



Three strategies of capital accumulation in China's agro-food sector: A technological-political-financial accumulation synergy

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Abstract. Capital accumulation in the agro-food sector displays new characteristics in modern society. By means of a case study of China's sugarcane sector, this paper identifies three capital accumulation strategies that recently emerged. The first strategy is the redistribution of costs and benefits between farmers and companies through the introduction of new technologies which is known as agro-technification. The second strategy is termed food politicization and relates to the profound restructuring of both sugarcane production and the sugar market through massive state intervention. The third strategy is land swindle, namely the conversion of land from a means of production into an object of speculation. Following a discussion of the three strategies by drawing on developments in China's sugarcane sector, this paper argues that these new capital accumulation activities will render national and transnational food systems more fragile and unsustainable. Moreover, it argues that classical agrarian analyses defining accumulation as a land-labour-capital triangular relation cannot explain the current capital accumulation in agro-food sector. Instead, a new triangular technological-political-financial synergy more aptly describes recent developments in the agro-food industry in general.

Key words: Capital accumulation, agricultural technology, food politics, land consolidation, China

1. Introduction

(1) The general debate on capital accumulation in agrarian society

Capital accumulation is currently a key driver of agrarian change across the world, as the result can be observed that agribusinesses have gained more power in every process of agricultural production and food supply. Although agrarian Marxists and pro-peasant intellectuals have different views on agricultural development, the fate of rural society, and the prediction of peasant differentiation, they all focus on capital accumulation in the agro-food sector. Classical Marxists tend to concentrate more on capital accumulation in the agricultural production sector. According to Marx, the first capitalists were landowners who expropriated land from peasants; primitive accumulation refers to the process of separating the producer from the means of production, thereby producing capital (Marx 2010 [1887]). Large farms (also referred to as "capital farms" or "merchant farms") could only be defined as truly capitalist in cases where farmers exploited wage labour to a greater extent and where the financial capital of the farm could accumulate (Marx 2010 [1887]). Lenin further developed the argument of capital accumulation in agricultural production and emphasized the potential crisis of peasant differentiation in rural society (Lenin 1982: 130). According to Lenin, the renting of land for commercial farming, the necessity of employing numerous farm labourers, and the generation of spare cash for farm improvements demonstrate capital accumulation by affluent peasants (Lenin 1982).

Kautsky, on the other hand, systematically analysed the relations of capitalism and the peasantry in modern society, expanding the previous Marxist explanation of capital accumulation

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driven by agricultural production activities. He recognized the functionality of peasant farms in the capitalist economy; their “underconsumption” and “excessive labour” formed the basis of accumulation in capitalist agriculture and industry (Kautsky 1988 [1899]). On the one hand, peasant farms are “production sites” for labour that capitalist farms and industry require. Conversely, surplus value is extracted from peasants through technological packages, credits, contracts, as well as through the control of modern storage, transport and retail outlets by agro-industrial capital (Kautsky 1988 [1899]).

Kautsky's understanding of capital accumulation is not far removed from that of peasant intellectuals (e.g. Chayanov and Shanin) who disapprove of the trend of capitalist class differentiation on peasant farms. He pointed out that capitalist profit extraction is made possible by upstream and downstream activities in the food supply chain, as well as by the credit system. Chayanov and his predecessors, on the other hand, did not explain capital accumulation to a great extent, but their work on peasant co-operatives show that the capitalist economy squeezes peasant farms through market specialization, machinery and science, processing, transporting, and retailing. In their view, a peasant cooperative is the best organizational system to compete with and to protect peasant farms from capitalist agriculture and industry (Chayanov 1991 [1927]).

Goodman et al. (1987) offered a systematic analysis of the industrial appropriation of rural production processes, exploring how industrial capital created accumulation sectors by restructuring the pre-industrial rural production process, including changes to agricultural equipment, processing, food manufacturing, and distribution. They contend that the replacement of labour and natural materials with machinery, fertilizers, hybrid seeds and agro-chemicals are two stages of appropriation entailing a different mode of capital accumulation. In addition to describing the means of value appropriation by agro-industrial capital, Van der Ploeg (2009) argues that today's giant food corporations never produce value; instead, they simply appropriate value produced by farmers through reorganizing the production process.

(2) The debate on capital accumulation in the Chinese agrarian society

The debate on capital accumulation in the agro-food sector has turned out to be key to understanding agrarian change in China. Huang argues that small peasant farms are the main force behind the massive increase in the total agricultural production value over the past three decades in China. Moreover, the diet structure transition and increased food consumption will ensure that peasant farms will survive and further develop by producing high-value agricultural products and by intensifying labour and capital on their farms (Huang 2010, Huang et al. 2012). Following this argument, Huang points out that profit extraction from peasants is taking place in the trading and food processing sectors instead of through farming activities (Huang 2012). In other words, capital accumulation takes place outside the farm, while value extraction occurs in the upstream and downstream agricultural supply chains.

Conversely, another group of scholars discuss the capitalization of agricultural production in China. Yan and Chen examine the dynamics of capital accumulation in rural China, arguing that accumulation in agricultural production is leaning towards capitalization and de-peasantization. Top-down accumulation works through “dragon-head” enterprises by vertically integrating farmers in the industrial system; that is, farmers become contract producers. Accumulation can, however, also happen from below through the scaling up of family farms (Yan and Chen 2015). Echoing Yan and Chen's argument, Sun refers to peasant differentiation in a rural town in southern China. According to him, several capitalist agricultural enterprises emerged due to land

consolidation encouraged by the local government. The result is that small-scale peasants lease out their land and labour on large farms (Sun 2015).

