

4 China's Global Meat Industry: The World-Shaking Power of Industrializing Pigs and Pork in China's Reform Era

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Nineteen-seventy-nine was a watershed year in the global meat industry. After growing in tandem for decades,¹ pork overtook beef, initiating the meteoric rise of “the other white meat” to the top of global meat markets.² Underlying the pork boom was China, or more specifically, the reforms to China's economy that began with Reform and Opening (*gaige kaifang*) in 1978. By liberalizing selected agricultural markets, supporting the emergence of private and state-owned agribusiness firms, and encouraging scaled livestock and feed operations, state policies were instrumental in the production upswings that brought more pork to the Chinese people, and pushed pork to dominance in the global arena. Pork's rise was China's rise.

Throughout China's reform era (post-1978), policies and markets have further industrialized and commercialized livestock and pork production. The Household Responsibility System (HRS) in 1981 decollectivized the countryside, spurring privatization and private entrepreneurship, and prompting new forms of commercial and contract farming. Liberalization of soybean imports from the early 1990s transformed the pork industry, freeing livestock feed needs from the constraints of China's high-population/limited-land conundrum. And the definition and adoption of agricultural “modernization” in development policy and practice since the 1990s further restructured agricultural production and rural social relations in ways that resulted in massive production increases, along with social and dietary change, and environmental degradation. Taken together, these transformations have propelled China's pigs and pork to become world-shaking things. By 1995, farmers and companies in China were producing 40 percent of all the pork in the world.³ Today, although production growth has stagnated since 2015, China remains home to almost half of the world's pigs, half of

the world's pork production, and half of the world's pork consumption.⁴ China produces five times as much pork as the United States, and twice the amount in the European Union (figure 4.1).

While pork is not the only meat rising in China, it is certainly the star of the show. Overall per capita meat consumption has quadrupled since 1980; by 2013, the average Chinese person ate 65 kg of meat.⁵ In 1980, pork accounted for 82 percent of China's meat consumption, declining to 61 percent in 2013, as chicken has become increasingly important in terms of production output and consumption levels.⁶ Still, pork remains the heart of the reform-era meat boom (figure 4.2).

These relatively rapid changes beg several questions: Why pork? Why now? How did the pork boom happen? With what consequences? And where is it heading in the future? This chapter offers some answers. It highlights cultural histories and meanings around pigs, pork, and peasants; the role of the state and corporations in the reform-era pork industry; and social and environmental implications of the pork boom.⁷ The chapter looks at some of the ways in which transforming pork production and consumption has been premised on the industrialization and capitalization of the swine sector *within* China, while considering relations *beyond* China as

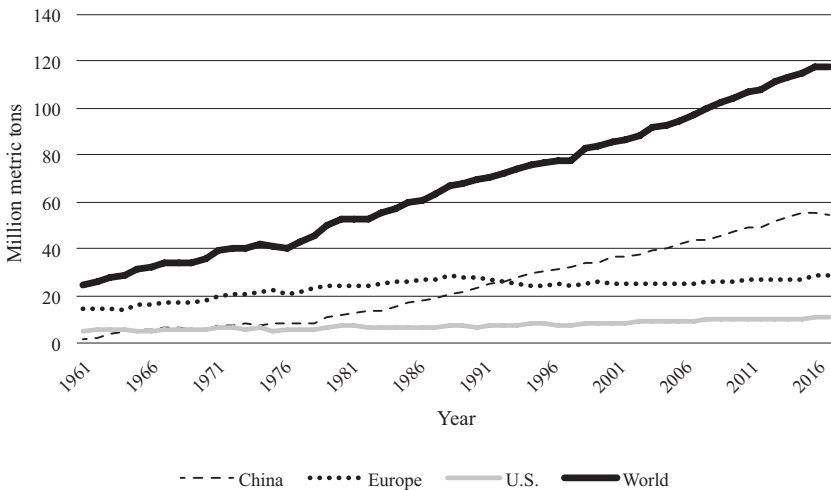
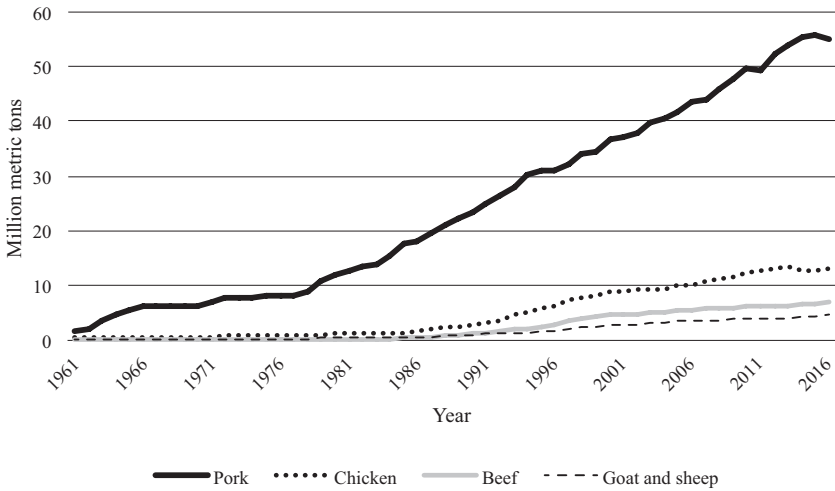


Figure 4.1

World pork production, 1961–2016

Source: FAO 2019.

