

MODERN MEAT, INDUSTRIAL SWINE:
CHINA AND THE REMAKING OF AGRI-FOOD POLITICS
IN THE 21ST CENTURY

A Dissertation

Presented to the Faculty of the Graduate School
of Cornell University

In Partial Fulfillment of the Requirements for the Degree of
Doctor of Philosophy

by

Mindi Leigh Schneider

August 2013

© 2013 Mindi Leigh Schneider

MODERN MEAT, INDUSTRIAL SWINE:
CHINA AND THE REMAKING OF AGRI-FOOD POLITICS IN THE 21ST CENTURY

Mindi Leigh Schneider, Ph. D.

Cornell University 2013

This dissertation examines the causes and consequences of the industrialization of pig farming in reform era China. As one of the most dramatic agricultural transformations in the world today, the shifting conditions and relations of livestock and meat production in China have profound social and environmental impacts for communities and agroecosystems in both local and global contexts. Investigating how modernity and food security are defined, practiced, and legitimated through the country's agricultural development model, and to what effect for social equality and environmental sustainability, is the primary task of this work.

The study is framed around the *meatification project*, a concept that directly engages the intentional and constructed nature of the shift of meat from the periphery to the center of human diets. I've defined the meatification project as "a strategically managed set of policies, discourses, relations, and resources enacted with the goal of increasing commodity meat production, modern forms of meat consumption, and agribusiness profits." Framed around pork and the processes involved in its making, my approach combines theories of development, political economy, and political ecology to explore the politics and consequences of industrial pork production and the rise of domestic agribusiness since Reform and Opening in 1978. The work is principally concerned with understanding how these agricultural transformations impact smallholder farmers, rural environments and social reproduction, food security and class diets, as well as how the form and management of China's agricultural development model is remaking global agri-food politics.

BIOGRAPHICAL SKETCH

Mindi Schneider received a BS in Horticulture Production with a minor in Philosophy from the University of Nebraska at Lincoln in 2000. After working on organic farms, as a professional horticulturalist, and as a florist, she returned to the University of Nebraska to study agricultural science and agroecology. There she earned an MS in Agronomy with a minor in Environmental Science. Propelled by questions about the politics of sustainability in agriculture, she came to Cornell University's Department of Development Sociology. Her major area of concentration for the PhD is in the Political Economy of Development, with minors in Environmental Sociology and International Agriculture and Rural Development.

For Ruth Anne.

ACKNOWLEDGMENTS

Thank you to Philip McMichael, the chair of my dissertation committee, my mentor, and a constant source of support and inspiration. From him I have learned how to be a scholar with my heart on my sleeve, and to take academic risks for the issues and politics I believe in. My way of thinking has been forever – and for the better – transformed by our relationship. Thanks to Alice Pell for challenging me to bridge sociology and agricultural science, for invaluable insights, and for encouraging me as a woman and a scholar. And thanks to Max Pfeffer for always asking the right question at the right moment. I am indebted to this committee for years of intellectual enthusiasm and personal care.

Thank you to my parents, Ron and Kristi Schneider, for always believing in me and teaching me how to believe in myself.

In China I was privileged to work with the Sichuan Agricultural University, the South China Agricultural University, the Liang Shuming Rural Reconstruction Center, Oxfam Hong Kong, and Solidaridad China. I am especially grateful to Derk Byvanck, Martin Ma, Huang Song, Nian Hai, Wang Debin, Dong Rui, the Ge family, and Li Xuewei for their generosity and patience. Thanks also to Shine Gao, Yu LiMing, Wang Yongli, and Mei Hua for inviting me into their worlds and showing me such kindness. To Erika Kuever, Matthew Hale, and Travis Klingberg – friends and colleagues with whom I shared life and work in “the field” and beyond – thank you for everything; Beijing and Chengdu wouldn’t have been the same without you.

My years in graduate school have been enhanced and made bearable by a very special set of friends and motivators: Chuck and Barb Francis, Marion Dixon, Lindsay Gilmour, Chris Seeds, S.P. Seeds, Jeni Wightman, Evren Dincer, Rodrigo Alatraste-Diaz, Michaela Brangan, Kelly Dietz, Emelie Peine, Marygold Walsh-Dilley, Jennifer Blesh, Danika Davis, Sequoia Davis, the Habermans, the Sorensens, Nishaan Sandhu, RuPaul, Tara Nelson, Marcie Farwell, Terry Boyd-Zhang, Nathan (Xiangzi) Zhang, Miss Piggy, Shannon Van Sant, Phillipa Hunt, and Loud Sue. You are all delightful, and I’m charmed to count you among my people.

Thank you to Devlin Kuyek at GRAIN for collaboration and inspiration. Thanks to Jim Harkness at the Institute for Agriculture and Trade Policy for seeing value and contradiction in “feeding China’s pigs.” To MaryKay Magistad, Cassandra Herrman, Nicola Davison and Kim Hunter Gordon: thank you for caring.

I wish to acknowledge, with gratitude, the institutions that provided financial support for this project. I owe much to the Department of Development Sociology, the East Asia Program, the Jeffrey Sean Lehman Fund for Scholarly Exchange with China, the Mario Einaudi Center for International Studies, and the FALCON program at Cornell University. I also wish to express thanks to the Fulbright-Hays program, and to Oxfam Hong Kong and Solidaridad China for so generously supporting my work.

Finally, Gayatri Menon deserves particular acknowledgement for helping me understand when to tone it down, when to turn it up, and when to dance it out. Thank you, G, for understanding me. Djahane Salehabadi has been my dear friend, my confidence-boosting-cheerleader, and my kindred spirit throughout this dissertation process - she makes me want to be a better person, which is the most one can hope for in a friend and a colleague. Claire Nelson is my calm and steady force, BJ Ohme is the connection to my core, and Emily Snider is the person who has most helped me give voice to my heart. I love you all.

TABLE OF CONTENTS

Biographical Sketch	iii
Acknowledgements	iv
Chapter One	
Introduction: The Meatification Project in Reform Era China	1
Chapter Two	
Pork and Beans Development: The Making of Modern Meat	22
Chapter Three	
The Metabolism of Meatification	51
Chapter Four	
<i>Nongmin</i> Discourses: Constructing a Problem for Industrial Agriculture to Solve	85
Chapter Five	
Dragon Head Enterprises and the State of Agribusiness in Reform Era China	111
Chapter Six	
Conclusion: Meatification Trajectories	143
Appendix	163
References	165

Chapter One

INTRODUCTION

The MEATIFICATION PROJECT in REFORM ERA CHINA

“Meat signifies wealth. The more money you have,
the more meat you will eat.”
CEO and founder of a commercial pork production enterprise
Shanghai, January 2007

“In China, everyone eats pork.”
Manager of an online food marketing company
Chengdu, November 2010

Meatscapes in China

China is awash with meat. On most any street in Beijing, there is some combination of meat on sticks, meat in soups, meat on platters, meat in tubes, meat on hooks. These items are sold fresh and processed from street vendor carts; in mom and pop stores; in wet markets, supermarkets, and hypermarkets; and at restaurants that range from a grill and a few stools on the sidewalk, to regionally-specialized dining spots, to domestic and transnational fast food stores, to ultra-modern palaces of haute cuisine. In the almost two years I spent living in Beijing between 2008 and 2011, I found meatscapes¹ composed of chicken, duck, beef, mutton, horse, deer,

¹ By “meatscapes,” I do not intend a direct connection to Arjun Appanduri’s (1996) five “-scapes” of global cultural flows. A “meatscape” can be considered to include the various forms of meat (types, cuts, sources, markets, relations) available at a particular time and in a particular place.

donkey, dog, seafood, scorpion, and most importantly, pork. In Mandarin Chinese, the word for meat (*rou* 肉) means pork², the so-called national food (Wang and Watanabe, 2007).