The debate on the capitalization in China's agriculture and food sector, following the aforementioned two classic traditions in agrarian studies, is of great significance for understanding the relation between capital and peasantry in the agricultural modernization process. However, current studies on accumulation in the agro-food sector are also limited to two theoretical trajectories. One theoretical stream focuses on accumulation within agricultural production—the emergence of capitalist farms and the agricultural labour force. The other concerns capital accumulation by agribusinesses by making peasant farms the object of value exploitation.

(3) The new accumulation strategies in China's agro-food sector

The discussion in this paper is based on the two perspectives of capital accumulation in agro-food production. Through an in-depth case study of the sugar industry and the sugarcane production sector in southwest China, new accumulation strategies in the agro-food sector could be observed. The current accumulation activities in China's sugarcane production sector and sugar industry have blurred the boundary of the two analytical viewpoints, giving rise to the identification of three distinct accumulation strategies: agro-technification, food politicization, and land speculation.

First, agro-technification refers to the acceptance and application of new technologies in the sugarcane production process. Sugar companies guide sugarcane farmers to accept new seeds and film-mulching techniques in cane production, and to apply new technology in the extracting process to obtain more valuable products from sugarcane. The introduction of new technologies has created a restructuring of costs and benefits to be shared between the sugar companies and cane farmers. Second, food politicization refers to extensive state intervention in the food market. The Chinese state emphasized the political significance of sugar in its national food security strategy. Thus, Chinese sugar companies can rely on state power to continue further accumulation activities through direct resource redistribution and administrative intervention in trade. The third strategy is land speculation. Within the sugarcane-planting project, which is guided by the governmental ideology of agricultural modernization, land is used by speculators as a material medium to raise capital through the modern finance system.

The following sections elaborate on the three accumulation strategies. The analysis is based on empirical data collected during three periods of fieldwork between 2014 and 2016 in Dongmen Town, a sugarcane-growing town in southwest China, which is briefly introduced in the following section.

2. Recent changes in Dongmen Town's sugarcane production sector

Dongmen Town is one of the typical rural towns in China's sugarcane production zone where local peasants' livelihoods heavily rely on the growing of sugarcane. It is under the jurisdiction of Fusui County in Guangxi Province, located on the border of southwest China and Vietnam. Sugar manufacturing is the mainstay industry in Fusui County and therefore it is also the main source of governmental fiscal revenues. The total farming land in this town amounts to around 200,000 mu (a Chinese measurement unit, 1 hectare equals 15 mu), of which 189,000 mu is used for sugarcane cultivation.

The popularity of growing sugarcane dates back to the turn of the century, when several changes in the region's social-economic background occurred. Firstly, sugar mills changed hands from the state to private capital, bringing with it greater capital investments required to update the crushing and refining equipment of the sugar mills. Consequently, the crushing capacity of the

sugar mills was augmented. Secondly, due to the increased demand for sugarcane, an administrative regulation system locally called the “cane zone system” was introduced to direct sugarcane selling and purchase activities according to zones. An official document (Guangxi Planned Economic and Trade Commission 2002 [No. 560]) shows that the sugarcane planting area in Guangxi Province is divided into different zones, with each zone having only one assigned sugar mill. Trans-zone selling and purchasing activities have been banned, except under the special circumstances where the local government allows trans-zone activities. The initial goal of this system was to avoid economic and social instabilities that might be caused by intensified competition among the sugar mills related to purchasing sugarcane. On the other hand, the sales channel of sugarcane is secured and therefore peasants prefer to grow sugarcane instead of other crops. The third and most important reason for an increase in the popularity of sugarcane growing is China's increasing demand for sugar, which has led to a price boom of both sugar and sugarcane on the domestic market.

Generally, a sugarcane zone covers five to eight rural towns, depending on the crushing capacity of the sugar mill. Dongmen Town is part of the largest cane-planting area in the cane zone of the Dongmen-Nanhua Sugar Company. This sugar company is one of many affiliated companies of the Nanhua Sugar Industry Group, which includes all types of businesses relating to sugar across seven Chinese provinces. Within Guangxi Province alone it owns 15 affiliated sugar companies. Given the fact that the sugarcane selling and purchasing channels are targeted under the cane zone system, the relation between cane peasants and sugar companies bears semblance to contract farming. However, the key difference is that peasant households still have the autonomy to switch to other crops whenever they desire to, since no real contract exists between them and the sugar company. Therefore, since 2012, when a drop in the sugar price on the global market heavily influenced the domestic sugar market, peasants gradually turned to growing other crops. As a response to the low motivation for growing sugarcane among peasants, the Guangxi Province government launched a five-year “double-high (a high sugarcane yield and a high sugar content)” project in 2013, which fits into the central government's national food security and agricultural modernization framework. According to official documents, the project aims to develop 5 million mu of sugarcane land with large-scale farming (above 200 mu per farm), mechanization, improved cane varieties and modern irrigation systems (Guangxi Government 2013 [No. 36], 2014 [No. 15]). Under the well-funded project, large governmental subsidies are invested in land consolidation activities, large agro-machinery, improved varieties of cane seed, specific agro-technical materials, and modern irrigation techniques including drip irrigation, underground irrigation, and water-fertilizer-integrated irrigation.

