8	9.3	2.5
Camellia oleifera	3.6	4.7	1.0
Total	22.6	26.8	4.2
Production（MMT)）			
Rapeseed	14.8	16.2	1.4
Peanut	16.5	18.7	2.2
Soybean	12.2	18.9	6.8
Camellia oleifera	2.0	6.0	4.0
Total	45.4	59.8	14.4
Output（kg/ha）			
Rapeseed	1,950	2,025	75
Peanut	3,585	3,900	315
Soybean	1,785	2,025	240
Camellia oleifera	540	1,290	750
Oil Content (%)			
Rapeseed	41%	43%	2%
Peanut	50%	52%	2%
Soybean	19.50%	21%	1.50%
Camellia oleifera	25%	27%	2%

(Source: National Bulk Oil Crop Production Development Plan, 2016)

1) Limited potential for expanding the growing area. China's per capita arable land area and water resources are only 40% and 28% of the world average, respectively. With limited land and water resources, it is challenging to maintain the supply of grains and increase the production of edible oils at the same time.
2) Weak ability to prevent or withstand natural disasters. The irrigation and drainage facilities in the rapeseed production area are insufficient, outdated and inefficient.
3) Equipment for mechanized harvesting of oil crops has not made breakthrough progress.
4) The breeding of fine varieties is slow. The average yield per hectare since 2004 is about 1,800 kg. The current varieties have a long growth period and low yield; the varieties suitable for mechanized harvesting are still in the research and experimental stage.
5) Comparative profits are low. In recent years, land costs and labour costs have risen rapidly. Compared with grains, the comparative advantages of oil crops planting continue to be low, and the fluctuations between years are substantial. From 2007 to 2014, the wheat purchase price rose steadily from 0.74 RMB/kg to 1.25 RMB/kg, an increase of 69%, the average net profit per hectare was more than 1,500 RMB. The purchase price of rapeseed increased from 1.75 RMB/kg to 2.58 RMB/kg but the net average profit per hectare was reduced from 1,275

RMB to 315 RMB in 2011. In 2012, the average annual loss per hectare was about 1,350 RMB while the loss amounted to 2,130 RMB in 2014. Hence, Chinese farmers' enthusiasm for rapeseed production has not been high.

Achieving the targets set in the NBOCPDP is associated with four major positives social-economic impacts, which are translated below:

1) Diversify consumption of edible oil. In the foreseeable future, China's edible oil demand will be stable and rising. It is estimated that by 2020, the total consumption of three major oil crops (rapeseed, peanut and soybean) will reach 130 MMT. Further accelerating the production of domestic oil crops and improving self-sufficiency are necessary measures to stabilize the supply of domestic edible vegetable oil.
2) Adjust agricultural structure and improve land productivity. Soybean cultivation can improve soil fertility, reduce fertilizer input and increase output. Intercropping between rapeseed, soybean and wheat, corn and other crops can effectively reduce pests and diseases, increase fertility, and increase production. Woody oils such as camellia oleifera use abundant forest resources and do not compete for land use with grains. Therefore, vigorously developing large-scale oil crops in suitable areas can optimize the agricultural structure, transform development methods, and improve agrarian quality and efficiency.
3) Promote agricultural efficiency and increase farmers' income. By improving oil crops production conditions, accelerating the development of high-yield, high-quality new varieties and supporting cultivation techniques and achieving mechanization of oil production, it can improve the yield and oil content of oil crops, reduce production costs, improve oil quality and increase farmers' income.
4) Reduce poverty in underdeveloped areas. The resource conditions of some poor regions are suitable to produce camellia oleifera, rapeseed and other oilseeds. And the planting benefits are considerable. In particular, the average output value of oilseed camellia per hectare in the southern mountainous areas can reach 30,000-45,000 RMB. The development of special oilseeds such as camellia and rapeseed in undeveloped areas can help farmers get rid of poverty and contribute to achieving Xi Jinping's commitment to eradicate extreme poverty by 2020 (Mu, 2019; Zhuang, 2017).

The NBOCPDP also recognized that the gap between low domestic edible oil production and high demand was expanding. Despite the challenges mentioned above, the NBOCPDP said, as translated below, it was feasible to increase the self-sufficiency rate of edible oil to over 40%:

1) The recovery of oil crops planting area is still possible. Under the premise of not affecting grain production, the planting area of major oil crops can be restored with certain conditions.

In winter, there are about 6.7 million hectares of field available for planting in the Yangtze River Basin, and approximately 2.7 million hectares of area is suitable to grow rapeseed. After the Three Gorges Dam is used for water storage and power generation, the number of tidal flats along the Yangtze River will increase, and the planting area of rapeseed can be raised by about 0.7 million hectares. More than 2 million hectares of soybean can be restored in the northeast region. And 0.3 million hectares of drought-tolerant peanuts can be planted in the northeast agro-pastoral zone by reducing low-yielding corn and implementing grain and oil crop rotation.