Outside of Beijing, the streets of China's cities are similarly flooded with meat, and people buying and selling it. I lived in Chengdu, a metropolis of 11 million in southwest China, for nine months in 2010. As the capital of Sichuan Province, the country's largest pig producing province, Chengdu is at the heart of China's contemporary pork boom. The city's meatscape is as diverse as Beijing's, ranging from tiny street vendors peddling meat from the back of bicycles to massive global retailers with brightly lit meat cases offering a China-specific variety of both packaged and cut meats. I visited wet and hyper markets on my own, and went shopping with friends and neighbors – women in their late 60s and their grandchildren for whom they are the primary caregivers – to get a sense of the different arrangements through which pork arrives at the market, as well as to understand how meat relates to notions of development and modernity in China today. For many in the city, especially people like my middle-to-upper class neighbors, buying and eating meat is a daily activity, and a meal without meat is considered no meal at all.

But while rising meat consumption is positively correlated with income and urbanization, the thoroughfares in towns and villages are also and increasingly sites of meat commerce. Urban and rural meat consumption is anything but even, with city dwellers eating on average almost twice as much meat as those in the countryside (Ministry of Agriculture, 2009). And yet mom and pop shops (*xiaomaibu* 小卖部) in rural areas offer a variety of packaged and processed meat products, and butchers sell meat on village roads, either alone, or alongside locally grown and harvested vegetables and grains at daily fresh markets.

² *Zhurou* (猪肉, “pig meat”) is the formal word for pork, but in conversation, on menus, and when ordering at a restaurant or butcher, “*rou*” by itself means “pork.” Chicken, beef, and mutton, for instance, must be specified as “chicken meat” (*jirou* 鸡肉), cow meat (*niurou* 牛肉), and “sheep meat” (*yangrou* 羊肉).

I met Ms. Chun, a farmer-butcher, in East Creek Village in Sichuan Province. Ms. Chun begins her days at 3:00 am when she wakes to slaughter a pig, either from her own or a neighboring farm. By 7:00 am, she hauls the carcass to her stand on the main road in the village, hoists it onto a hook, and hacks away at the body until every last bit of muscle, fat, skin, intestines, head, legs, and ears have been sold to villagers before 9:00 am. Ms. Chun is one of two farmer-butchers in East Creek Village, providing fresh pork for households where mostly grandmothers will buy, cook, and eat the meat with their grandchildren (and perhaps husbands who are not away working as migrant laborers) in the same day. Depending on price and household budgets, meat is not necessarily a daily purchase in East Creek Village, but it is an increasingly regular and expected dietary component.

Today, meat is available more broadly than ever before in China, though it comes in different forms and through different channels and relations, depending on the social and geographic locations of the people raising and buying it. Meatscapes, in other words, are diverse and uneven, even as availability and access to meat are increasing across the board.

This was not the picture 30, 70, or 3,000 years ago. Meat, and especially pork, has been a consistent part of the major agricultural and food traditions in China for thousands of years³, but peripheral in diets until very recently. For most of history, and for most Chinese people, eating pork 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 one percent of their food energy from animal products, while grains made up the bulk of their diets (Hsu & Hsu, 1977).

³ 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 - who make up 1-2% of the country's total population, do not eat pork in any form.

Rather than being awash with meat, pre-reform China might be better imagined as being awash with 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 each year (Li, 2010; Zheng, 1984). Pigs were more valuable alive than dead, acting as efficient converters of kitchen and agricultural scraps into nutrient-rich fertilizer, 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 (Wittwer et al., 1987). *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 includes 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, defines much of the country's 7,000 years of agricultural history.

In the contemporary period, the value of pigs and pork have changed dramatically, with sweeping political and social changes in the 20th Century bringing about changes in the ways meat was produced, sold, and eaten. During the Maoist period, from the founding of the People's Republic of China in 1949 until Mao Zedong's death in 1976, regulation of pigs followed larger political debates about property and private ownership. Following massive production losses during the Chinese Civil War (1927-1950), livestock policy in the interim period from 1949-1957 allowed farmers to own the pigs they raised. This policy was reversed during the "Great Leap Forward" from 1958, when farmers were required to put private pigs into collectives for distribution. Inadequate feedstocks, general decreases in agricultural productivity, and severe natural disasters during this period reduced pig inventories to shortage levels, such that from 1961-1966, the State Council once again allowed private pigs in addition to collective swine. The

ownership status of pigs would change again during the Cultural Revolution, when from 1967-1976, private pig breeding policies were abolished, and production was once again collectivized (Wang and Watanabe, 2007).

During much of the Maoist period, central planning dictated that pigs would be sold to government purchasing stations and rationed to villagers and urbanites by coupon. In the wake of disastrous droughts, problems with distribution, and more general policy failures, the first 30 years of the People's Republic were punctuated with large-scale agricultural shortfalls, household-level food insecurity, and infamously, even famine. While Chairman Mao regularly indulged in his favorite dish of Red-Braised Pork (*hongshaorou* 红烧肉), allegedly to the extent that it played a role in his failing health and death, most Chinese people were not eating or living high on the hog, as the saying goes.

The next profound set of changes that affected meat production and consumption came in the wake of Deng Xiaoping's "Reform and Opening" (*gaige kaifang* 改革开放) in 1978, which launched the idea of "Socialism with Chinese Characteristics" (*zhongguo tese shehuizhuyi* 中国特色社会主义) (Deng, 1984). Rapid economic and social transformations also re-formed agriculture and diets. As central authorities selectively privatized and liberalized agricultural markets, while at the same time decollectivizing the countryside and divorcing social welfare benefits and food from work units, pork became a commodity and agribusiness was opened as a new site for investment and profit. The industrialization of the swine and pork sectors proceeded at a rapid pace, with specialized and commercial forms of production displacing smallholder farmers and to a large degree, replacing household self-provisioning with marketized pork.

As a result of these changes, pork production and consumption skyrocketed in China after 1978, initiating a long march to the top of global meat markets. Starting in 1979, pork became

the most produced and consumed meat category worldwide. It surpassed beef as the global leader, and later almost doubled it. Today half of the world's pigs, half of the world's pork production, and half of the world's pork consumption is in China. In 2012, farmers and companies in China produced 50 million metric tons of pork from a domestic swineherd of 660 million head (United States Department of Agriculture (USDA), 2012). This was twice the amount of pork produced in all 27 European Union countries combined, and five times the amount in the United States. Domestic consumption matches production, and pork imports and exports are currently negligible (see figures below).