Due to the project, two trends in sugarcane production are evident in Dongmen Town. Firstly, the farming company appeared on the scene and developed large sugarcane plantations. The plantation built up by the Kaili Agricultural Investment Company in 2014 covers 6,300 mu of farmland across two villages and involves nearly 180 households. In fact, with the support of the “double-high” project, the Kaili Agricultural Investment Company has invested in several large plantations in other sugarcane production zones in Guangxi Province. Secondly, the sugar company has become the intermediary body between the local government and farmers. Government subsidies for “modernizing” sugar production, including for improved varieties of cane seed, agro-technology, and large agro-machineries, are administered through the sugar company.

Consequently, two main modes of sugarcane production currently exist in Dongmen Town: sugarcane production by the massive number of small farming households, and that of the

emerging large-scale plantations. The farms owned by peasant households and operated mainly by family labour range in size from 20 mu to around 120 mu, but the newly-built cane plantations invested in by the farming company usually cover thousands of mu of farmland. Skilled labourers needed for operating machines are hired all year around on the plantations. Within this context, the following sections will discuss the new strategies of capital accumulation in the agricultural production sector, as has recently occurred in China.

3. Agro-technification: cost-shifting and the redistribution of harvests

The relation between technology and capital accumulation in agriculture has been widely discussed in the social sciences. Kenny (1986) documented the evolving university-agro-industry relation in terms of the development of modern biotechnology, focusing particularly on how the agricultural sector has become one of the main sectors for biotechnology application. Companies invest in biotechnology research in order to conceive new products and techniques (such as technology stimulating superovulation in cattle farming and plant diagnostic technology), which can open new markets and create significant profits.

Seed is the most noticeably commodified natural material in farming activities. Kloppenburg (1988) reviewed the history of the way in which the biotechnology industry has established the plant breeding business and gained control of seeds, pointing out that the objective of modern plant breeders is to produce new seed varieties that can be sold at a profit, instead of aiming to reach some sort of social optimum. This reveals the imperative of profitability in a capitalist system. The most elaborate explanation of modern technology and capitalist development of agriculture comes from Goodman and Sorj (1987), who argue that the industrial appropriation of the rural production process (mechanical, chemical and genetic innovations) and the industrial substitution of rural products (large-scale food processing and preservation processes; artificial raw materials) are the two patterns of capital accumulation in the modernization process of the agro-food system.

These studies explain how modern companies, by applying new technologies based on scientific research, attempt to capitalize the agriculture production and food processing sectors. Put differently, industrial capital accumulates through creating new technological products for agricultural and food production. The wider impact of this process on peasants is the rising cost of food production. Shiva (2000) states that:

...as farming is transformed from the production of nourishing and diverse foods into the creation of markets for genetically engineered seeds, herbicides, and pesticides...as farmers are transformed from producers into consumers of corporate-patented agricultural products...the global economy becomes a means for the rich to rob the poor of their right to food and even their right to life (Shiva 2000: 7).

This section further explores capital accumulation through science and technology in the agro-food production sector, which relates not only to the commoditization of agricultural inputs, but also to the unequal bearing of the increased cost of applying technology in agricultural activities and the unequal sharing of increased harvests between peasant farming and the food industry as a result of the application of new technologies. The former can be referred to as “cost-shifting” by food companies and the latter as the “redistribution of harvests” between peasants and food companies.

China’s “double-high” project aims to achieve a high sugarcane yield on farms and a high percentage of sugar content in sugarcane primarily by means of improving sugarcane varieties and

through the introduction of new film-mulching technique. The Chinese government stipulates that subsidies are to be made available only in cases where all the above-mentioned standards are met (Guangxi Government 2014 [No.89]). Peasant farms are excluded from the massive project subsidies due to their farm size and mechanization level. Nevertheless, they were strongly advised by the sugar company and the local government to use the improved cane varieties and to apply the film-mulching method. Agricultural technicians from the government or the sugar company organized training sessions to convince peasants of the benefits of the new seeds and film-mulching method.

However, new seeds and mulching technologies are costly. Traditionally, cane farmers have a stockpile of cane seeds and only purchase seeds when their stores have been depleted. Switching to new seeds entails great capital expenditure for peasant farmers, which implies an increase in production costs. In the 2013/2014 financial year, the market price of the improved varieties of cane seed was 470 yuan/tonne, while that of the traditional varieties was 440 yuan/tonne. The cost of film mulching is also quite substantial. Sugarcane requires 2.5 to 3.5 kilograms of plastic film for one mu of land, and the film price amounts to 25 to 35 yuan per kilogram. Hence, the material cost alone is around 90 yuan per mu, which does not include the cost of mulching activities by either tractor or labour.

To push for the change, the sugar company and the local government resorted to both economic incentives and administrative means. As an economic incentive, the sugarcane company offered peasants 30 yuan per tonne more for the improved seeds as compared to the price of regular cane varieties, while peasants who applied for the film-mulching technology could receive a subsidy of 60 yuan per mu from the second year of the ratoon cane. Administratively, local government control has ensured that regular sugarcane varieties have gradually dropped off the market; film-mulching technology was propagated by the local government as part of their political agenda.

The four improved varieties of cane seed that are offered for 30 yuan more per tonne of the purchasing price by the sugar company are GT 29, GT 42, YT 93/159, and LT 05/136. According to the official report, the new varieties are—compared with CK 22, the most popular traditional cane variety—early to mature and lodging-resistant. They also have higher degrees of sugar content, and three out of four varieties have relatively higher yields according to tests. Because of the harvest being earlier due to the early-to-mature cane, the production is, in sugar factories, immediately efficient, whereas with the traditional cane variety the sugar factory would run inefficiently during the first month(s) given the little quantity of sugar cane available. Besides, the lodging-resistant character is developed for harvest machines suited for large cane plantations.