**Figure 4.2**

Meat production in China, 1961–2016

Source: FAO 2019.

well. It argues that China's is a global meat industry: resource flows, production, political economic relations, and political ecological consequences transcend borders, and leading Chinese pork firms are increasingly transnational in nature and operation. Pork is more and more a global industry with Chinese characteristics.

Why Is Pork the Heart of China's Meat Industry?

Pork is China's so-called national food (Wang and Watanabe 2008). More than the massive scale of production already described, this label reflects deeper cultural meanings and associations, and dietary norms and traditions. In Mandarin Chinese, the universal word for meat (*rou*) refers to pork. Formally, *zhurou* ("pig meat") means pork, but in conversation, on menus, and when ordering at a restaurant or market, talking about *rou* is talking about pork. By contrast, "chicken meat" (*jirou*), "cow meat" (*niurou*), and "sheep meat" (*yangrou*) must be specified: they are *types* of meat while pork *is* meat.

That pork stands in for meat is a current expression of a much longer history. Pigs and pork have been central to Chinese households for millennia,

carrying cultural meanings and performing agroecological functions. For example, the Chinese character for home and family is 家 (*jia*). It was created some 3,500 years ago by adding the roof radical to the pig radical,⁸ or more figuratively, by putting a roof over a pig's head (Harbaugh 1998). Similarly, there is a saying, *meiyou zhu, meiyou jia*, which translates as “no pig, no home.” These examples illustrate that at some time, pigs lived in houses (or in the household) with families (Wieger 1927). They also reflect that pigs were thought of as key components of the household, and of the very meaning of “home.”

In terms of diet, pork has been a consistent part of the major agricultural and food traditions in China for thousands of years,⁹ but peripheral in diets until very recently. For most of history, and for most Chinese people, eating meat was limited to social and ceremonial events, never produced in quantities that would allow for routine consumption for the entire population. Before 1949, Chinese farmers received only 1 percent of their food energy from animal products, while grains made up the bulk of their diets (Hsu and Hsu 1977). While China today seems full of meat, pre-reform and pre-modern China was full of pigs. Starting 6,000 to 10,000 years ago, when pigs were domesticated in various parts of China, each place had its own locally adapted pig breed, and most households raised at least one or two pigs a year (Jian 2010; Zheng 1984). Pigs were more valuable alive than dead, acting as efficient converters of kitchen and agricultural scraps into nutrient-rich fertilizer (Schmalzer 2016; Wittwer et al. 1987), before becoming pork that could be given as a wedding gift, used to curry political or social favor, or eaten as part of Chinese New Year celebrations (Chang 1977). *Pigs* were a staple of Chinese farming systems and households, while for the vast majority of people *pork* was a rare treat. Although this long tradition of pork consumption in China included variation across different times, places, and social relations, the smallholder model of raising pigs as part of diverse crop and livestock agroecosystems, coupled with only occasional meat eating, defined much of the country's 7,000 years of agricultural history.

Meanings and associations have changed through time, but pigs and pork remain important cultural signifiers in China today. For instance, 2007 was a “Golden Pig” year in the Chinese zodiac. A symbol of prosperity and happiness, tens of thousands of couples in China were eager to have children born under this auspicious sign. Golden Pig fervor was

so high that officials predicted a Golden Pig baby boom¹⁰ and media outlets in China and internationally reported overloaded maternity care wards ahead of the New Year, as well as concerns about whether social institutions would be able to handle hundreds of thousands of Golden Pig babies thereafter (Cody 2007; *Economist* 2007).

Although other Chinese zodiac animals are considered auspicious, the 2007 Golden Pig was something special. Companies selling diapers, baby oil, and baby food increased their advertising budgets by 50 percent ahead of 2007 (Cody 2007), in hopes of cashing in on (and perhaps helping to create) the Golden Pig fertility rush. But more than short-term economic gains for baby companies, the frenzy around the 2007 Golden Pig year also suggests the importance of pigs in contemporary Chinese culture. The Golden Pig is a rich symbol of the new role that pigs play in China's economy. Pigs are big business: they occupy important positions in China's food and agricultural markets, they are a destination for state and private investment, they serve as a source of profit for agribusiness firms and the state, and concerted efforts to breed and feed them has rerouted trade, investment, and resource flows globally.

Why Is Pork Booming Now?

Although common and even ubiquitous in China for thousands of years, pigs in the reform era are dramatically different. From their earlier stature as symbols of home and suppliers of fertilizer, pigs have become most highly valued for the pork they produce. This is so in terms of economic value—with profits accruing to firms along the pork commodity chain—and in terms of social value—with meat consumption serving as a marker of social status. These transformations are part and parcel of China's broader capitalist transformations.

Throughout the reform era, meat in general and pork especially have signified progress against a backdrop of scarcity. During the Cultural Revolution (1967–1976) when pig production was collectivized, meat was rationed to households by coupon. Even though for centuries farmers only ate meat once or twice a year for holidays and special occasions, meat rationing impacted the diets of virtually all Chinese people, changing popular notions and expectations of the frequency and amount of meat consumption. What's more, the first thirty years of the People's Republic

of China (from 1949) were punctuated with large-scale agricultural shortfalls, household-level food insecurity, and famine. During this time, many Chinese people directly experienced food scarcity.