Figure 1. World meat production, 1961-2010 (FAOSTAT).

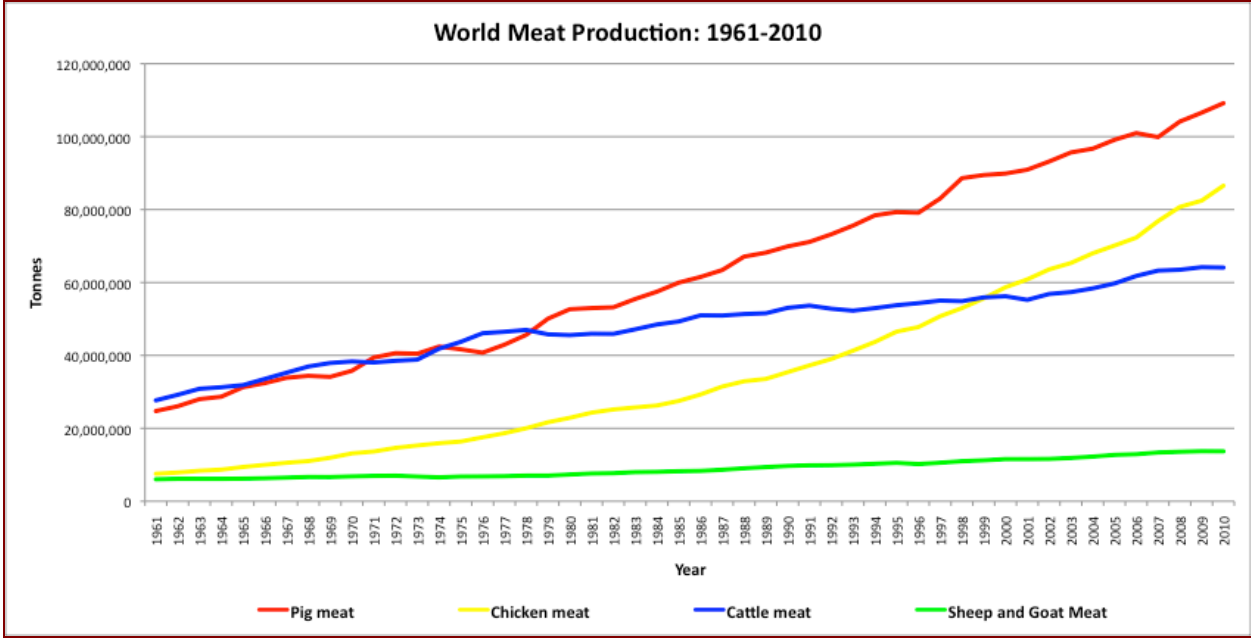


Figure 2. China meat production, 1961-2010 (FAOSTAT).

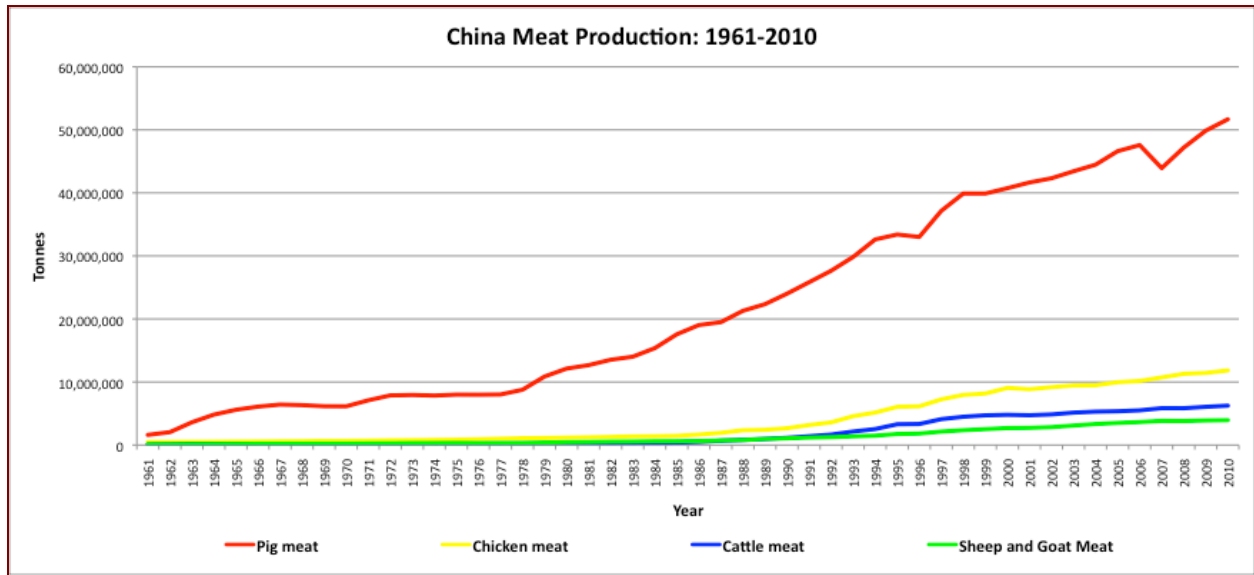
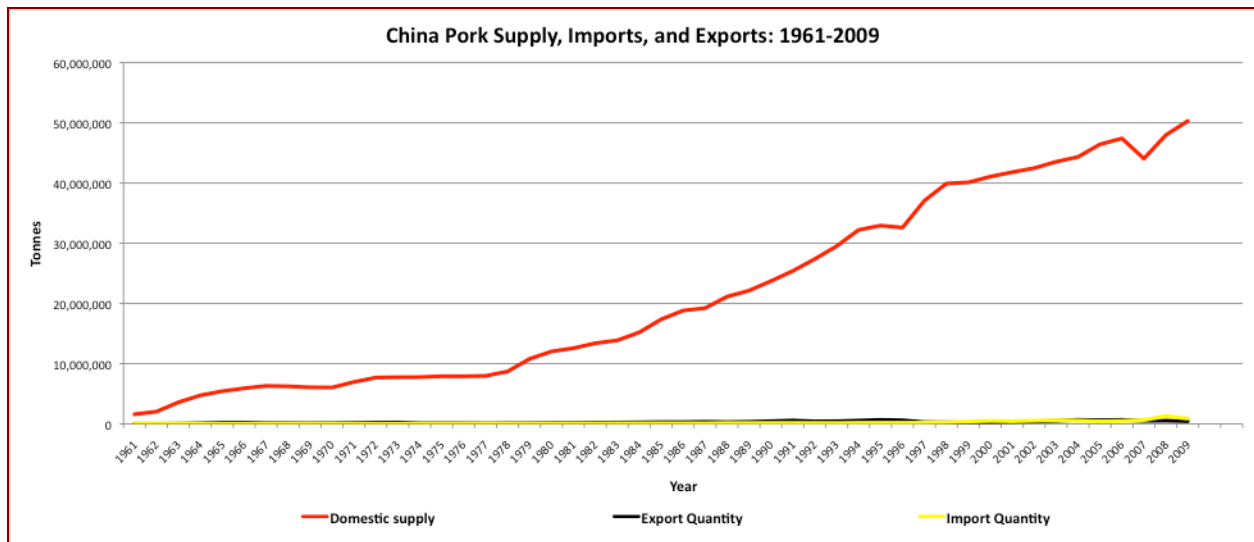


Figure 3. China pork supply, imports, and exports, 1961-2009 (FAOSTAT).