These measures have had remarkable outcomes. According to the local government, in the past decade the adoption rates in Dongmen Town of improved seed varieties and film-mulching technology exceed 50% and 80%, respectively. Cane farmers believe that they can have a better harvest by investing in the new seeds and film-mulching technology, as promised by the agricultural experts and technicians. Plausibly, cane from improved varieties can fetch a higher price and film mulching also increases yield. However, the new technologies enable the redistribution of costs and benefits among the sugar company and the cane farmers.

The pursuance of a higher sugar content or higher cane yield is complex, since the sugar company and cane farmers have different desires in this respect: the sugar company wants a higher sugar content rather than simply a higher yield, because it gains profits from sugar extraction, but has to pay for sugarcane by weight. For cane farmers, a high yield is desired. The sugarcane variety database of the Guangxi Academy of Agricultural Sciences together with reports provided by the

Guangxi Science and Technology Department show that the cane yields (tonnes/mu) of these improved varieties range from lower to a bit higher (maximum +11%) as compared with CK 22. However, the quantity of sugar extraction from one mu of land (tonnes/mu) can increase from 14% to 21% when the improved varieties are applied (GAAS 2012, Huang et al. 2016). Linking up increased rates of yield and sugar extraction with market prices clearly shows who profits from the change. In the 2013/2014 financial year, the average sugar price was 5,700 yuan/tonne and the corresponding sugarcane price was 470 yuan/tonne for the improved sugarcane varieties. The average cane yield of peasant farms is 4.5 tonnes/mu and around 8 tonnes of sugarcane produce 1 tonne of sugar, which means 1 tonne of sugar requires sugarcane from 1.78 mu of land. If we choose the highest increase rates for both cane yield and the expected quantity of sugar, peasants would receive an additional 232.65 ($=470 \times 4.5 \times 11\%$) yuan/mu, while the sugar company would receive an extra 672.47 ($=5700/1.78 \times 21\%$) yuan/mu.

However, the costs of the changeover to the improved varieties are incurred at the peasant household level. Scientific knowledge of the film-mulching technology was distorted when introduced to the cane farmers. Film mulching increases yield only for the first-year cane seedling, while cane farmers were told that the primary advantage of using film-mulching technology is an overall increased yield. The logic is that the ideal environment created by covering cane seed with film can speed up the germination process and produce strong seedlings. The cane density in a piece of land is finalized in the first year and will not see obvious change in the following years. In the years afterward, the main function of film mulching is to increase the sugar content instead of boosting the yield. However, the agricultural technicians misleadingly informed cane farmers about the yield-increase effect when promoting this technology. Besides, the subsidy from the sugar company covers less than two-thirds of the material cost of film mulching and is only assigned from the second year of the ratoon cane. Therefore, while the cane farmers bear the increased cost of the new technology, the sugar company secretly gains more benefits.

The second objective of harvest redistribution through technology is to produce multiple products from sugarcane. With technology development, the agricultural product processing industry can cover a wide range of business fields. Traditionally, the products derived from sugarcane crops have been limited to food, fodder, wood, wool, and fibre. However, recently the high-value products extracted from agricultural crops have come to include bioenergy, electric power, pharmaceuticals, cosmetics, chemicals, and organic fertilizers. Borrás et al. refer to crops with such character as ‘flex crops and commodities’, which include ‘crops and commodities that have multiple uses (food, fodder, fuel, industrial material) that can be, or are thought to be, flexibly inter-changed’ (Borrás et al. 2014). However, here the term “all-in-one crops” is used, because these crops are not in an either-or relation, but coexist. For instance, sisal can be transformed into fibre, saponin, cosmetic ingredients, and medicine components.

The “all-in-one” economic benefits are determined not only by the character of the crops, but, more importantly, by high technology. Currently, most crops can be processed into multiple products through one processing line, and sugarcane is a typical crop for deriving maximum economic benefit. The sugar company obtains two primary products after crushing the cane: molasses and bagasse. Sugar, the main product, is first cleared from molasses. In the next step the “waste molasses” are fermented into monosodium glutamate, yeast, a nutrient medium, lysine, and other acids. Bagasse is used primarily as a fuel for operating the entire processing line, but only part of the total amount of bagasse is used for this purpose; a large amount of bagasse is also used for generating electricity and producing pulp. Furthermore, the sludge left from the burning of bagasse is turned into organic fertilizer for crops and sold back to peasants. While it is difficult to

calculate the total value of the by-products from one tonne of sugarcane, it is clear that these by-products are mostly high-value products, for instance, monosodium glutamate is around 15 yuan/kilo, bagasse-based organic fertilizer is around 200 yuan per truck (around 10-13 tonnes). Given that sugarcane can produce so many high-value products, it is surprising to see that the purchase price of sugarcane is only determined by the market price of sugar. From 2012 onwards, the sugar price both on the global market and on China's domestic market has fallen. As a result, the basic purchasing price of cane dropped from 500 yuan/tonne in the 2011/2012 financial year to 400 yuan/tonne in the 2014/2015 financial year. The low cane price made cane farmers' life more difficult, considering the money inflation in the economy and the increased costs of cane production. According to the data from National Survey of Cost-Incomes of Agricultural Products in 2014, the cash income generated by growing sugarcane was +683.33 yuan/mu, but the net profit—the margin between cash income and the sum of market prices of family labour and self-owned land—was -150.04 yuan/mu (CSMNSCIAP 2014). While cane farmers suffered from the low cane price due to the stagnation of the sugar market, the sugar company still maintained the entire industrial chain by lowering the cane purchase price and gaining substantial profits from by-products. Therefore, sugar companies attempt in different ways to prevent farmers from resorting to other crops. The basic problem in the technology promotion is the unequal distribution between the cane farmers and the sugar company regarding the increased production cost and gained harvests. It is clear that agricultural technification has become a covert way of capital accumulation that shifts the technological cost to farmers and the gains to food processing companies.