Common experiences of rationing informed the state's reform-era focus on increasing pork production and consumption, both to heal the wounds of past scarcity, and to legitimize the state for its role in creating a bountiful agrifood system (Schneider 2017b). In a country where the politicians who run the central government are not elected, mechanisms for creating and sustaining state legitimacy are important, with productivist and environmental discourses becoming especially salient (Chen, Zinda, and Yeh 2017). Raising meat production is one such mechanism (with attendant discourses), making pork consumption a political goal, as well as a tool for economic development.

How Has the Pork Industry Developed?

Ramping up pork production since 1978 has entailed a suite of political economic transformations including liberalization, privatization, and commercialization broadly. In 1987, small-scale or “backyard” household farms supplied 95 percent of all the pork in China (Qiao et al. 2016). Today, medium-size and large-scale operations have the largest share, the result of years of concerted effort to scale up and modernize the sector, and to eliminate smallholding in favor of commercial enterprises.

Industrializing Pig Production

State support for industrializing the pork sector began early in the reform era, intensifying through the 1990s,¹¹ and solidifying as a goal and set of policies in the 2000s. Following earlier efforts to increase the scale and output of pork production,¹² industrialization got a boost from the PRRS (porcine blue-ear disease) epidemic that swept across China in 2006, leading to the cull of 20 million pigs and subsequent skyrocketing pork prices (An et al. 2011). In the wake of the outbreak, the central government doubled down on efforts to scale up and modernize pig production. The State Council laid out measures in 2007 to increase state support for large-scale, industrialized, and standardized pork production to stabilize the industry and protect against future shocks.¹³

Post-disaster subsidies successfully boosted the national swineherd from 40 million to nearly 50 million, igniting overall production growth. But subsidies not only increased production, they also restructured it. After dedicating 2.5 billion RMB (\$366 million) to large-scale production facilities or specialized “pig barns” in 2009, the Ministry of Agriculture reported that farms raising more than fifty hogs a year accounted for almost 60 percent of total slaughter, an increase from less than half in 2007 (Woolsey and Zhang 2010).

Confined Animal Feeding Operations (CAFOs) “Pig barns” are various forms of confined animal feeding operations (CAFOs), ranging from relatively small-scale operations with 50–200 fifty to two hundred pigs, to massive industrial megafarms raising thousands to hundreds of thousands of hogs each year. Regardless of scale, the logic of the CAFO is the same: confine livestock to control (and speed up) the conversion of feed to meat (“efficiency” in industry terms), while sparing land for other uses, freeing labor for other employment, and creating a sector that can be effectively monitored and regulated.

Discursively, CAFOs have been a rather easy sell. First, because China has 21 percent of the world’s population and only 9 percent of arable land, CAFO production is seen as inevitable for raising meat consumption without compromising food security. Second, during the first decades of reform, economic development occurred primarily in cities on China’s east coast, both pushing and pulling hundreds of millions of migrant workers from the farm to the factory (and the restaurant, construction site, massage parlor, KTV [Karaoke Tele Vision] lounge, etc.). Specialized pig production was proposed as a way to free many rural people from pig raising, while providing opportunities for some to concentrate on raising pigs exclusively (the medium-scale version), and for others to take up employment in commercial operations (large-scale production and processing). Finally, given rising concerns over environmental regulation and food safety, especially in recent years, CAFOs and large-scale operations are further justified as the most governable form of production. The discourse is that hundreds of millions of spatially dispersed peasants are difficult to regulate, while commercial farms are governable entities that can be more effectively monitored and controlled, especially through law (Schneider 2017b).

As in any place where CAFOs become the dominant form of production, claims about their efficiency and governability require concerted and critical analysis. Decades of research document the ecological crises of so-called factory farming, as well as social and public health implications (discussion follows). Research also demonstrates corporate consolidation around and through CAFOs, with firms effectively owning national livestock herds that live primarily in their factory farm operations (Howard 2016; see also chapter 2). While governments always play a role in corporate power through supportive policies and subsidy programs (Clapp and Fuchs 2009; McMichael 2009b), in China these relationships are not hidden; the state designates agribusiness firms as the leaders of agricultural development, and supports them as agents of economic and rural development. State-corporate relations are central to the political economy of China's reform-era pork boom.

The Political Economy of Industrialization

Industrialization is not a neutral process of simply capitalizing on economies of scale and responding to the changing labor composition in the countryside. It is also, and importantly, a process in which power relations structure the choices made about how "goods" and "bads" will be distributed both socially and spatially, creating a political economy of winners and losers. This political economy of the pork boom includes material relations among state, private, domestic, and international actors, who negotiate and manage pork industry developments and profits, and environmental relations on an uneven playing field. Today, the most powerful players in China's pork industry are domestic agribusiness firms, and government ministries and bodies at various political scales. These players are linked through industry groups, policy committees, and boards of directors. Together they are creating a robust domestic agribusiness sector to serve as an arena for national-level rural and economic development, and as a launching pad for accessing markets and resources abroad. Agribusiness-led vertical integration and industrialization are the hallmarks of China's modern agriculture (Schneider 2017a).

Modern Agriculture In the first decade of reform, agricultural productivity stagnated. Then in the mid-1990s, under the leadership of Jiang Zemin, the central government announced a development plan based on

transitioning from traditional to modern agriculture. Government authorities characterized modern agriculture as commercialized (*shangyehua*), specialized (*zhuangyehua*), scaled up (*guimohua*), standardized (*biaozhunhua*), and internationalized (*guojihua*), and identified industrialization and vertical integration (*chanyehua*) as the primary means by which to achieve these goals. In 1998, authorities introduced a set of policies that put lead firms called dragon head enterprises¹⁴ (DHEs) at the center of the modernization campaign. Central leadership began promoting and supporting these firms as *the* vehicles to bring about modernization (Zhang and Donaldson 2008, 29). Contracts between firms and farms became the preferred mechanism for integrating rural primary producers under the umbrella of modern agriculture.