Meatification

The figures above provide graphic representation of the striking expansion of the swine sector in reform era China. They also elicit a number of important questions: How and why did China become the world leader in pork production and consumption? How has it maintained and

increased its position throughout the reform era? What are the social and ecological implications of massively ramping up pork production?

These seemingly straightforward questions at first appear to have rather straightforward answers. For example, a standard developmentalist interpretation would have it that China is in the midst of a *nutrition transition* (Du et al., 2002; Popkin, 1994) and a *livestock revolution* (Delgado et al. 1999; Waldron et al., 2007), in which rising incomes and higher levels of urbanization have brought about increasing demand for meat⁴ (FAO, 1970). The World Bank and similar neoliberal organizations see the industrialization of livestock agriculture as an answer to this demand, with restructuring and scaling-up of production that at once “frees” some smallholder farmers from the land, while incorporating others into commercial value chains (World Bank, 2007). The environmental consequences of industrial transformation are serious, but in the developmentalist camp, can be managed by increasing production efficiencies, managed largely through providing market incentives for commercial producers to invest in technological fixes without altering underlying structures or resources⁵. And the social consequences – the dietary transitions in particular – are considered to be improvement in the human condition. Meat consumption is a kind of development metric, indicating progress (Fiddes, 1990) along a predetermined path to a protein-rich modernity, corresponding to Rostow’s (1960) stages of economic growth. The social inequalities that these changes both create and reproduce (see Chapter Six) are largely ignored in this approach.

More critical responses to questions about the pork (and meat) boom in reform era China would propose that China’s encounter with industrialization of agriculture follows a neoliberal

⁴ In addition to increased meat consumption, the nutrition transition describes a general shift from complex carbohydrates and fiber as the highest proportion of caloric intake, to plant and animal fats, saturated fats, and simple sugars (Drewnowski & Popkin, 1997).

path of privatization, standardization, depeasantization, and transnationalization, with attendant social and ecological consequences. For instance, when I began this research project, I intended to situate my study of the pork sector in China as an analysis of the *global hog*, adding to the sociology of food systems literature on the *world steer* (Sanderson, 1986) and the *global chicken* (Dixon, 2002). I was concerned with how transnational agribusiness corporations – the entities that scholars have analyzed as among the most powerful in the organization of the world food system – were restructuring pig farming in China, and how smallholder peasant farmers in particular were experiencing these changes. The key political economic relationships, I thought, were between and among transnational corporations (TNCs), the Chinese state, the World Trade Organization (WTO) and other institutions of global governance, and farmers. The more I learned about China’s model of agricultural development, however, the more I realized that I was framing my inquiry in a way that missed an important set of relations between these well-known entities and a new emergent group of powerful *Chinese* agribusiness firms. As I expanded my study to include domestic operations, I found that China’s agrarian transformation is not just a “typical” neoliberal development, in which capital accumulation is a private and largely transnational process: rather, I found that China’s transformation is a complex of domestic and global, and state and private, processes and actors, which together are transforming global agri-food politics.

To theorize pork’s meteoric rise in China since 1978 as a political economic process with profound and multi-scaled social and environmental implications, one concept in particular has remained as a broad and orienting analytical frame in my study. Tony Weis (2007) connects the industrialization of agriculture and rural landscapes to the *meatification* of diets, or “the radical

⁵ See for example the \$66 million Asian Development Bank biogas project that aims to turn manure from industrial livestock operations in Northeast China into energy that can be sold as a commodity (Schneider, 2010).

shift of animal products from the periphery to the centre of human food consumption patterns” (p. 17). He notes that meatification is an uneven process, brought about by a global political economy in which firms focused solely on profit enact factory farming on a world scale, resulting in both unequal markets and diets, and environmental crises. A key component of Weis’s argument is that meatification occurs because land that would otherwise be used to produce food crops for human consumption is diverted to produce feed crops for livestock. In other words, “rising meat consumption and industrial livestock production should be understood together to comprise a powerful long-term vector of global inequality” (Weis, 2013, p. 65).

Meatification picks up on a long tradition in critical food studies of problems associated with unequal food distribution (for example, Lappé, 1971), of the privileging of meat production for consumer classes (for example, Rifkin, 1992), and of global feed-livestock regimes (for example, Friedmann & McMichael, 1989; Sanderson, 1987). For theorizing agricultural and dietary transformations in contemporary China, the meatification concept offers a analytical lens that links the politics of industrialization to the politics of dietary change, and as Weis is currently developing in his forthcoming book on the *Ecological Hoofprint*, that highlights both the political economic conditions and the environmental implications of increased meat consumption⁶.

But Weis’s formulation is most appropriate as an analysis of what is global in the process of meatification. In order to further specify the concept, and make it more flexible for understanding particular cases that express changing conditions, I propose the *meatification*

⁶ It is important to note that the *ecological hoofprint* varies greatly depending on the species being raised and the environment in which production is taking place. Pigs, because their nutritional requirements are similar to those of humans, are in some respects a worst case scenario, while traditional pastoral systems in semi-arid areas are often the least damaging agricultural enterprise. The Fulani in the Sahel or the Borana in Ethiopia, for example, are not involved in heavy industrialization, but rely on meat consumption. Additionally, crop production in these regions often has more adverse environmental impacts than animal production.

project as an analytical framework. This approach combines Weis's description of meatification with Philip McMichael's articulation of development-as-project – in which “the meaning and practice of development changes with changing political-economic and environmental conditions” (2012, p. 15) – and his elaboration of food regime analysis, which “prioritizes the ways in which forms of capital accumulation in agriculture constitute global power arrangements, as expressed through patterns of circulation of food” (2009 p. 140). My argument is that meatification is an important component of notions and trajectories of modernization and development, and that the logics, mechanisms, and relations that animate it need to be understood in context. This approach teases out what is general and what is particular, and suggests ways that the general – or the global – is being reconstituted.

The meatification project also exposes consumer demand as a social construction, and denaturalizes the idea that economic growth necessarily leads to growth in meat consumption. Research makes clear that in the present historic moment, demonstrable relationships exist between rising income, rising meat consumption, and rising levels of pollution and greenhouse gas emissions⁷. This is certainly the case in China, where scholars see a livestock-revolution-fueled-nutrition-transition taking place that is associated with far reaching implications for human health, the environment, and trade (Du, et al., 2002; Waldron et al., 2007). These methods, however, take for granted that consumer demand for meat is a natural outgrowth of increasing urban populations, leaving questions unanswered about the ways in which consumer demand and desires are structured, what these structures conceal, and how urbanization is

⁷ The classic FAO study from 1970 first demonstrated that countries with high GNP levels were associated with diets higher in animal protein and fat (as opposed to plant-based diets based on complex carbohydrates). The joint FAO-LEAD (Livestock Environment and Development Initiative) report from 2006, *Livestock's Long Shadow: Environmental Issues and Options*, is perhaps the most well-known and oft cited publication on the contribution of global meat production to environmental and climate crises, though the topic is now the subject of substantial and growing literatures both in academic and popular contexts.

structured. By showing that increasing meat production and consumption is an institutionally enacted and managed process of social change rather than a natural or spontaneous one arising from consumer demand (which itself is a construction), the meatification project approach complicates nutrition transition and livestock revolution theories, asking questions about the distribution of benefits and harm, as well as about political origins. It allows a look behind the veil of statistical data and the assumptions they express to understand how and why the income-meat correlate exists, and to bring the social inequalities and ecological crises it conditions to the analytical fore.