2) There is plenty of room for the development of woody oil crops. Woody oils such as camellia oleifera do not compete with grain and are one of the additional sources for increasing oil supply. According to the *Opinions of the General Office of the State Council on Accelerating the Development of Woody Oil Industry* (General Office of the State Council, 2015), by 2020, the planting area of woody oil crops will grow from the existing 8 million to 13.3 million hectares, and the output of woody edible oil will be about 1.5 MMT. At present, there are more than 3.3 million hectares of forest land in 14 major tea-producing provinces and regions suitable for planting camellia oleifera.
3) There is potential to improve yield through mechanization. Compared with other major edible oil producing countries, the average per-hectare output of soybeans in China is only about 1,800 kg, 450 kg lower than the world average and 750 kg lower than leading countries such as the US, Brazil and Argentina.
4) There is room for oil content improvement. Among the bulk oil crops, rapeseed and peanuts have higher oil content and have more significant potential for development. In the past two years, most rapeseed varieties approved by the state have an oil content of over 43%, and many have reached 50%, which is 7% higher than the current large-scale promoted varieties. There is also a batch of reserved strains with more than 60% oil content. The oil content of peanuts has been significantly improved, and a batch of 55% high oil varieties have been bred, which is 5% higher than the current promoted varieties. There is still room for improvement in the oil content of soybeans in the northeast region. With the promotion and application of new varieties, new technologies and new producing processes, the oil content of camellia oleifera seeds can be increased by more than 2%.

Partial actual results of domestic oil crops development

It is hard to assess the long-term overall performance of China's agriculture policy, as there are mostly short-term qualitative and scale-based indicators available publicly (Liu, 2018). Thus, this report can only offer a partial assessment of oil crops development based on information from open sources. In 2017, an onsite observation meeting about the development of high-yield and

high-efficiency technology model in the rapeseed industry was held in Hunan demonstration zone. Hunan is one of the core rapeseed planting provinces in China. During the meeting, Chen Mengshan, the party secretary of the Chinese Academy of Agricultural Sciences (CAAS) told the media that China had made significant progress on oil crops development and became competitive in the international market (Li, 2017). Within five years, the production cost of rapeseed oil was reduced from 5 RMB/kg to less than 2 RMB/kg in core rapeseed producing area. This reduced cost is close to the price (after duties are paid) of canola oil imported from Canada. CAAS summarized three innovations along the value chain that contributed to this progress, which are translated below:

1) *Breed innovation*. After the on-site inspection, the output of newly developed rapeseed variety, "Zhongyouza 19" developed by Doctor Wang Hanzhong`s research team,[20] reached 2,805kg/ha, which was 64% higher than the output of traditional rapeseed (1,710kg/ha). Its incidence of sclerotinia is 51% lower compared with the local control group. Its actual oil production per 100 kg of rapeseed was 43 kg, which was 23% higher than the local variety (35 kg). The actual oil production per unit area of the demonstration area had doubled compared with the local control group. "Zhongyouza 19" satisfied the market demand and provided core technical support for processing enterprises and growers.
2) *Technology innovation*. The level of technology standardization has been further improved. Research teams in Hunan demonstration zones focus on: integrated technology management, integrating density adjustment, new immune protein pesticide like arbutin, pre-emergence closed weeding, agricultural drone management, chemical drying, etc. Owing to the mechanization, the whole process of automation and standardization of rotary tillage, trenching, fertilization, sowing, weeding and disease prevention, and harvesting have been realized. As a result, yield and efficiency have been significantly improved. The production cost per hectare is now 4,500~5,250 RMB, and the benefit is 4,500~7,500 RMB, which increases the competitiveness of domestic rapeseed.
3) *Product innovation*. 7D, which is a new technology and equipment producing high quality, concentrated rapeseed oil, provided a new solution to improve quality and efficiency in rapeseed processing. It broke through some essential techniques such as rapeseed selection, microwave conditioning, low temperature and low residual oil pressing, low-temperature green refining, automatic control, quality management, etc. Compared with the traditional oil pressing process, 7D could reduce the producing process by 50%, cut energy consumption by 20%, and reduce production costs by 30%

[20] Wang Hanzhong is an academician of China Engineering Academy and the associate dean of CASS.

(Nie, 2017). 7D could improve the competitiveness of domestic rapeseed industry once it is implemented nationally widely.

Diversification through the BRI

> *China appears reluctant to rely on its current agricultural trading partners (such as the United States) for its food imports and has attempted to diversify its imports to new markets through promotion of foreign farm investment and its BRI. While these efforts have been largely unsuccessful to date, there may be adverse long-term effects on U.S. agricultural exports as Beijing gets better at carrying out its diversification strategies* (USCC, 2018).