Dragon Heads Agribusiness firms emerged rapidly after 1978, and subsequently, their number and importance have continued to grow. At the end of 2011, there were more than 110,000 officially designated dragon heads, and another 280,000 enterprises engaged in agricultural industrialization.¹⁵ According to the State Council in 2012, “Dragon heads are not like ordinary commercial enterprises: they are responsible for opening up new markets, innovating in science and technology, driving farm households, and advancing regional economic development. They are capable of driving agricultural and village economic restructuring, driving commodity production development, promoting increased efficiency, and increasing farmers’ income.”¹⁶

The dragon head designation entitles a company to government programs that subsidize their rural and economic development responsibilities, and label the company as a lead firm, which can translate into enhanced legitimacy and trustworthiness in the market. State support comes in the form of direct subsidies for construction and operating expenses, as well as tax exemptions and reductions, export tax rebates, discounted loans with little or no interest, and investment (Zhang, Fan, and Qian 2005).

To become a dragon head, a firm must have legal standing as a state-owned or private enterprise, a group or corporation, a Chinese-foreign joint venture, or a wholly foreign owned enterprise.¹⁷ It must also meet operational, financial, and farm integration criteria as outlined in government documents.¹⁸ An important stipulation is that 70 percent of the firm’s primary products processing and distribution must come through an “interest

coupling mechanism" (*liyi lianjie fangshi*) for integrating farm households into their operations and markets. Officially, lead firms were working with 110 million rural households in 2011, using contracts with farmers, and following the "radiation-driven" (*fushe daidong*) farming model, in which technology, information, and market opportunities radiate from firms to cooperating or contracted farmers.¹⁹ Unofficially, the figure is much lower, as studies find discrepancies between reporting and actualization of contracts between firms and smallholders.²⁰

Restructuring the Pork Sector Government statistics report that dragon head-led vertical integration is the principal form of agricultural production, operating on 60 percent of the country's cropland, and covering 70 percent of livestock (pigs and poultry) and 80 percent of aquaculture production in 2011. Dragon heads' combined sales revenue was 5.7 trillion RMB (US\$917 billion) in 2011, and they produced two-thirds of the average food basket in major cities (Guo, Jolly, and Zhu 2007).

The extent to which the dragon head model benefits small-scale farmers is unclear. It is certain, however, that smallholder numbers are declining. In 1996, 70 percent of agricultural households (135 million) raised pigs, with 77 percent of them raising five or fewer hogs each year. From 2002 to 2012, the number of farms raising fewer than 50 pigs per year decreased by half, while the number of farms with more than 50 pigs increased by 1.7 million. From 2009 to 2012 alone, the number of operations with more than 5,000 hogs grew from 8,300 to 11,400 (Gale 2017). In terms of marketed pork, farms with fewer than 50 pigs accounted 95 percent of slaughter in 1987, compared to only 35 percent in 2011 (Qiao et al. 2016). Reliable figures on the number of households raising fewer than 10 pigs (a "backyard" peasant farm) and their share of slaughter do not exist, though this scale is no doubt declining even faster than the undifferentiated "under 50" category.

Pork sector restructuring is the result of continued state support for the growth of corporate power and consolidation. Most recently, the Ministry of Agriculture's 13th Five-Year Plan for 2016–2020 set objectives for ongoing modernization. In the hog sector, objectives include further increasing the scale and vertical integration of hog farms, and shifting more control to companies (Gale 2017).

Feed Imports, Illusions of Land Sparing, and Offshoring

If 65 percent of China's 670 million pigs are produced on farms with 50 or more pigs, then more than 436 million Chinese pigs live in "pig barns," or CAFOs. These enclosed structures take up very little space. For an operation with 50 pigs, the building is about as big as the bodies of the 50 pigs themselves, with some wiggle room for feeding and tending the animals. Similarly, a 500-pig building is close to the size of 500 full-grown pigs, and a mega-operation with 100,000 pigs is made up of several buildings—and/or stacked "pig apartment" buildings—roughly the size of the number of animals they house. This is to say that the confinement system is just that: animals are confined together, tail-to-snout, with very little room to move. In large-scale operations, aside from pig stalls or crates, there is additional space for workers to carry out their tasks, for equipment, and perhaps for offices. The buildings, however, are small compared to their output, a relationship that is the hallmark of the CAFO's so-called efficiency.

Engineers and animal scientists have created a system that produces as much meat as possible from the smallest possible amount of space. This is accomplished in large part through breeding and feeding. Industrial pigs are made to survive the factory farm, with commercial feed mixes designed to make them quickly convert grains and oilseeds into muscle, even though they spend their lives standing in place. Modern breeding began early in the reform era, and now the same pig breeds that dominate industrial operations globally also dominate China's pork sector. "Exotic" pigs like Duroc, Landrace, and Yorkshires have all but replaced indigenous swine: exotics account for 90–95 percent of China's pork.²¹ Modern feeding, too, began early in reform, when liberalization of soybeans co-produced the industrialization of pig farming.