I'm defining the meatification project as *a strategically managed set of policies, discourses, relations, and resources enacted with the goal of increasing commodity meat production, modern forms of meat consumption, and agribusiness profits*. As a general analytical concept, the meatification project is a complex involving the industrialization of agriculture, agrarian transformations, dietary change, class diets, changes in food security policy, the expansion (and often off-shoring) of livestock feed production with attendant forms of smallholder dispossession, and a range of environmental and climate crises and inequalities. More specifically, the meatification project is based on and reproduces prevailing notions of what constitutes modernity and how human societies are related to ecological cycles (see Rifkin, 1992). It is managed by political and economic elites in global, national, and/or local contexts. It is enacted in particular historical moments, based on historical processes and legacies, and changes accordingly. It transforms agroecosystems, diets, health, economies, and the composition and meaning of meat. It produces ecological crises and reproduces social inequalities. And it is framed in a way that suggests progress, improvement, development.

My intention is that the meatification project concept can be analytically applied to unveiling the processes and relations involved in commodity meat in general, and meat and livestock-related developments at different spatial and temporal scales. For instance, it could be used to analyze the mechanisms and implications of stockyard development in the US Midwest in the 19th century (building on Cronon, 1991), of increasing meat consumption in the Global South since the 1960s (Nierenberg, 2005; Weis, 2007; GRAIN, 2010), of the U.S. export of industrial livestock farming as a model of efficiency across the globe (Nierenberg, 2005), and for my purposes, of global and local causes and consequences of swine sector and dietary transformations in contemporary China. The following section introduces China's meatification project, and its particular pork flavor.

China's Meatification Project

Of all agrifood sectors, pork is perhaps the most distinctly Chinese. I interviewed Mr. Bu Hongguo, the founder and general manager of a Shanghai-based commercial pig and chicken operation in 2007. From Mr. Bu I got my first glance into the world of Chinese agribusiness, but more importantly, he taught me about the significance of pigs in Chinese history and culture, bringing ideas I'd read about and found to be of passing academic interest more squarely into my analysis. Mr. Bu is not just an executive, but also a dedicated pig enthusiast and cultural entrepreneur. He opened a farm resort (*nongjiale* 农家乐) on the outskirts of Shanghai where he built "traditional peasant homes" as sites for tourism, complete with a restaurant serving "traditional" dishes and a guesthouse with traditionally-styled but contemporarily-rich furnishings. *Nongjiale* are becoming increasingly popular across the country, as middle- and upper-class urbanites want to reconnect with what is considered to be an agricultural past,

understood in stark and somewhat romantic contrast to the seemingly inevitable industrial present and future.

On the same site, Mr. Bu also founded and operates a Pig Culture Museum, where he took me on a personal tour, and I started to understand some of the cultural meanings attached to pigs. He led me through displays showing archeological evidence of how the Chinese character for home and family, 家(*jia*), evolved through various historical periods. The character 家 was created some 3,500 years ago by adding the roof radical to the pig radical⁸, or more figuratively, by putting a roof over a pig's head (Harbaugh, 1998). Mr. Bu highlighted the saying, “*meiyou zhu, meiyou jia*” (没有猪, 没有家), which translates as “no pig, no home” to demonstrate that at one time pigs lived in houses with families (Wieger, 1927), and were long thought of as key components of the household, and of the very meaning of “home.” My host was also keen to note that even though fewer and fewer people raise pigs in China today, swine continue to be important cultural and social signifiers of China as a modern nation, and one with enduring ancient legacies. Mr. Bu went on to say that, “Meat [pork] signifies wealth. The more money you have, the more meat [pork] you will eat.” This sentiment very clearly illustrates the changing value of pigs and pork, and the way those values define the modern era.

Starting with the Reform and Opening in 1978, and in the context of agrarian transition and agro-industrialization, the meaning associated with pigs has shifted decidedly: today, pork in its commoditized form is the primary source of value, expressed in socio-cultural and political economic terms. In contemporary China, meat in general and pork in particular signify progress against a backdrop of scarcity. During the Cultural Revolution (1967-1976), pig production and

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*).

distribution was collectivized, and meat was rationed to households by coupon. Even though farmers for centuries ate meat only 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. Several people whom I interviewed in Northeast China described the monotony of seemingly endless meals of rice, cabbage (*baicai* 白菜), and steamed buns (*mantou* 馒头) during that time, and how meatless dinners and intermittent coupons constructed feelings of scarcity and desire. A man who grew up in Liaoning province in the early 1970s expressed this sentiment:

“When I was a boy, my dream was to eat meat. Today I can eat meat for breakfast, lunch, and dinner if I want to... *This is progress.*”

These legacies and experiences of rationing and “meat dreams” inform the state’s reform era focus on increasing pork production and consumption, both to satisfy what people described as “eating meat in revenge” (against past scarcity), and to legitimize the state for its role in creating a bountiful agrifood system that satisfies those dreams.

Animal husbandry, and pig production specifically, have been on the state’s agenda throughout the reform era, but came even more into focus in the wake of the 2006 Porcine Reproductive and Respiratory Syndrome (PRRS, or porcine blue-ear disease) epidemic and the skyrocketing pork prices that followed. The State Council’s *Views on Promoting the Development of Live Pigs and the Stability of Pig Markets* from 2007 laid out measures to increase state support for large-scale, industrialized, and standardized pork production as a way to stabilize the industry and protect against shocks (Wang & Watanabe, 2009). Measures included direct farm payments for sow insurance and disease prevention, and compensation for losses from the PRRS epidemic. There were also subsidies for seed-breeding of live pigs, investments in production infrastructure and market monitoring systems, grants for safe disposal

of sick pigs at slaughter, rewards for counties that significantly increased production, and financial incentives for leading agribusiness firms. Many of these post-disaster subsidies and programs continue presently, either from national or provincial governments.

China's strategic pork reserve, the only one of its kind in the world, also underscores the political (and economic) importance of pork in the meatification project, as well as the use of pork in state attempts to quell potential protests that might threaten state legitimacy. Pork prices are the most influential component of the Consumer Price Index in China, so much so that some in the press have called it the "China Pig Index" (Orlik, 2011). When the inflation rate hit 6.5 percent in 2007, and the price of meat and poultry surged 49 percent from the previous year, central authorities created the strategic pork reserve to help control pork prices and to work as a signal for needed policy shifts. The specifics of how the reserve operates are not public information, and according to a pork industry analyst I interviewed in Beijing, are tightly held state secrets. What is known is that the reserve consists of two different parts: a live pig reserve housed on 200 to 300 commercial pig farms, and a frozen pork reserve administered through packing plants, both of which are monopolized by the China National Cereals, Oils and Foodstuffs Corporation (COFCO), the state-owned agribusiness giant. The state purchases pigs and pork for the reserve when the pork/corn price ratio falls below 6:1, and releases stocks when prices are too high. Analysts disagree about the effectiveness of the reserve (see for example Wines, 2011; Woosley & Zhang, 2010), yet it continues to be used as a price-controlling mechanism (or in the words of an agricultural attaché at the USDA Foreign Agricultural Service office in Beijing, a "price distorting mechanism.")