The USCC's above conclusion on China's agricultural trade diversification through the BRI is relevant to Canadian canola exporters. In 2017, the Development Research Center of the State Council (DRCSC), which is a governmental policy research and consulting agency, published a report on how to diversify China's food supply via the BRI (Ye, 2017). As 100% self-sufficiency is an impossible food security goal, the DRCSC's report suggested that BRI countries[21] could play a more prominent role in China's food supply diversification strategy in order to avoid the following risk, as translated:

1) Food supply is highly concentrated in "New World" countries. In 2015, the top five countries from which China imported agricultural products were: the United States, Brazil, Australia, Canada, and Argentina. Together, they accounted for 54% of the total value of agricultural imports.
2) Agricultural imports are highly concentrated in land-intensive farm products such as edible oilseeds and livestock products.
3) The import of land-intensive agricultural products is highly concentrated in a few countries. The top 5 import sources account for more than 90% of total agricultural imports.
4) The transportation modes for the imported agricultural products are highly concentrated in maritime transport, and the import ports are highly concentrated in the southeast coastal areas. A few large multinational companies monopolize the import trade channels.

[21] As of April 30, 2019, China has signed 187 cooperation documents with the 131 countries and 30 international organizations to build the BRI cooperation document: https://www.yidaiyilu.gov.cn/xwzx/roll/77298.htm.

The DRCSC's report argued that it is important to diversify China's agricultural trade with BRI countries for the following reasons, as translated:

1) The production and export of land-intensive agricultural products from BRI countries have excellent growth potential.
2) China's agricultural trade with BRI countries has strong complementarities. Central Asian countries, Russia, Mongolia and ASEAN[22] countries have significant potential to export agrarian products consumed mostly by China.
3) Logistic costs from BRI countries could be more competitive compared with maritime transport. For instance, the China-Europe Railway Express (CERE) is considerably cheaper than air and faster than sea (Hillman, 2018). As such, it will reduce over-reliance on maritime transport.
4) The trade balance will be achieved between China and BRI countries by increasing the importation of land-intensive agricultural products.

Four policy recommendations, as translated below, were provided by the DRCSC's report to diversify China's agricultural trade with BRI countries:

1) Strengthen data analysis ability to determine whether China should import more animal feeds or livestock in the future. Accurate quantitative research is also needed to evaluate the BRI countries' agricultural export potential.
2) Build agricultural cooperation demonstration zones in key BRI countries to share Chinese technology and development experience with them. That will help BRI countries optimize their agricultural industry chain, form industrial clusters, enhance the sustainability of the demonstration area, and ultimately export more agricultural products to China (Ministry of Agriculture and Rural Affairs, 2017).
3) Improve the stability and reliability of agricultural supply from BRI countries through China's major agrarian enterprises' foreign investment. The critical investment sectors in BRI countries include agricultural product processing, warehousing, logistic, etc.
4) Provide financial support for land reclamation companies to encourage their exploration in BRI countries.

Current policy results

CERE is getting more efficient. In 2018, there were 65 CERE running routes, connecting 56 cities in China and 49 cities in 15 countries in Europe, with 6,300 trips, an increase of 78 times

[22] Association of Southeast Asian Nations

compared with 2013 (Yao, 2019). The running time has been shortened from above 20 days to the 15 days and market competitiveness has increased significantly (Yao, 2019).

China's trade diversification strategy is also progressing via BRI (Bai, Lu and Gao, 2019):

1) About 30% of China's exports of agricultural products to the world are exported to BRI countries, and about 40% of imported agricultural products come from BRI countries.
2) In the past five years, China's agricultural trade with BRI countries has increased annually on average by 15%.
3) Since 2014, China's imports of rapeseed oil, soybean oil, flaxseed, rapeseed, soybeans and sunflower seeds have increased significantly from BRI countries. As mentioned previously, the 2018 GAC announcements reopened the Chinese market to rapeseed meal from India and Kazakhstan (Reuters, 2018). This new market access is a clear signal for BRI countries that they are preferred sources of imports for China to diversify its food importing channels (Reuters, 2018).
4) At present, the trade volume of edible oils and fats between China and BRI countries accounts for 11.3% of China’s total agricultural trade and 17% of total imports of agricultural products from BRI countries.

At the first day (April 27th, 2019) of the *Second Belt and Road Forum for International Cooperation*, MARA (former MOA) reported that since the start of BRI, there were 657 agricultural investment cooperation projects, of which private enterprise projects accounted for 89%. And BRI agricultural stock of investment reached US$ 94.4 billion, an increase of 70% compared with 2014 (CCTV, 2019). China also noted the current unsuccessful agricultural investment observed by USCC. The 2019 No. 1 Central Documents stated that China planned to: accelerate and support agriculture to go global; strengthen agricultural international cooperation via BRI to expand the import of agricultural products that cannot be produced domestically and diversify import channels; foster a group of multinational agricultural enterprises and raise the level of agricultural cooperation (see Annex 2). During the Forum, Chinese media (Bai, Lu and Gao, 2019) also reported that since 2014, through the South-South Cooperation Trust Fund and foreign aid funds, China has dispatched about 30 groups of more than 400 agricultural experts and technicians to BRI countries in Africa, focusing on variety breeding, fertilizer application, agricultural machinery application and processing. Such technical cooperation has enhanced the ability of host countries to increase their food supply and upgrade the level of agricultural modernization.