Feed and Soybeans To increase pork consumption for upward of one billion people without converting the entire country into a massive pig feed farm, China's authorities had little option but to move toward industrial feeding systems. This began with efforts to develop feed milling in the early 1980s, first for pig feed, followed by chicken feed in the 1990s (Ministry of Agriculture of the People's Republic of China 2009). The real boom, however, came with soybean imports. Although China is the home of soybean domestication, and was the longtime world-leading soybean producer, liberalizing soy in the 1990s shifted not only domestic production and consumption, but also global production, markets, and flows.

Before Reform and Opening, soybean harvests in China were destined for tofu, soy sauce, and other human-food uses; they were rarely used for live-stock feeding (Shurtleff, Huang, and Aoyagi 2014). Soybeans only became important for pork production in the context of China's globalization and capitalization. With the goal of raising meat consumption without sacrificing food security, and in anticipation of accession to the WTO in 2001 (which required selective liberalization), central authorities started to open soybean imports in the 1990s, while encouraging domestic processing. As a result, soy imports soared at an average growth rate of 26 percent. In 2016, China imported 91 million tons of soy, or 64 percent of the global trade, predominantly from Brazil and the United States. Imported beans, which accounted for 95 percent of soy crushing in China in 2016, are processed domestically to produce livestock feed (soybean meal) with soy oil as a co-product. These two agroindustrial uses now drive the country's soy industry, with global consequences: China is the world leader in soybean imports, in soybean meal production, and in soybean oil production (USDA FAS 2017b).

Offshoring Soy imports represent an offshoring of the needs and impacts of industrial pork production, as the land, labor, and resources that go into soybean production are largely managed in the United States and Brazil, each of which supplies around 40 percent of international soy trade (USDA FAS 2017b). The United States is the "traditional" world soybean leader, while Brazil is the new soy powerhouse, growing in concert with China's pigs and economy. Soybeans are Brazil's top export to China, balancing imports of Chinese consumer goods, and fueling new South America-East Asia coordinates in the global livestock-feed complex (Oliveira and Schneider 2016). Since 2009, China has been Brazil's largest trading partner, with soybeans accounting for 13 percent of all Brazilian exports in 2013 (Oliveira 2016).

It is important to note that these relations are not simply between nation-states. Indeed, as Gustavo Oliveira (2016) notes, the three largest transnational seed companies (Monsanto, DuPont, and Syngenta) control 55 percent of the global market for soy seed, and four trading companies (ADM, Bunge, Cargill and Luis Dreyfus, the first letter of each company name or surname forming the shorthand reference of "ABCD") control almost 80 percent of the international soybean trade. In South America, the

latter four ABCD companies control 50 percent of crushing capacity and 85 percent of soybean exports. In China, foreign firms, including ABCD, own about 70 percent of soybean crushing (Yan, Chen, and Bun 2016), with domestic firms making up the balance.²²

The lion's share of soybeans that feed China's pigs are the result of soil, water, and labor relations quite outside of China's borders. In a basic empirical sense, when the land needed to produce soybeans (and other feed crops) is included in the calculation of space needed for CAFO production, notions of the system's efficiency quickly evaporate (Schneider 2014; Weis 2010). Growing crops to feed industrial pigs requires billions of hectares of land and billions of gallons of water (Steinfeld et al. 2006). It requires the labor of people in all stages of feed production and transport, while creating surplus laborers by dispossessing people of their land and territory. It operates through corporate seeds and inputs (fertilizers and pesticides), supportive and coordinated national and trade policies, and often transnational feed industries. And it results in a host of social and environmental problems (e.g., Oliveira and Hecht 2016; Turzi 2011), which in this case, are also offshored to the global locations where farmers and firms produce the soybeans that fuel China's pork industry.

There are also, of course, social and environmental implications at home. As soybean imports have boomed, domestic soybean production has fallen drastically, sounding the alarm for a "soybean crisis" in the country. Between 2008 and 2013, the area of soy planted in China dropped by 24 percent, with the most dramatic reduction in Heilongjiang Province, which experienced a 42 percent drop (Yan, Chen, and Bun 2016). The livelihood implications of these changes are not yet well understood, but contribute to an overall hollowing out of the countryside and of rural social relations with the advance of capitalist industrial agriculture.

As Pork Booms, What Are the Social and Environmental Consequences?

Large-scale, intensive, corporate-led industrial meat production damages people, nonhuman animals, communities, and ecologies. The socio-environmental consequences of the global meat complex are well documented in policy and in academic, advocacy, and activist circles.²³ They are also increasingly well known among even casual observers who read mainstream international press such as the *Guardian* and the *New*

York Times.²⁴ From the climate-changing contributions of farting cows, mountains of manure, and transportation networks; to pathogens and antibiotic-resistant disease-causing organisms that make their way into waterways, food products, and human bodies; to the diversion of grains, land, water, and labor to feed livestock instead of people in a world full of food insecurity—the problems of industrial meat are no secret. And yet, CAFOs are the fastest-growing form of production in the world, steadily spreading through the global north and south, and the places in between. The growth of industrial livestock in China is not an exception, nor are its consequences; corporate concentration, public health crises, and environmental degradation are written into the model itself, wherever it touches down. The following sections briefly outline some of the most profound consequences of China's global pork industry, focusing inside of China.