4. Food politicization: the state and agro-food capital nexus

Clapp and Fuchs (2009) advanced the literature on food governance with their analysis of the relationship between agri-food corporations and food governance. They proposed an instrumental-structural-discursive framework to identify the political role and the power construction processes of transnational corporations in the arena of global food governance. Their work is critical for understanding the interaction between the global food system and transnational private capital. To some extent, their explanation corresponds to Harvey's accumulation analysis of the "transnational capitalist class" in the neoliberal global economy (Harvey 2003: 183-189). However, this global political economic view of agri-food corporations does not fully explain the political and economic processes related to food governance at the national level.

This section thus aims to understand how agro-food capital and the state interact to shape a certain framework of food governance at the national level. This includes two guiding questions: how do agro-food corporations make use of state power in order to continue accumulation activities at both the national and transnational level; and how can the state reinforce its political power related to national food governance through its support of accumulation activities of agro-food capital? This section shows the allied strategy of capital accumulation and state governance in the neoliberal economy era. This must be distinguished from the state-driven accumulation for economic development—the so-called developmental state (Johnson 1999).

In the case of China, the transition of the two historical stages started in the 1990s, when the Chinese economy entered into a privatization and liberalization stage as the result of the "open-up" policy and domestic economic reform. However, the power of both international financial capital and domestic private capital were submissive to the Chinese state in performing their economic activities (Harvey 2007: 122-123). In the sugar industry sector, the decisive change took place in 1993 when the Thai MitrPhol Sugar Group acquired five state-owned sugar mills in

Guangxi Province and founded the Nanning East Asia Sugar Company in China. The company expanded rapidly and soon became the largest sugar producer in China. In addition, the Yangpu Nahua Sugar Group was officially registered in Hainan Province in 1997 by domestic private capital and later expanded its activities to Guangxi Province and other provinces. Therefore, over the past two decades, private corporations have dominated the Chinese sugar industry, although a few state-owned farms are still engaged in sugar production activities.

The Chinese sugar market was further liberalized after China accessed to the WTO in 2002. China's accession agreement stipulated that, following the phase-in period of six years, the sugar import quota would be over 1.9 million tonnes, and the in-quota tariff and out-quota tariff were set at 15% and 50%, respectively (World Trade Organization 2001). It is clear that the low sugar import tariffs pushed the Chinese sugar sector into the liberal global market. This is even clearer when making a comparison between China's sugar import tariff and the sugar import tariffs of most member countries forming part of the WTO. A report from CI Consulting has shown that the average sugar import tariff of WTO member countries is 97%.

The hasty opening of China's sugar market to the global sugar market with its low import tariffs did not immediately show a negative impact on the domestic sugar industry after the end of phase-in period, because the global food market encountered dramatic price increases at the time (in 2007 and 2008) (Von Braun 2008). However, with the waning of the global food price crisis, the competitive disadvantage of domestic sugar companies came to light. From the 2010/2011 season onwards, the domestic sugar price has declined over six years due to the excess supply in the global sugar market. The low sugar price led to the bankruptcy of small private sugar companies as well as to a substantial reduction in the sugarcane planting area. Thus, capital in the Chinese sugar industry was facing an accumulation crisis.

The countermeasure strategy of these sugar companies was to shift the problem onto the political agenda. Originally, "food security" in China was equated to grain security. As Ghose (2014) indicated, cereal grain production was prioritized in the restructuring of the agricultural sector during China's economic reform period in the 1980s (Ghose 2014). In 1996 Chinese Premier Li Peng, at the second World Summit on Food Security, promised that China would rely on domestic resources to achieve mainly grain self-sufficiency. To this day, the grain self-supply strategy is still the national guiding policy for agricultural production. Furthermore, cotton and oil are also considered as strategic goods in the Chinese agro-food policy discourse. Sugar was never considered a dietary product of political significance.

The enduring sugar price fall drove sugar companies to lobby the Chinese central government since 2012. They argued that sugar should be prioritized alongside grain, cotton and oil in the national agro-food security strategy. Sugar security is about the domestic sugar supply and the sugar or sugar-based food industries, but it is also directly related to the income of China's 40 million sugarcane farmers (Ministry of Agriculture of the PRC 2014). Sugar companies' lobbying efforts were successful and garnered the attention of the central government. Under the instruction of the State Council, an official document titled "Development Plan for the Main Sugarcane Producing Area (2015-2020)" was issued in 2015. The document clearly states that from that point onward, the development of the domestic sugar industry would form part of the national food security strategy framework. As with many agricultural projects, substantial investments were made in infrastructure, science-technology, and machinery in the sugar and sugarcane production sector (National Development and Reform Commission 2015). Following this idea, a "double-high" project was launched. The project contains four components: land consolidation, improved cane varieties, mechanization, and irrigation infrastructure. For the

modules relating to new seeds and machines, sugar companies carried out the application of governmental subsidies to project practices. Clearly, the project brought direct benefits and power to sugar companies.