In terms of massively ramping up both production and consumption throughout the reform era, and particularly after 2007, the pork focus in the meatification project has been

wildly successful. Subsidies to recover the national sow herd after the PRRS outbreak successfully boosted the herd from 40 million to nearly 50 million animals, igniting overall production growth (Woosley & Zhang, 2010). The structure of subsidies has not only increased production, but also restructured it. After dedicating 2.5 billion RMB (\$366 million) to subsidize large-scale production facilities or specialized “pig barns” in 2009, the Ministry of Agriculture reported that farms that raise more than 50 hogs a year accounted for almost 60 percent of total slaughter, up from less than half in 2007 (Woolsey & Zhang, 2010). At the same time, the number of rural households that raise pigs has rapidly declined, while the production share of large-scale commercial pig farms has grown quickly. For state and private, and domestic and foreign investors alike, this growing commercial pork sector is seen as a promising arena for investment and profit. As a result, all stages of pork production, distribution, and retail are becoming increasingly commercialized, capitalized, and industrialized, and vertical integration is proceeding rapidly. This study illuminates these as general processes, with distinctively Chinese characteristics.

Organization of the Dissertation

The following chapters further specify China’s meatification project; the policies, discourses, meanings, and relations that define it, as well as the transformations and contradictions it produces. The eight propositions below summarize the approach and findings of this work, and outline the organization of the dissertation.

(1) China’s meatification project is pork-focused. While chicken⁹, mutton, beef, and aquaculture

⁹ There has been a parallel, but smaller, increase in chicken production in the reform era, and a recent Rabobank (2013) report indicates that the poultry industry is growing faster than the swine industry in China. These two sectors will continue to grow in tandem, but the historical importance of pigs in Chinese culture and farming systems imbues pork with a distinctive character that places it at the heart of the country’s meatification project.

are also being promoted and supported by policies and investments, as the “national food” with long-standing cultural significance, pork is *the* meat of the meatification project (Chapter 1).

- (2) The meatification project reflects broader political and economic processes, and vice versa. Reform and Opening in 1978 conditioned the emergence of the project by commodifying pork and opening pig farming to agribusiness penetration, moves that have in turn further solidified the project throughout the reform era. Ensuring and increasing pork supply is a mechanism through which the state can claim legitimacy as a political entity that responds to the consumer demands, while maintaining stability and a “harmonious society” (Chapter 1).
- (3) The making of modern meat in reform era China is best described as a kind of “pork and beans” development that hinges on imported exotic pig breeds and imported soybeans. Co-development of the swine and feed industries since 1978 has largely displaced indigenous pigs, locally-based feeding practices, and culturally preferred forms of pork (Chapter 2).
- (4) The meatification project transforms agroecosystems, diets, notions of modernity and value, and the distribution of environmental harm. These transformations are based on, and deepen, the metabolic rift. As people, livestock, and agricultural practice are uprooted from agroecological cycles, humans are separated from nature in both minds and bodies. Changes in swine feeding and manure management in particular reveal these ruptures and their crises (Chapter 3).
- (5) In the march toward a meat-rich modernity, smallholder farmers are (re)defined as backwards, redundant, and a drag on development. Political discourse and pronouncements, as well as popular imaginations and meanings around farmers (*nongmin* 农民), illustrate prevailing assumptions about the “low quality” of smallholders, and the desire to improve

them through industrial agriculture as a mechanism of dispossession and/or vertical integration. In other words, *nongmin* are cast as a problem for industrial agriculture to solve (Chapter 4).

- (6) Rather than just an expression of neoliberal development with TNCs at the helm, China's state-led meatification project operates primarily through leading domestic agribusiness firms called Dragon Head Enterprises. Through the operation of the country's agricultural development model, China is a site of agribusiness development in its own right, not simply a destination for transnational capital. The pork sector is an exemplar (Chapter 5).
- (7) The rationale for the meatification project is based on the discourse that industrial production is the most efficient way to overcome the challenge of feeding 21 percent of the world's population on nine percent of its arable land. But rather than promoting food and agricultural self-sufficiency, the project increasingly enacts the "go out" strategy to invest in land and infrastructure abroad, externalizing many of the social and environmental consequences that accompany increased meat production to land and farmers in other parts of the world (Chapter 6).
- (8) The state manages tensions between meatification and food security through a livestock feed regime that is a complex of both soy and maize imports, and more recently, land grabs. Off-shoring feed allows Chinese middle- and upper-class urbanites to join a growing global consumer class of meat eaters whose diets require the diversion of more land, resources, and crops to feed livestock rather than people. This deepening of class diets produces a contradictory food security politics around *meat for the elite and grains for the masses*, with both domestic and global articulations (Chapter 6).

Taken together, these chapters detail and develop the meatification project concept, and specify its practice in reform era China. My overall argument is that the further the meatification project proceeds, the further it creates the conditions of its demise. In the meantime, its contradictions and crises are already being disproportionately borne by rural people and environments, both of which fuel the project without benefitting from it.

Methods and Study Sites

The empirical material in this dissertation derives from fieldwork in China from 2009-2011, and shorter research trips in 2007 and 2008. My work took me to Northeast, Southwest, and Coastal China, including three municipalities (Beijing, Shanghai, and Chongqing), and cities and villages in five provinces (Sichuan, Guangdong, Hebei, Heilongjiang, and Guizhou). I conducted participant observation at 81 research sites, including: farms, agribusiness firms, government agricultural offices, universities, agricultural trade shows, agriculture and agribusiness conferences, food markets, banquets, nongovernmental organizations, rural farm resorts, factories, a migrant worker legal support center, and a “pig culture museum” (see Appendix A). Additionally, I conducted 47 interviews with farmers, agribusiness executives, government officials, university researchers, migrant workers, factory owners, journalists, food market workers and customers, and NGO workers, using a combination of purposive and snowball sampling. I had 72 informal conversations with strangers, colleagues, friends, acquaintances, and neighbors that informed my research, and several email exchanges with informants that provided further information and insights. I also administered and analyzed surveys of 123 factory workers in Xiamen in Fujian Province and Dongguan in Guangdong Province. I have changed the names of all people, companies, and locations that might

compromise confidentiality. Otherwise, the names of government ministries and of national-level agribusiness firms are real.

Ethnographic material is supplemented with secondary data from newspapers, scholarly journals, agribusiness and government websites and documents, and government statistics.

Specific methodologies and expositions of study sites are included in the following chapters.