Peasants and Corporate Concentration

Peasant production methods and relations are declining, while corporate ownership and concentration are increasing. Rather than distinct phenomena, the two are intimately linked: the definition of small-scale peasant production as “backward” is both a driver of industrialization and a result. The model of household pig raising that was practiced in China for thousands of years relied on locally occurring plants (including “weeds”) and kitchen and agricultural “scraps” as feedstuffs. This is a slower growth cycle that produces a fattier pork, and in limited quantities; just enough for once- or twice-per-year pork consumption. In the rush to increase meat consumption, develop domestic agribusiness, and transition to a “modern” economy and society, the peasant mode of production and the peasant her/himself have come to stand in for what's wrong in China's food and agriculture systems, and what must be replaced. Denigration of the peasantry is certainly not unique to China or to the twenty-first century. But the specific register of this relation in China today is that political and popular discourse define the peasant as the problem for which further capitalist industrialization is the only and inevitable solution (Schneider 2015). Restructuring the pork sector—with large- and medium-scale operations replacing small-scale production—is an expression of these politics on the figure of the peasant.²⁵

In addition to scaling up and restructuring, corporate concentration is increasing. Dragon head enterprises (and agroindustrial firms more

generally) control an ever-growing share of production, distribution, and retail. In the pork sector, three firms have led the industry in the past decade. In 2011, the annual sales of WH Group (formerly Shuanghui, or Shineway), Jinluo Meat Products, and Yurun Group accounted for 68 percent of total sales and 86 percent of total profits for the top ten pork processors in China. In addition to processing, these firms are vertically integrated from production through retail, and linked horizontally through industry and government organizations (Schneider 2017a). With WH Group's purchase of Smithfield in 2013, it is the world's largest pork processor, further adding to the concentration of corporate power in China's, and the world's, pork industries (see chapter 2). While the WH Group is the clearest example of Chinese pork firms operating as transnationals, it is not the only one. Jinluo, for instance, was incorporated in the British Virgin Islands, and conglomerated in Bermuda as a wholly owned foreign firm (Schneider 2017a). These examples reflect broader policy trajectories. Since 2000, the state has been encouraging firms to "go out" (*zou chuqu*) for access to markets and resources abroad, and to extend their global reach and competitiveness.

Dietary Change and Public Health

As agriculture changes, diets are also transformed. Chinese diets are becoming increasingly meaty, processed, eaten away from home, and associated with diet-related diseases. Again, meat consumption has quadrupled since 1980 to an average of 65 kg per person per year. Still, the increase is uneven across the population. According to official statistics, urban households bought an average of 36 kg of meat (pork, beef, mutton, and chicken) in 2012, while rural households consumed an average of 29 kg of meat, poultry, and processed products according to National Bureau of Statistics data. Unofficially, the difference is much greater. Because meals eaten away from home are not included in National Bureau of Statistics figures, middle- and upper-class urbanites who have disposable income to spend at an array of restaurants and urban eateries are consuming as much as three times more meat than rural residents (Xiao et al. 2015). Processed and packaged pork products are the fastest-growing market segments, sold increasingly in supermarkets and hypermarkets, as well as in family-owned shops and other small retail outlets. These products are also typically eaten away from home.

One result of dietary changes (of which industrial pork is an important part) is that public health is suffering. In 2015, cancer, heart disease, and cerebrovascular disease (hypertension) accounted for 69 percent of deaths in urban China and 68 percent in rural China. Compared to 1998 when the National Bureau of Statistics (n.d.) began reporting these data, the 2015 figures were an increase of 7 percent in urban areas and 20 percent in rural areas. At the same time, while China's pork has become leaner (because of commercial breeding and feeding), China's people are becoming fatter. A recent study in *The Lancet* found that there are more obese and overweight people in China than in any other place in the world. According to the study, more than 43 million Chinese men and 46 million Chinese women are obese, accounting for 16.3 percent and 12.4 percent of the respective global totals. Moreover, 23 percent of boys and 14 percent of girls under the age of twenty in China are overweight or obese (NCD Risk Factor Collaboration 2016). These "diseases of affluence" (Campbell and Campbell 2009) cannot be attributed entirely to diet (cancers especially are also related to pollution), nor can the rise of obesity be solely explained by increasing pork consumption. The pork production boom, however, is also a consumption boom, and an important component of changing eating habits, expanding waistlines, and the emergence of diet-related diseases and causes of death.

Environmental Health and Food Safety

The human health consequences of industrial livestock extend beyond diet. As elsewhere (Imhoff 2010), China is now experiencing the *environmental* health consequences of the CAFO. Food safety, which is the highest public concern in China (Song, Li, and Zhang 2014) and a key area of focus for the state,²⁶ is the clearest illustration. One example is growth promoter, or "lean meat powder" (*shouroujing*) residue in meat. The most highly publicized case was in 2011 when pork from Shuanghui (now WH Group) was found to contain clenbuterol, a banned pork industry growth promoter that can cause toxicity-related illnesses and cancers in humans. Another example is the emergence of antibiotic-resistant disease-causing organisms in meat products, soils, and water. Because CAFO operators administer antibiotics in "subtherapeutic" doses throughout the production cycle to promote growth, antibiotic-resistant strains of bacteria develop, making their way into manure, the environment, and human bodies. This is a global problem

that is particularly acute in China where nearly half of the 210,000 tons of annually produced antibiotics end up in livestock feed (Hvistendahl 2012), and 25 to 75 percent of those antibiotics are “excreted unaltered in feces and persist in soil after land application” (Luo et al. 2010, 7220). Antibiotic resistance—especially to tetracycline, which is most used in CAFOs—is a serious and growing public health problem in China. Antibiotic-resistant genes have been found in soils around feedlots, in water, and in human guts (Hvistendahl 2012; Ji et al. 2012; Luo et al. 2010). They are accompanied and complemented by heavy metals, especially mercury, copper, and zinc (Ji et al. 2012).