New trend: sustainable agricultural development

As China has set an explicit goal to pursue an "Ecological Civilization" based on its culture and heritage (Tucker, 2017), Chinese national key research institutes also proposed an action plan for achieving more sustainable agricultural development (Table 8). Recently the state launched a "National Ecological Civilization Pilot Zone" in Hainan province in 2019 (Xinhua, 2019). This ecological civilization objective will also affect China's agricultural development in the future.

Table 8: Action plan for more sustainable food production and consumption in China

levers/ barriers	actors	increasing crop productivity and resources use efficiency	increasing animal productivity and resources use efficiency	more healthy diets and reducing food wastes and losses
levers	policy makers	incentives for more sustainable cropping systems and for improved management and technology	incentives for land- and pasture-based animal production systems	incentives for choosing healthy diets and for reduction of food wastes
		enforcement of soil, water and air quality standards and regulations	incentives for improved manure management and technology	enforcement of soil, water and air quality standards and regulations
			enforcement of soil, water and air quality standards and regulations	
	researchers and extension services	design and development of high-yielding and sustainable cropping systems	design and development of high-yielding and sustainable animal production systems	research linking nutrition, diet, food wastes and behavior
		clear information and sound extension services	clear information and sound extension services	clear information and sound extension services
	farmers and citizens	innovative networks and achieving targets	innovative networks and achieving targets	innovative networks and achieving targets
	industry and market	optimized logistics and increased utilization of wastes	optimized logistics and increased utilization of wastes	facilitation of consumers associations, to reduce food wastes
		development of site-specific technology	development of site-specific technology, especially for manure utilization	
barriers		lack of entrepreneurial skills	shortage of land for feed production	western influence on food habits
		lack of education risk aversion	lack of experience with integrated crop-animal production systems	lack of political willingness to influence consumption patterns
		number and age of farmers	upscaling of innovative designs. management and technology	
		upscaling of innovative designs, management and technology		

(Ma et al., 2019)

Conclusion and recommendations

China is an important market for Canadian agri-food exports in general and canola exports in particular. China's domestic policies as well as other exporting countries' actions will continue to have a significant impact on Canadian exports. This report offers a Chinese policy perspective on the current canola trade dispute between Canada and China, showing that there is much more to it than Meng Wanzhou's arrest. As such, it explores the domestic socio-economic factors and external pressures underlying China's restrictions on Canadian canola imports in 2009 and 2016. Tracking the evolution of China's agricultural policy, it is clear that China had planned to limit

canola imports long before the current Canada-China tensions. China has not only been adjusting it agricultural structure to enhance its food security but it has also been advancing the "Belt and Road" initiative (BRI) to diversify its food supply. To solve the current canola dispute, sustainable agricultural development may represent an opportunity on which Canada can (re)build confidence with China (Paul Evans, 2013) for a constructive resolution to the current trade disputes.

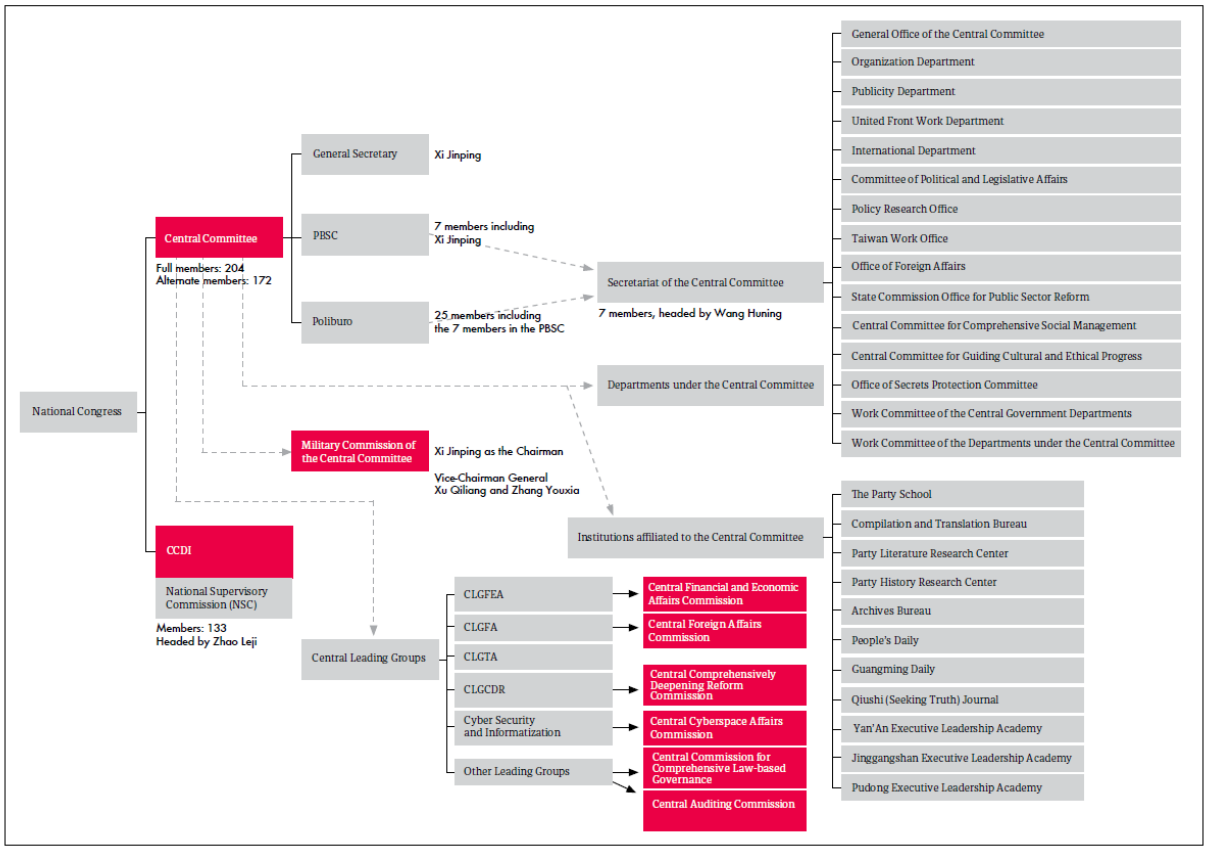
To form a long-term agricultural trade strategy and mitigate potential risks in the Chinese market, Canada should enhance its China capacity by forming a solid evidence-based action plans:

1) Developing data and analytical capacity to better understand the implications of key domestic policy changes and economic trends in agriculture sector within China. All key agricultural exporters, industry associations and government agencies should have an internal information-needs assessment and statistical framework to:
    a) Track key global agricultural exporters from other markets that interact with China.
    b) Track key domestic policy changes and economic trends in agricultural sectors within China.
2) Prioritizing across key government agencies, exporters and industry associations to place on their boards of directors individuals who are based in China or to create China advisory teams with one or more of the members based in China. Such individuals would serve to have a handle on how China's policies and actions, such as BRI, have changed and will continue to change global trade flows and market prices.
3) Supporting existing academics and growing a future generation of experts across all sectors based in Canada to conduct specialized and integrated field studies in China. The resulting knowledge will allow Canada to engage with China more effectively.

Whatever the eventual solution will be for the current canola trade dispute, Canada needs to quickly fill its knowledge gap on China. It is too costly to react poorly and belatedly to Chinese agricultural policy actions, which have increasing influence on Canada and the world.

Annexes:

Annex 1: Central Level of CPC (Communist Party of China) Structure



（Source: Alex He, 2018）

Annex 2: Selected No. 1 Central Documents (translated from Chinese)

Date	Tittle	Tasks related to food security
2007	Several Opinions on Actively Developing Modern Agriculture and Solidly Promoting the Construction of New Socialist Countryside(关于积极发展现代农业扎实推进社会主义新农村建设的若干意见)	Strengthen the monitoring and regulation of food production, consumption, inventory and import and export. **Establish and improve food security early warning systems and maintain the stability of the domestic grain market.**
2009	Several Opinions on Promoting the Sustainable Development of Farmers' Sustainable Development(关于促进农业稳定发展农民持续增收的若干意见)	Ensure the country's food security and the effective supply of major agricultural products, do everything possible to promote the continuous growth of farmers' income. **Establish an effective food security supervision and inspection and performance appraisal mechanism level by level**.
2010	Several opinions on strengthening the overall planning of urban and rural development and further consolidating the foundation of agricultural and rural development (关于加大统筹城乡发展力度 进一步夯实农业农村发展基础的若干意见)	Increase the incentive subsidy funds for the grain-producing counties and increase the per capita financial strength of the grain-producing counties. The relevant support policies should be tilted to the large grain-producing counties (farms) that produce a large amount of commodity grain and have made outstanding contributions to national food security. Vigorously develop oil production, speed up the construction of high-quality rapeseed and peanut production bases, and actively develop woody oils such as camellia and walnut.
2011	The decision on accelerating the development of water conservancy reform(加快水利改革发展)	Take farmland water conservancy as a key task in rural infrastructure construction and take strict water resources management as a strategic measure to accelerate the transformation of economic development mode to ensure food security.