Besides directly allocating resources to sugar companies, political influence also spans business and trade activities. According to the China-WTO agreement, the Chinese government applies a low-tariff rate (15%) to the import quota of 1.95 million tonnes and high-tariff rate (50%) for the additional imports beyond the quota. Before 2010, the annual sugar import volume was within the quota of the low-tariff rate. From 2011 onwards, the yearly import volume of sugar rapidly exceeded the quota. The data from National Bureau of Statistics of China show that sugar imports increased from 2.92 million tonnes in 2011, to 3.75 million tonnes in 2012, to 4.55 million tonnes in 2013, to 3.48 million tonnes in 2014, and finally, to 4.84 million tonnes in 2015. By 2015, imported sugar thus comprised more than one-fourth of the total domestic sugar supply, and this proportion keeps rising due to the low price of raw sugar on the global market. Initially, the China Sugar Association devised regulations for domestic sugar refineries regarding the restriction of the import volume of raw sugar (Yunnan Sugar Web 2014). However, the commercial rules were not capable of controlling the profitable sugar trading business. By late 2014, the central Chinese government introduced a new registration system for sugar import that is applied with the high-tariff rate (Reuters 2014). Although the Commerce Ministry did not publicly motivate the reason for the introduction of the registration system, it is clear that this new system can buffer against sugar imports.

The sugar companies further argued that control on sugar importation was necessary but not sufficient, since the low import tariff was the main problem; the global average for sugar tariffs is 97%, while the Chinese sugar tariffs is 15% for quota import and 50% for out-of-quota import (Dominique 2015). Thus, the Guangxi Sugar Association in 2016 officially applied for an investigation into the damaging effect of sugar importation on the domestic sugar industry. The Ministry of Commerce then commenced with an investigation into the sugar tax; as a result, the current China-WTO agreement on sugar tariffs was adjusted (Ministry of Commerce, PRC 2016). Hence, after obtaining subsidies in the production sector, the sugar companies successfully received support from the state to intervene in trade activities. However, the “from-capital-to-the state” intervention approach is only one of two components of the state-capital interactive process. The other constituent of the state-capital interaction is the “from-the state-to-capital” intervention, which operates through the expansion of state-owned food enterprises. While the state can reinforce its political power on food governance through its support for domestic food companies, private capital investment cannot always adhere to the national food security plan. Therefore, state-owned food enterprises started to encroach on the sugar business when the domestic sugar market crisis began. COFCO and the Bright Food Group are two such state capital-controlled food companies. In 2009, the Bright Food Group acquired a 60% share of the Yingmao sugar company—the largest sugar company operating in Yunnan Province (the second largest sugar-producing province in China), which was previously fully financed by foreign capital. The Bright Food Group then continued its acquisition strategy and merged with the Guangxi Feng Sugar Company—a large private sugar company in Guangxi Province—in 2014. COFCO, on the other hand, since 2011 more aggressively asserted its dominance through business acquisition or new projects. Table 1. Shows their development trajectories in the sugar industry.

Table 1 Chinese state-owned agro giants and their expansion in the sugar sector in recent years

State-owned agro giant	Acquisition period	Name of merged/newly-formed sugar companies	The previous capital owners or new projects
COFCO (-TUNHE)	2011	Tully Sugar Limited	Foreign capital
	2011	COFCO sugar manufacturing company in Guangxi Province	Newly built
	2014	Caofeidian Sugar Refinery (largest sugar refinery of imported raw sugar)	Newly built
	2014	Sugar mills of Noble Agri Limited in Brazil	Foreign capital
	2014	China Huafu Trade & Development Group Corp (responsible for the national sugar reserve)	State-owned
	2014	Sugar business module in China National Sugar and Alcohol Group Corp (the largest sugar sales and marketing company in China)	State-owned
Bright Food Group	2009	Yingmao Sugar Industry Company (the largest sugar company in Yunnan Province)	Foreign capital/ domestic located
	2014	Guangxi Feng Sugar Company (one of the largest sugar companies in Guangxi Province)	Private capital

Note: The table is synthesized by the author based on information from the COFCO and Bright Food Group websites and from various news reports.

The direct result of the state-owned capital expansion has been the tendency towards state-owned capital monopoly in the domestic sugar industry. COFCO and the Bright Food Group quickly secured positions at the top list of sugar-producing companies in China. Besides, the state-owned sugar companies are assigned 70% of the low-tariff import quota. Moreover, COFCO controls most of the domestic sugar marketing channels. This change also led to the restructuring of capital power in the sugar industry and trade; that is, the rise of state-owned capital and the decline of foreign and domestic private capital. In turn, capital structural adjustment in the sugar industry sets the ground for the “double-high” sugarcane project. As the manager of Dongmen-NanHua sugar company said:

We (as domestic private capital) respond to the governmental policy and positively get involved in the “double-high” project. We also contribute to the national sugar security goal. COFCO and other state-owned sugar companies are more active in the project because they have abundant capital from the state. Besides, it is their responsibility to achieve sugar security goals. However, the East Asia Sugar Company is not participating well in the sugarcane project. They do not follow the instructions of the government about investing in land consolidation and sugar plantations. This is because the boss is Thai; he is not Chinese. (personal interview, 2 January 2017)

In both the “from-capital-to-the state” and the “from-the state-to-capital” interventions, agro-food capital cannot continue its accumulation activities without the support of the state. Similarly, the state cannot ensure its political authority and economic security without collaboration with capital groups. By framing the stagnation of domestic sugar production as a national food security problem, private capital acquired both natural resources and governmental subsidies to fund its activities. Conversely, through its support for the agro-food companies, the state can ensure that its strategy targeted at national food governance is carried out. In countries like China, the state can govern the domestic agricultural production and food industry through specific market activities—by using state-owned capital to interfere in the agro-food sector.