CAFOs also impact ecosystem health. Since 2010 when the government released results of China's first national pollution census, it has been widely known that manure from industrial livestock is the country's biggest source of water pollution.²⁷ Industrial pig and chicken operations dump manure onto soil and into waterways, such that phosphorus and nitrogen levels exceed what can be cycled and recycled. Waterways become eutrophic, killing some species of aquatic life while promoting others, and reducing the amount of water available for rural households. Manure in water, combined with fertilizer runoff from crop fields, is so severe that a dead zone has developed in the East China Sea, at the convergence of the *Changjiang* (Yangtze) and *Huanghe* (Yellow) Rivers (Diaz and Rosenberg 2008).

Food safety, public health, and water pollution are the pig-related environmental issues highest on the Chinese government's agenda. They are not, however, the only problems of the CAFO. Species diversity is declining as industrial hogs replace indigenous pigs. Greenhouse gas (GHG) emissions from manure and transport grow in concert with the industry (see chapter 7). Particulate pollutants fill the air around pig barns. And perhaps most infamously, dead pigs float in rivers.²⁸ How these issues are resolved—or not—will have further consequences for the trajectory of the pork industry, and China's people, land, water, ecology, and politics.

Conclusion: What's Next?

China's pork boom is a political economic process that capitalizes on (and transforms) cultural meanings and historical practices, while rerouting global flows of capital, commodities, and harm. It is a boom of world-scale

proportions with global and local consequences. It is a boom that has increased meat consumption for hundreds of millions of people, and profits for a generous handful of Chinese and foreign firms. It is a boom with political import, both legitimizing the party-state and economic development, and drawing harsh public criticism over its public health and environmental degradations. And it is a boom almost forty years in the making, with an uncertain ending date.

By way of conclusion, two recent developments are important for considering the trajectory of China's global pork industry. First, pork production has stagnated in China since 2015, equating to a corresponding global production decline. As a result, imports have increased, much to the delight of exporting countries and firms. In 2016, in addition to producing and utilizing 45 percent of the world's pork, China also imported 31 percent of total pork imports (USDA FAS 2017a). Some market analysts point to stricter enforcement of environmental regulations in China as the cause behind the pork downturn, as operations in urban areas especially have been forced to close or relocate (FAO 2017b). Others cite price (labor scarcity and rising feed and pork prices) in China as the major force driving imports and creating market opportunities for exporters (Gale 2017). In either case, analysts predict further expansion of the pork sector though ongoing restructuring with "enhanced efficiency and greater economies of scale" (FAO 2017b, 45). In other words, more industrialization, more vertical integration, more and bigger CAFOs, more agribusiness control, and fewer smallholder farmers.

Second, and somewhat alternatively, there is growing recognition that (industrial) pork cannot and should not boom forever, given public health and environmental consequences. For instance, in 2016, China's Ministry of Health released new dietary guidelines calling for a 50 percent reduction in meat consumption.²⁹ Although guidelines are not binding policies, the new language around "reduction" indicates at least discursive acknowledgment of the health and climate problems that have accompanied pork's rise. At the same time, Chinese consumers' food safety concerns are compounded by increasing awareness of the health and environmental impacts of meat consumption. Some studies suggest that middle- and upper-class urban consumers have more faith in imported and/or industrially produced meat, which they view as more regulated and therefore safer than pork produced domestically and by peasants (De Barcellos et al. 2012; Xiu et

al. 2017). However, not all consumers who have incomes high enough to make consumption decisions share this point of view. Alternative markets have emerged that offer ostensibly healthier and more “sustainable” meat and food products. Among the blossoming “alternative food networks” in China—which include farmers’ markets, community-supported agriculture (CSA), and organic and biodynamic farming—consumers also cite food safety as their primary motivation for participation (e.g., Shi et al. 2011). These markets are often more locally based, using their nonindustrial nature as a selling point and a tacit point of critique.

Whether government guidelines, consumer choice, and alternative markets necessarily lead to less industrial meat is an open question. That there are distinct class politics involved in meat and meat markets is increasingly clear. Perhaps industrial pork will continue to grow in the coming years, penetrating even further into the layers of Chinese society, reaching more rural and low-income people, and further restructuring their diets. Perhaps organic, local, biodynamic, and “boutique” pork will develop further for especially middle- and upper-class people and markets. And perhaps some smallholder farmers will continue to raise pigs under more-than-challenging social, economic, and environmental conditions, maintaining pigs’ genetic diversity and occasionally eating fresh pork in addition to processed sausages. In any case, China’s global pork industry is firmly rooted for the time being, even if its foundation is as shaky as it is world shaking.

Notes

1. FAO statistics on global meat production begin in 1961.
2. See figure 1.2.
3. Unless otherwise noted, production and trade statistics are summarized from FAO 2019.
4. According to the most recent estimates from the USDA FAS (2017b), China produced 48 percent of the world’s pork in 2016, reflecting a decrease from the most recent peak in 2014 when China produced 51 percent of global pork.
5. While average annual consumption in places like the United States (120 kg) and Australia (118 kg) dwarfs the Chinese figure, China’s meat consumption is well above the world average of 42 kg of meat per person per year, and is expected to continue to grow (Weis 2013a).