2012	Several Opinions on Accelerating Agricultural Science and Technology Innovation and Continuously Enhancing the Ability of Agricultural Products Supply Support(关于加快推进农业科技创新持续增强农产品供给保障能力的若干意见)	Promote agricultural science and technology innovation to ensure national food security and to break through the constraints of resources and environment.
2013	Several Opinions on Accelerating the Development of Modern Agriculture and Further Enhancing the Vitality of Rural Development(关于加快发展现代农业进一步增强农村发展活力的若干意见)	It aims to solve the problems of who will operate agriculture, how to operate it, and how to manage rural society in the process of urbanization. The document requires new subsidies to be concentrated in the main producing areas and dominant production areas, to the new production and management entities, to cultivate and strengthen new agricultural production and operation organizations.
2014	Several Opinions on Comprehensively Deepening Rural Reform and Accelerating Agricultural Modernization(关于全面深化农村改革加快推进农业现代化的若干意见)	**A long-term national food security strategy based on domestic supply and moderate imports will be followed. It will ensure production capacity and endorse science and technology**. Ensure that the grain is basically self-sufficient, and the rations are absolutely safe. **Further clarify the central and local food security responsibilities and division of work,** the main sales area should also establish the bottom line of the grain growing area and ensure a certain rational self-sufficiency rate. Enhance the awareness of food-saving in the whole society and promote the reduction of facilities and technology across the entire process of production and circulation.

2016	Several Opinions on Implementing the New Concept of Development, Accelerating Agricultural Modernization and Realizing the All-round Well-off Target (关于落实发展新理念加快农业现代化实现全面小康目标的若干意见)	By 2020, the progress of modern agricultural construction will make significant progress, the grain production capacity will be further consolidated and improved, the national food security and the supply of important agricultural products will be effectively guaranteed, and the quality and efficiency of the agricultural product supply system will be significantly improved.
2017	Several Opinions on Deepening the Supply Side Reform of Agriculture and Accelerating the New Development of Agricultural and Rural Development (关于深入推进农业供给侧结构性改革加快培育农业农村发展新动能的若干意见)	Based on ensuring national food security, China aims to increase farmers' income and improve the effectiveness and quality of agricultural supply
2018	Opinions on implementing the rural revitalization strategy(关于实施乡村振兴战略的意见)	Strictly hold the red line of cultivated land to ensure national food security. **Promote food security legislation.** Actively participate in global food security governance and agricultural trade rules building.
2019	Several Opinions on Adhering to the Priority Development of Agriculture and Countryside and Doing a Good Job in "Three Rural Issues"(关于坚持农业农村优先发展做好 “三农”工作的若干意见)	Implement agricultural product security strategy. Strengthen the top-level design and system planning, based on domestic supply of important agricultural products, coordinate the use of international and domestic markets and resources, scientifically determine the supply level of domestic important agricultural products, and improve domestic food supply security. **Accelerate the legislative process of food security law.** On the basis of enhancing the quality and efficiency, China will consolidate the production capacity of cotton, oil, sugar and natural rubber; **accelerate and support agriculture to go global, strengthen agricultural international cooperation via BRI** to expand import of the domestic lacking agricultural products and

		diversify import channels; foster a group of multinational agricultural enterprise and raise the level of agricultural cooperation.

(Central Committee of the Communist Party of China, 2019; Shi & Zhang, 2018; Wang, 2018)

Annex 3: Selected science articles on blackleg of canola (for reference only)

Data	Research article	Findings
2010	加拿大进境油菜籽加工过程中油菜茎基溃疡病菌的检测与鉴定(Detection and characterization of Leptosphaeria maculans in processed rapeseed imported from Canada)(Wang et al., 2010)[23]	*"In this research, four types of samples, including shipborne rapeseed, storage silo rapeseed、rapeseed dregs and byproduct, were randomly selected from processed rapeseeds to investigate the occurrence of Leptosphaeria maculans. The results showed that* ***all eighteen shipborne rapeseeds, seven storage silo rapeseeds, and eleven byproducts were positive in PCR detection of Leptosphaeria maculans, but eight rapeseed dregs were negative in such detection****. The results from pathogen isolation,charcterization and pathogenicity testing of three samples confirmed the PCR detection."*
2001	Epidemiology and management of Leptosphaeria maculans (phoma stem canker) on oilseed rape in Australia, Canada and Europe(West, Kharbanda, Barbetti, & Fitt, 2001)	***"The epidemiology and severity of phoma stem canker differs between continents due to differences in the pathogen population structure, oilseed rape species and cultivars grown, climate and agricultural practices****. Epidemics are most severe in Australia, where only the A group occurs, and can be damaging in Canada and western Europe, where both A and B groups occur, although their proportions vary within regions and throughout the year.* ***Epidemics are slight in China, where the A group has not been found."***