Chapter Two

PORK and BEANS DEVELOPMENT

The MAKING of MODERN MEAT

“Plants and animals have been turned into homogenous rivers of grain and tides of flesh, more closely resembling the money that enlivens their movement from field to table, than their wild ancestors.”
Harriet Friedmann (2000, p. 481)

“The pork today is no good. It has no flavor,
not like when I was a boy.”
Man in his late 50s
Village outside of Beijing, April 2011

Pork and Beans Development

A pork-focused meatification project makes sense in China. As I detailed in Chapter One, pigs have long held cultural and agroecological significance, and as the “national food,” pork is a highly valued form of protein. The making of modern meat, however, bears little resemblance to the history of pig raising in China. In the process of industrialization and commodification, the materials, practices, and knowledges used to produce pork have changed dramatically. Whereas Chinese farmers for millennia raised locally adapted indigenous pigs on locally produced or occurring feedstuffs, in the reform era, modern pork is made from exotic pig breeds and largely imported oilseeds and grains. These transformations have resulted in a kind of meat for which consumer demand has to be created: modern pork is lean pork, and from countless conversations with Chinese consumers who remember eating meat before industrialization, “the pork today is no good.”

In this chapter, I examine the political economy of the making of modern meat in reform era China as “pork and beans development.” I begin by discussing the displacement of Chinese indigenous pigs by imported exotics, and then detail the co-development of the swine and feed industries since 1978. Chapter Three builds on the information presented here by putting changes in breeding and feeding in the context of the metabolic rift, with a particular focus on how farming practices and knowledges are shifting, and with what social and ecological implications.

Making Modern Pigs; Making Modern Meat

When the Chinese Academy of Agricultural Sciences undertook the first national survey of indigenous livestock in 1960, researchers found more than 100 indigenous pig breeds, which ranged from the extreme northeast of present day Heilongjiang Province, to the Tibetan Plateau in the southwest, and all the places in between (Zheng, 1984). Millennia of animal husbandry produced a genetically diverse range of locally adapted pigs with characteristics such as high prolificacy (large litters), the ability to thrive on coarse feedstuffs and often in unfavorable environments, and production of juicy flavorful pork (Tang et al., 2008). For virtually all of China’s 7,000 years of agricultural history, local people raised local pigs on local resources and ate them in local (geographic, cultural, social, dietary) contexts.

In the contemporary era, the production of modern pigs and modern pork are radical departures from this historical model. A modern pig reaches market weight and finishing standards in the shortest possible time (Holden & Ensminger, 2005). It is an animal that has been bred to efficiently (quickly and prolifically) convert feed (soy and maize) into lean pork that can be processed, packaged, and sold in a variety of different forms. And increasingly, it is one of a

narrow range of pork breeds, owned and traded by a narrow range of agribusiness firms (Gura, 2008).

In China, improving the national swine herd by replacing indigenous pigs with imported exotic breeds is an important agricultural development goal. I interviewed Dr. Tai Hong, an official in the National Animal Husbandry Service at the Ministry of Agriculture about this process. He told me that the “modern industrial hog” has taken over swine production in China as elsewhere around the world. Presently, three exotic breeds - namely Duroc, Landrace, and Yorkshire (DLY) - have all but replaced indigenous pigs. Farmers at all scales of production, from smallholders to vertically integrated commercial operations, raise these breeds either in pure or crossbred form. The less than 50 remaining indigenous pig breeds are now maintained on state-funded and privately operated conservation farms, where they have to be grown out and reproduced using fresh semen, either through natural or artificial insemination; unlike many other animals, pig semen does not remain viable when frozen, so storage in a gene bank is not currently an option (though this is changing). Dr. Tai estimates that indigenous pork accounts for less than ten percent of the country’s total pork production.

In interviews with agribusiness executives, government officials, researchers, and farmers, I was told over and over again that replacing China’s pigs with “DLY” (spoken in English) is the key to modernizing the sector. Agribusiness brochures are filled with glossy color images of their best DLY boars and sows, agricultural expos are abuzz with vendors touting their “superior” DLY stocks, and state-operated breeder farms use DLY and other “improved” exotic breeds in their hybridization efforts. I attended the Guangdong Pig Industry Association’s Annual Swine Expo in Guangzhou in 2010, the largest of its kind in China. In the swine auction, DLY pigs were the stars of the show. Agribusiness buyers paid 4,800 RMB (\$780) to 10,000

RMB (\$1,625) per head for boars that performed well on feed-to-meat conversion measures.

These prices are commensurate to what similar boars – good industrial performers, but not prize or show pigs – would cost in the United States.

DLY and other so-called “improved” pig breeds are posed as the opposite of China’s “traditional” indigenous pigs, which like the smallholder farmers who raise them, are thought of as best done away with as soon as possible so that the country can get on with the business of modernizing. (I’ll return to the point about smallholders in Chapter Four.) But there are cruel ironies in these constructions.

First, Chinese indigenous pigs have historically, and continue today, to contribute to the making of the “improved” pigs breeds that are replacing them. According to Yu Youtai (1987), a former professor at China’s Northeast Agricultural College, the Roman Empire imported pigs from southern China to cross with their own indigenous swine during the third century B.C. These early hybrids were grown out for thousands of years, ultimately passing along genes from Chinese indigenous pigs all the way to the now world famous English breeds, including the Yorkshire and Berkshire. Later, Chinese pigs were introduced in England around 1700, and again at the beginning of the 19th century into other Europe countries where they were used in breeding the current incarnations of Middle White and Large White (Yorkshire) pigs (McOrist & Walters, 2009; White, 2011). Also in the 1800s, hybridizers in the U.S. used Chinese pigs in crosses to produce the popular Poland China and the Chester White (Yu, 1987).

More recently, in the 1970s and 1980s, firms in Europe and the U.S. imported Chinese Taihu Meishan pigs to improve fertility characteristics of commercial swine. In 1989, the USDA and the Universities of Illinois and Iowa brought 144 Fengjing, Meishan, and Minzhu pigs to the U.S. for a breed improvement and research program, based on the animals’ pork flavor, disease

resistance, and large litters (Holden & Ensminger, 2005; McOrist & Walters, 2009; Tang et al., 2008; Young 1998). A 2009 issue of Pig Progress, an international publication on the pig industry, ran a cover story on the “Native Pig Breeds of China,” suggesting that while these animals don’t fit modern production systems, they do have traits that warrant breed conservation (McOrist & Walters, 2009).

On the significance of Chinese indigenous pigs to global processes, Sam White (2011) argues that when introduced in England around 1700, the emergence of capitalism and industrialization together “ensured that the newly introduced Chinese pig would not continue its traditional role as a small farm animal, but would instead facilitate the transformation of Western hogs from a household animal into an industrial commodity” (p. 95).

At the same time that Chinese pigs have been used in breeding programs abroad, exotics have been coming in since the end of the 19th century. Crossbreeding with Berkshires, Yorkshires, U.S.S.R. Big Whites, and Landraces began around this time, and continued through targeted hybridization campaigns in the early 20th century. These crosses resulted in several new breeds, including the Northeast Xinjin, the Fuzhou Black, the Ningxia Black, the Shanghai White, the Xinhuai, the Harbin White, the Hanzhong White, the Northeast Spotted White, and the San Jiang White (Yu, 1987). With Reform and Opening, transnational agribusiness corporations began to stake a claim in the development of the country’s animal husbandry industry, and domestic genetics firms began to operate through joint ventures or as sole proprietorships. Today both PIC and Hendrix Genetics, the first and second largest pig breeding companies in the world, have established firm footholds in China¹⁰.