5. Land swindle: land consolidation activities for obtaining agricultural resources

Building modernized sugarcane plantations is one of the principal objectives of the “double-high” project that aims to reduce the sugarcane production cost as well as to ensure a stable sugarcane supply to the sugar mills. According to the government, four actors in the sugarcane sector are eligible for governmental subsidies if they expand cane plantations beyond 200 mu. They are: sugar companies, agricultural investment companies, cooperatives, and scaled-up family farms (Guangxi Government 2014). For these actors, merging pieces of land owned by scattered peasant households is key for engaging in farming activities and accessing agricultural subsidies. However, land consolidation by agricultural investment companies shows the aggressive accumulation strategy of taking advantage of the agricultural subsidy system. This accumulation activity can potentially undermine national food security and the livelihoods of local peasant households.

Land consolidation undertaken by agricultural investment companies is usually a swindle game rather than a production activity. To understand this, it is necessary to reflect on the development of the Kaili Company. Due to the domestic sugar industry crisis, sugar companies and local governments were put under pressure from corporate profits and tax revenues in the 2010/2011 crushing season. Seizing the opportunity, Huang, the initiator of the Kaili Agricultural Investment Company, promoted the mode of large plantation production to the local government, which reported to the Guangxi provincial government that this mode of production is the solution to local economic hardship. The provincial government further developed the idea into a blueprint of the so-called “second prosperity of the sugar-cane industry”, which fits into the sugar security plan of the central government. Therefore, corporate plantations became the main highly subsidized production mode in the “double-high” sugarcane project. Having gained policy support, the Kaili Company started land consolidation activities. Land consolidation is based on land (operation right) transfer under the Chinese Household Responsibility System; that is, renting land from the farmers. Between 2013 and 2016, eight sugarcane plantations have successively been created in the cane production zone in Guangxi Province (see Table 2 below). In fact, the sugarcane plantation in Dongmen Town is only one of the eight cane plantations under the operation of the Kaili Company.

Table 2 The expansion of sugarcane plantations implemented by the Kaili Company

Location of cane plantations	Acreage of each expanded plantation	Completion year
Zhanjiang	4,000 mu	2013
Nanning-Wuming	3,450 mu	2013

	8,000 mu	
	3,700 mu	
Liuzhou	600 mu	2014
Chongzuo-Fusui	6,800 mu (Palou-Pabai plantation, in Dongmen Town)	2014
	6,255 mu	2015
	4,200 mu	2016

Source: Data obtained from an interview with one of the managers of the Kaili Company. Some of the plantation acreages are approximate figures.

The accumulation mechanism is very bold. According to one key interviewee, the Kaili Company is, like any other agricultural investment company, a “fund-extracting company”. The company registered itself without substantial capital; on the contrary, it was founded for raising capital. According to the subsidy rule of the “double-high” project, one can get 2,478 yuan/mu construction cost from the government for establishing a modern sugarcane plantation. Thus, the Kaili company can receive $(4000 + 3450 + 8000 + 3700 + 600 + 6800 + 6255 + 4200) * 2478 = 91,698,390$ yuan for its eight plantations. Moreover, to achieve government performance and accomplish the local targets of the “double-high” project, the local government placed pressure on the sugar companies and the banks to provide loans to the Kaili Company with very low interest rates. The known amounts are 12 million yuan from the Dongmen Nanhua Sugar Company and 10 million yuan from the Nanning East Asia Sugar Company. The loan amounts from the local China Agricultural Bank are not clear. According to information from another key interviewee, the government sponsored a substantial part of the input cost of the plantations. The Guangxi Sugarcane Research Institute offered free cane seeds to the Kaili Company and the government also subsidized large agricultural machines and other production materials (like pipes and plastic films). As the interviewee said, ‘Kaili started with very little money, but now it has already 100 million in assets.’ (personal interview, 23 December 2016)

The land consolidation activity is unsustainable in many respects. First, in terms of the impact on the local economy, land transfer and concentration placed pressure on the local villagers’ livelihoods and income and caused tensions. The villagers have doubts about the Kaili Company as regards its capacity to pay the land rent and its capacity to complete the contract period. The tension around land rent caused real conflicts in the summer of 2016 when the local villagers did not receive land rent from the Kaili Company at the agreed time. They protested in front of the building of the Kaili Company and at the township government’s office. When they received no response, they forcefully stopped production activities in the plantation and locked the gate of Kaili’s machinery storage facility. After two months, the Kaili Company paid the villagers after the county government pushed the local China Agricultural Bank to offer a loan to Kaili. However, because of the conflict, the plantation missed sugarcane’s best growing season. The doubt about whether Kaili can abide by the contract has not yet resulted in any action, but the villagers remain worried about it. Almost every interviewed farmer echoed the words of one farmer, who said:

Who knows, one day the boss may take the money and run away and leave the chaos to us. If it happens, we will get nothing from the land for the next two to three years, because it will take at least two years to redistribute the land to each household. (focus group interview, 2 January 2017)

Second, unemployment is a feature of the local societies where cane plantations are established. Gambling became more popular in the local societies due to high unemployment rates, and gambling groups can be found at every corner in these villages. Since the large plantations can only hire a very small number of labourers, the majority of the villagers that rent out their land have become unemployed. Most of the local villagers have been farmers for their entire lives and have little working experience in cities. As several young men said,