[23] Authors are from Hubei Entry-Exit Inspection and Quarantine Bureau

2005	Population dynamics and dispersal of Leptosphaeria maculans (blackleg of canola)(West & Fitt, 2005)	*"Blackleg of canola (oilseed rape, Brassica napus) is caused by two closely related fungal species, Leptosphaeria maculans and L. biglobosa. In Australia, with a few rare exceptions, blackleg is caused by L. maculans, whereas in Europe and north America, both species coexist.* *This paper reviews factors influencing the distribution of L. maculans and L. biglobosa with emphasis on the role of dispersal on a world-wide and local scale. T**he pathogens can be spread to new areas by seed movement or by wind-dispersed ascospores from fruiting bodies on crop debris. Although many ascospores travel less than 1 km from the source, their aerodynamic properties suggest that some may travel considerable distances**. This may explain why the breakdown of host resistance based on major genes can be widespread."*
2006	World-wide importance of phoma stem canker (Leptosphaeria maculans and L. biglobosa) on oilseed rape (Brassica napus)(Fitt, Brun, Barbetti, & Rimmer, 2006)	*"If L. maculans isolates are introduced to China considerable damage could result. Furthermore, **in China, there are large areas grown to vegetable brassicas**. There is a need to improve the resistance to L. maculans in Chinese oilseed rape cultivars (B. napus) and vegetable brassicas (B. oleracea, B. rapa). In the meantime, **strict quarantine measures should be employed to ensure that L. maculans does not enter China in the next few years."***
2008	Strategies to prevent spread of Leptosphaeria maculans (phoma stem canker) onto oilseed rape crops in China; costs and benefits(Fitt et al., 2008)	***"There is a serious, if small, risk that L. maculans will enter and become established in China, since China imports seed of oilseed rape from Canada where seed‐borne infection by L. maculans does occur. Furthermore, Chinese cultivars of oilseed rape are highly susceptible to L. maculans."***

2010	Detection of Leptosphaeria maculans from imported Canola seeds(Chen et al., 2010)[24]	***"It is the first report on the detection and identification of L. maculans from Canadian oilseed in China."***
2015	油菜黑胫病病原生物学及所致产量损失研究(Studies on Biology of Leptospharia Biglobosa And Evaluation Of the Impact of This Pathogen on Seed Yield of Oilseed Rape)(Xiang Cai, 2015)	***"Only L. biglobosa was found in Hubei, while L. maculans has yet to be found.*** *Results suggest that …under the climatic condition in central China, it was observed that L. biglobosa can form mature pseudothecia and ascospores in autumn. It was also observed that the blackleg disease may possibly spread by airborne ascospores in central China as in other countries. Sever phoma stem canker symptoms were observed on winter oilseed rape in China but the yield losses caused by this disease is unknown. … The results showed that the yield losses were lower than 15% on fields. However, the yield losses were up to 40% in pot experiments … two new cruciferous hosts of L. biglobosa in China: white radish (Raphanus sativus) and purple cai-tai(Brassica campestris ssp. chinensis var. purpurea)."*
2016	Infection of canola pods by Leptosphaeria maculans and subsequent seed contamination(Van de Wouw et al., 2016)	*"We show that canola pods infected by L. maculans can lead to seed contamination, and resultant seedling infection, which then leads to cankering in adult plants. The fungus can sexually reproduce over summer on stubble derived from these plants.* ***Airborne sexual spores are then released in the following year–thus completing the life cycle of the fungus from a contaminated seed and providing a potential source for an epidemic, particularly in countries such as China where canola cultivars do not have high levels of resistance to L. maculans. Our data suggest that restrictions on certain Australian ports may not be an effective measure for minimising export of contaminated seed."***

[24] The authors are from Jiangsu Province Key Laboratory for Prevention and Management of Invasive Species, Nanjing Forest University and Plant Quarantine Laboratory, Jiangsu Entry-Exit Inspection and Quarantine Bureau

2016	Blackleg (Leptosphaeria maculans) Severity and Yield Loss in Canola in Alberta, Canada (Hwang et al., 2016).	*"Seed yield per plant decreased by 1.8 g for each unit increase in disease severity, corresponding to a decline in yield of 17.2% for each unit increase in disease severity. Pyraclostrobin fungicide reduced disease severity in all site-years and increased yield. These results show that the* ***reduction of blackleg in canola crops substantially improves yields****."*
2016	Detection of Leptosphaeria maculans and Leptosphaeria biglobosa Causing Blackleg Disease in Canola from Canadian Canola Seed Lots and Dockage(Fernando et al., 2016)	*"Admixture is more likely to be a major source of inoculum than infected seeds during the spread of the disease.* ***It is therefore essential to efficiently remove admixture, especiallyat crushing sites, to minimize the risk of introducing L. maculans to new areas."***
2018	Insights into fighting against blackleg disease of Brassica napus in Canada(X. Zhang & Fernando, 2018)	***"Field populations of L. maculans display a high evolutionary potential and are able to overcome major resistance genes within a few years, making disease control relying on resistant varieties challenging."***
2018	加拿大进境油菜籽茎基溃疡病菌的生物学特性 (Biological characteristics of Leptosphaeria maculans from Canadian canola)(Pan Lingling et al., 2018) [25]	***"The leptosphaeriamaculansis imported from Canadian canola is more adaptable than that has already occurred in China.*** *Once the disease is introduced into China, it will have a great impact on China's rapeseed industry. At present, Canadian and Australian canola containing Leptosphaeriamaculans are allowed to export to Hainan, Guangdong, Guangxi, Fujian, Hebei, Liaoning, Tianjin and other places in China. In the ports of Hainan, Guangdong, Guangxi, Fujian and other places, almost all the annual ambient temperature meets the growth of the leptosphaeriamaculans. Therefore,* ***it is particularly***