6. Meat consumption was calculated by adding FAO meat production and import figures and subtracting export figures. Per capita consumption for 2017 was calculated using population figures from China's National Bureau of Statistics (n.d.).

7. Material in the chapter draws from eighteen months of fieldwork on pork industry transformations in northeast, southwest, and southern China from 2009 to 2012. Ethnographic material is supplemented with secondary data from media outlets, scholarly journals, organizational documents, agribusiness and government websites, and government and organizational statistics.

8. Radicals are simple characters used as building blocks for making more complex characters (Wong 1990). 家(*jia*) is the combination of the roof radical and a condensed version of the character for pig 猪(*zhu*).

9. For detailed treatments of the uses and significance of pork in Chinese cooking, eating, and cultural organization, see Chang (1977) and Anderson (1988). Also note that Chinese Muslims—including the Hui, Uyghur, Kazakh, Dongxiang, Kyrgyz, Salar, Tajik, Uzbeks, Bonan, and Tatar minority groups—do not eat pork in any form.

10. Reports differ on whether there was, in fact, a Golden Pig baby boom. Data for 2016 from the National Bureau of Statistics (n.d.) suggests there was not, while some media reported Golden Pig births were double that of a normal year (Li 2010). There is also disagreement about the extent to which an uptick in births could be attributed to the Golden Pig, as opposed to a demographic bump related to the mini-baby boom in the 1980s (People's Daily 2007).

11. For a discussion of agricultural policy in the 1990s, see Zhang and Donaldson 2008.

12. See Gale 2017, 6, for a summary of recent pig-related policies.

13. Measures included: direct farm payments for sow insurance and disease prevention, compensation for losses from the PRRS epidemic, subsidies for seed-breeding of live pigs, investments in production infrastructure and market-monitoring systems, grants for safe disposal of sick pigs, rewards for counties that significantly increased production, and financial incentives for leading agribusiness firms.

14. Throughout the chapter, I use *dragon head*, *dragon head enterprise*, *lead firm*, and *leading firm* or *enterprise* interchangeably. All signify the word *longtou qiye* in Mandarin Chinese.

15. These figures are from the inaugural speech of Hui Liangyu, deputy prime minister of the State Council, at the launch of the China Association of Leading Enterprises for Agricultural Industrialization in 2012. The full text of the speech (in Chinese) is available at <http://baike.baidu.com/view/9676144.htm>.

16. Author's translation of the Baidu Baike entry for "dragon head enterprise" at <http://baike.baidu.com/view/125729.htm> (in Chinese).
17. Although possible, foreign firms are not typically designated as dragon heads. See Schneider 2017a.
18. Eight government institutions jointly issued the "Provisional Measures for the Administration of Dragon Head Enterprise Identification and Operation Monitoring" in 2003, with an update in 2010. The full text (in Chinese) is available at <http://wenku.baidu.com/view/090cc1e96294dd88d0d26be4.html>.
19. From Hui Liangyu's 2012 speech (note 15).
20. See Guo, Jolly, and Zhu 2007. I also found evidence of firms over-reporting their relationships with smallholders during my fieldwork.
21. Interview No. 58, Ministry of Agriculture, Beijing, September 17, 2010. The native pigs that remain are raised either by small-scale farmers, on specialty "boutique pig" farms, or on state-funded and largely privately run conservation farms tasked with preserving genetic diversity.
22. See Oliveira and Schneider (2016) for a discussion of how transnational corporations become leaders in China's soy sector after the soybean-crusher enterprise defaults in 2004. See Schneider 2017a for an analysis of dragon heads and state investment in domestic soybean firms. And see Yan, Chan, and Bun 2016 for a discussion of the crisis of domestic soybean production and farmers in the context of soaring imports.
23. Leading policy publications include *Livestock's Long Shadow: Environmental Issues and Options* (Steinfeld et al. 2006) and the Pew Commission's report *Putting Meat on the Table: Industrial Farm Animal Production in America* (2008). Recent academic work includes *The Ecological Hoofprint: The Global Burden of Industrial Livestock* (Weis 2013a); *Every Twelve Seconds: Industrialized Slaughter and the Politics of Sight* (Pachirat 2013); *Political Ecologies of Meat* (Emel and Neo 2015); and several articles in academic journals. Among the many advocacy and activist books and references are *Meat Atlas: Facts and Figures about the Animals We Eat* (2014), published by the Heinrich Böll Foundation and the Friends of the Earth Europe, and *The Meat Racket: The Secret Takeover of America's Food Business* (Leonard 2014).
24. The *Guardian* has published several pieces related to the problems of industrial livestock production; see, for example, Harari 2015 and Vidal 2010. Similarly, see Bittman 2008 as well as the *New York Times* "Factory Farming" news index page at <https://www.nytimes.com/topic/subject/factory-farming>.
25. For thorough analysis on the figure of the peasant in contemporary China, see Day 2013.

26. Food safety was on the state's agenda in the 12th Five-Year Plan (2011–2015), and is again prominent in the current 13th Five-Year Plan (2016–2020).
27. See China Pollution Source Census 2010 (in Chinese).
28. The most serious instance was in March 2013, when 16,000 pig carcasses were found floating in the Huangpu River in Shanghai. Other similar, though less extensive incidents have occurred since. See Duggan 2014.
29. China's new dietary guidelines can be found at <http://dg.en.cnsoc.org/> (in English and Chinese).

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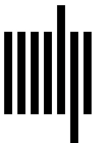
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