We have no college diploma, nor professional skills; who will hire us? We tried to work in cities before, but we spent more money than we earned. So, our parents asked us to come home and grow sugarcane. But since we rent out our land, we just wait for the land rent and enjoy life. (personal interview, 26 December 2016)

Contrary to those who spent their time gambling, the families with greater economic burdens to bear, such as to ensure their children's education, arrange filial marriages or combat serious diseases, seek additional income sources. These villagers are mostly opposed to land transfer and the Kaili Company, since they can benefit more from self-farming than from land leasing. They are anxious and resentful about the current situation and the future. One of these farmers said that

...compared with the land rent, I can get a double to triple the income from the land if I work hard by myself. Now I have to go to our county centre to look for jobs. I will do anything that people offer me—I will become a guard or dustman, etc. I am old; it is not easy to find [a job]. But I have two children who are of schooling age." (personal interview, 28 December 2016)

The third unsustainable aspect is the countereffect of large-scale land transfer on national food security. The key issue here is productivity. The government and the Kaili Company claimed that modern cane plantation could increase the sugarcane yield, so that it can lower sugarcane production costs. However, the cane plantations did not provide evidence of higher yields over the past two years. The average yield in the cane plantations was less than 4 tonnes/mu, while the average yield of small farmers is 4.5 tonnes/mu. The manager of the Kaili Company blamed the local villagers' protest action for the low yield in the cane plantations. But, as the local farmers explained,

...even if there has not been an interference, this mode does not work well. The plantation workers only spray pesticide and weed at the outer part of the cane field; they do not go inside the field. No one works as hard as for their own farm. (focus group interview, 2 January 2017)

Another issue relating to productivity is the output per unit of land. Before the land transfer, farmers intercropped sugarcane with watermelon. Per mu of land, farmers on an annual basis can produce on average 4.25 tonnes of sugarcane and 2.5 tonnes of watermelon. Although the farmers didn't intercrop watermelon in the entire cane field, 30% to 70% of the land was planted with the two crops, depending on each household's farming plan. However, monocropping is the popular planting system in the plantations, while the average yield is even lower than that of small farmers. Even if the cane plantations can achieve their yield goal of 6 tonnes/mu—a difficult feat given the current situation—it is still uncertain which farming methods can produce more food. While small farmers choose intensive farming to increase production for an increased income, plantations search for profits based on large-scale land and rough farming. Rough farming refers to the farming

strategy that uses more land but less labour to produce food. This strategy can reduce production costs when the labour price is relatively higher than the land price in the market (Huang 2014). The yield of a particular crop in the plantation mode may be higher, but small farms produce more diverse farm products within their limited land plots. Accordingly, the project goal of achieving food security is seriously challenged by its unrealistic method.

This accumulation mechanism is based on resource extraction, including financial resources and natural resources. It is detrimental to both the national food security plan pursued by the Chinese government and the livelihoods of the local villagers. Furthermore, this accumulation activity is turning into a serial and trans-border land occupation action. Speculators accumulate their initial large capital by extracting agricultural funds in China, where the government currently subsidizes large-scale agricultural production due to the high domestic land and labour prices. But after obtaining the funds, speculators can shift the plantation business to neighbouring countries, where land and labour prices are low. In the meantime, they can declare their limited liability companies inside China bankrupt. As stated by two key interviewees, the boss of the Kaili Company is searching for sugarcane locations in Cambodia, Thailand and Myanmar. In fact, the latest news from the informants residing in Dongmen Town in 2018 reveals that the Kaili Company is bankrupt and that its leader currently resides in Myanmar.

6. Conclusions: an accumulation synergy and the food security issue

This paper discussed three strategies of capital accumulation that can be currently observed in the agro-food sector in China. New technologies restructure the distribution of costs and benefits between food companies and farmers. State intervention provides the ideal socio-economic context for capital to continue its accumulation activities. Land speculation is the most unsustainable and fraudulent way of capital accumulation and resource extraction, from both nature and financial funds, is destructive to the agricultural population and its activities.

Benvenuti argued that the agricultural sector has been shaped by many institutions, including state agencies, agribusinesses, banks, and service providers, and the agricultural producers who live in such an “environment” have been directed what, how, when and why their activities should be conducted. This situation of recent agricultural production echoes the theoretical model of ‘Technological-Administrative Task Environment’ (TATE) (Benvenuti 1975). The accumulation strategies discussed in this paper have echoed the TATE analysis. New technologies and state intervention create a new environment in which farmers and nature have lost their prominence in agricultural production. Rather, the new environment takes agricultural production as the process of capital accumulation and state governance, and the activities of the governments and companies have shown an accumulation synergy.

This paper attempts to show how the new accumulation strategies work; how the strategies defy food security and rural livelihoods; and how the strategies destroy the sustainability of nature and society. By showing that large-scale, modernized sugarcane plantation cannot guarantee sugar supply security in China, this paper argues that national food security should not be equated with the production security of each individual crop. Even at the domestic production level, national food security is an entire production system of various crops, including vegetables, fruits, tea, and other non-staple products. In terms of food security, domestic production is only one of the influential factors. There are other factors, such as: food import sources, food storage systems, and the food consumption habit. In addition, social and natural sustainability should be considered when the state pursues its national food security plan. A food production system based on a

capitalist agricultural production modality is likely to be ineffective and unsustainable. Food production may be better off relying on the moderate family farming pattern, which returns farming to individual households and rural society.

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