[25] The authors of this articles are from the Qinzhou Entry-Exit Inspection and Quarantine Bureau of Guangxi Zhuang Autonomous Region and Guangxi Subtropical Crops Research Institute

		important to strengthen the monitoring and epidemic prevention and control work around the port of discharge, transportation routes and fixed-point processing plants."
2018	中国油菜黑胫病危害风险性分析及预防策略 Leptosphaera maculans in China: Hazard Risk Analysis and Prevention Strategy)(Rong Songbai, Chu Mingguang, Wu Xinjie, Hu Baocheng, & Li Qiangsheng, 2018) [26]	*"The risk value of L. maculans in China was 2.59, belonging to special high-risk level.* ***Since the invasion of the pathogen might bring a tremendous threat to the rapeseed production in China, we should take strategies such as import quarantine, inspection of the pathogen and resistance breeding."***

[26] The authors are from the Crop Institute of Anhui Academy of Agricultural Sciences

Annex 4: Area, Yield, Production of Canadian oilseeds (2014-2018)

	2014-2015	2015-2016	2016-2017	2017-2018	2018-2019
Flaxseed					
Seeded Area(000 ha)	649.5	645.5	381.0	422.9	345.6
Harvested Area(000 ha)	628.9	626.9	341.5	418.9	340.8
Yield(t/ha)	1.4	1.5	1.7	1.3	1.4
Production(000 t)	883.3	943.1	591.4	555.1	490.9
Canola					
Seeded Area(000 ha)	8,457.9	8,411.3	8,410.9	9,313.4	9,232.2
Harvested Area(000 ha)	8,392.4	8,364.4	8,263.3	9,273.1	9,119.8
Yield(t/ha)	2.0	2.2	2.4	2.3	2.2
Production(000 t)	16,410.1	18,376.5	19,599.2	21,328.1	20,342.6
Soybeans					
Seeded Area(000 ha)	2,271.6	2,238.8	2,269.2	2,946.9	2,557.8
Harvested Area(000 ha)	2,256.7	2,232.5	2,231.8	2,934.8	2,539.6
Yield(t/ha)	2.7	2.9	3.0	2.6	2.9
Production(000 t)	6,044.8	6,456.3	6,596.5	7,716.6	7,266.6
Oilseeds					
Seeded Area(000 ha)	11,379.0	11,295.6	11,061.1	12,683.2	12,135.6
Harvested Area(000 ha)	11,278.0	11,223.8	10,836.6	12,626.8	12,000.2
Yield(t/ha)	2.1	2.3	2.5	2.3	2.3
Production(000 t)	23,338.2	25,775.9	26,787.1	29,599.8	28,100.1

(Source: Agriculture and Agri-Food Canada, 2019)

Annex 5: Projections of China's food production, demand, net import (MT), and self-sufficient rate (SSR, %) for 2020

Food	Production	Demand	Net import	SSR	Reference
Cereal	439.8	505.2	66.0	87	Chen (2005)
Rice	183.5	178.8	–3.3	103	
Wheat	94.5	102.8	8.3	92	
Maize	143.0	168.4	24.7	85	
Soybean	18.8	55.1	36.3	34	
Coarse grain	42.7	46.9	4.2	91	Chen and Liu (2008)
Rice	–	–	–	103	Huang *et al.* (2010)
Wheat	–	–	–	95	
Coarse grains	–	–	–	86	
Oilseeds[1)]	–	–	–	45	
Beef and mutton	–	–	–	94	
Pork and poultry	–	–	–	100	
Dairy	–	–	–	81	
Soybean	18.5	98.1	79.3	19	Cao and Zhao (2011)
Grain	536.2	595.8	59.6	90	Lu *et al.* (2011)
Cereal	478.3	493.1	14.8	97	
Rice	188.3	192.1	3.8	98	
Wheat	115.4	117.8	2.4	98	
Maize	174.6	180.0	5.4	97	
Soybean	17.2	61.4	44.2	28	
Coarse grain	9.2	9.1	–0.1	102	
Grain	575.0	663.0	88.0	87	Huang *et al.* (2012)
Rice	160.7	157.5	–3.2	102	
Wheat	134.8	137.5	2.8	98	
Maize	210.0	230.0	20.0	91	
Soybean	15.8	87.8	72.0	18	
Mutton	5.0	5.3	0.4	94	Ding and Xiao (2014)
Mutton	4.5	4.7	0.2	96	Liu *et al.* (2014)
Rice	201.0	206.5	5.5	97	Ni (2014)
Wheat	121.8	128.0	6.3	95	
Maize	221.6	260.5	38.9	85	
Maize	219.1	245.4	6.5	89	Yang and Wu (2014)
Pork	71.7	73.6	1.9	97	Hu *et al.* (2015)
Beef	6.0	7.2	0.6	83	Shi *et al.* (2015)

[1)] Oilseeds in Huang *et al.* (2010) include soybean and other oilseeds.
–, no data.

(Source: Huang, Wei, Cui, & Xie, 2017)

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