¹⁰ See company websites: <http://www.picchina.com/> (in Chinese), <http://www.hypor.com/en/local-activities/china/>.

The second irony is that exotic lean type pigs produce meat that is not well-suited to Chinese cooking traditions or to Chinese consumer preferences. DLY and other “improved” varieties are *meat pigs*, bred primarily for quickly converting protein- and energy-rich (soy and maize) feed into lean muscle. In industrial production, meat pigs are seen as the most advanced in three stages of breed classification, following *lard pigs* as the traditional type, and *bacon pigs* as the post-World War II type. Lard pigs are thick, compact animals with short legs and fat bodies, producing meat with a high fat content that separates easily from the lean components through rendering. In the U.S., lard pigs were raised in the 19th and early 20th centuries both for their flavorful meat, and for their lard, which was used as a cooking fat and as a mechanical lubricant. In the Midwest, pigs were bred specifically to convert the region’s massive maize crop into pork as a more highly valued commodity, earning them the name “corn on the hoof” (Towne & Wentworth, 1950, p. 164). A high energy maize diet, in combination with lard pig breeds, produced a fatty kind of pork.

During the Second World War, because most lard was diverted for military purposes in the manufacture of explosives, people began using vegetable oil for cooking. After the war, when petrochemicals and synthetic nitroglycerine replaced lard for industrial and military purposes, and marketing campaigns had successfully sold consumers on the idea that vegetable oil was healthier than fat for cooking, lard pigs were replaced with bacon pigs. This new type, bred for muscling rather than fattening, produced leaner meat from the glut of soy and maize that was emerging in the wake of the synthetic fertilizer boom. Berkshire, Duroc, Hampshire, Poland China, and Yorkshire were the most popular breeds at the time, and were further developed into the modern meat pig in the intervening years (Christman, 1997).

Using this classification system, Chinese indigenous swine would by and large be categorized as lard pigs, which is intimately linked to the development of culinary cultures and traditions. As a result of thousands of years of raising pigs on coarse feeds with low protein content, Chinese pork was historically fatty pork. Many Chinese recipes use cooking methods based on pork with easily distinguishable and separable sections of meat and fat. This is in stark contrast to marbling, or intramuscular fat, that is an artifact of the modern pork industry. Also, lard has typically been preferred over vegetable oils for cooking (Anderson & Anderson, 1977). When pigs were slaughtered at Chinese New Year, rendered lard was saved and used throughout the year, supplemented with locally-specific cooking oils.

The hegemony of exotic lean-type meat pigs has changed the consistency and flavor of pork, and for some, has lessened its appeal. This kind of modern meat is not the meat that enlivens Chinese cooking, or the taste preferences of especially middle-aged and older Chinese people who have memories of pre-industrial pork. Despite this, the market for pork continues to grow, and younger consumers demand leaner pork (Personal Communication, 2010). The pork industry has sold consumers on the idea that modern pork is better pork, revealing the construction of consumer demand as a mechanism to support the meatification project and the accumulation of agribusiness profits.

The third irony is that “improved” pig breeds are only “improved” for industrial production systems, and not for smallholder farmers who cannot afford the requisite soy and maize-based commercial feedstuffs. Even though smallholders increasingly raise exotic hybrids, because their feed is higher in energy (coarse feeds and maize) and lower in protein (oilseeds like soy), they cannot compete with the faster production cycles on factory farms, and often cannot meet market standards for leanness that are required for sale to vertically integrated processors.

Currently, small-scale farmers use other local markets for their pigs, but producing under contract with state-supported agribusiness firms is the predominant rural and agricultural development model in China today, which I'll detail in Chapter Five. The point here is that DLY (and other exotic breed) pigs are proposed as a way to improve and modernize pig farming – not just for the commercial sector, but also as a form of development for rural households – but the benefits of “improved” varieties accrue predominantly to agribusiness firms, and only when combined with industrial feeding.

The Meatification Project: Feeding People or Feeding Pigs?

To understand China's meatification project is to understand the political economy of the feed industry, and the ways in which the pork and feed trajectories are interdependent. Making modern meat is a process as much about feeding livestock as it is about feeding people. In the sections that follow, I detail the development of China's feed industry in the reform era, which conditions and co-develops the pork industry.

Feeding China's Pigs

Before 1975, most Chinese pigs' lips would never have touched processed feed. Grains and oilseeds were cultivated for human consumption, while livestock were raised on weeds, grass, crop residues, kitchen scraps, or any of a number of other readily available feedstuffs. In an effort to speed up the conversion of plant materials into meat, from 1976 to 1985 China's leaders supported rapid development of a milling industry that would provide compound livestock feeds, as well as employment opportunities in rural areas. These changes were expected to increase meat consumption in the country, improving diets and food security, and moving the population beyond the famines and meat rationing of the past. Through a combination of market

reforms and government financial support, China's feed industry went from practically nothing before 1975 to becoming the world's second largest feed producer by 1995. Pig feed was the first boom in the 1980s, followed by chicken feed in the 90s (Ministry of Agriculture, 2009).

Today, China has a multi-billion dollar (US\$) livestock feed industry. Its 2008 gross output value was 425.8 billion RMB (US\$62.3 billion), an 8.5 percent increase from 2007. Of that total, 381.29 billion RMB was from formula feed, 28.66 billion RMB from feed additives, 6.96 billion RMB from animal-derived feed, and 8.88 billion RMB from feed machines and equipment (Ministry of Agriculture, 2009). For the past 10 years, domestic feed demand has been rising by about eight percent each year, making China home to one of the largest feed industries in the world, and poised to pass the U.S. as global leader in the coming decade.

Since its inception, the ownership and management structure of the feed industry has changed dramatically. During the first two decades after reform, government agencies such as the Ministry of Agriculture (MOA) and the Ministry of Finance and Commerce (MOFCOM) managed most feed mills. Farmers cooperatively owned some mills through township and village enterprises (TVEs), generally under MOA supervision. At the same time, private ownership increased, and central authorities also started to encourage foreign firms to invest in joint venture mills. Before the turn of the century, private and public/private operations accounted for 30 percent of all mills, and foreign investment in 66 joint ventures totaled over US\$200 million (Ministry of Agriculture, 2009).

Currently, private enterprise, both of the domestic and transnational agribusiness variety, defines much of the sector, particularly in soybean crushing. An analyst I interviewed in Beijing estimates that 69% of the active soybean crushers in China are privately owned. Of the 31% state-owned share, several operations also have foreign and domestic private investors.

Soybeans: The Key to Modern, Lean Pork

Producing modern, industrial pork requires modern, industrial feed. Soybean, a plant that was domesticated in China 5,000 years ago, is a current feed industry star, sharing the spotlight with maize, but under very different political conditions. Similar to the diversity in Chinese indigenous pigs, the millennial-scale cultivation of soy has produced around 6,000 domestic varieties and a rich associated knowledge about soy production, processing, and uses. But whereas China continues to be largely self-sufficient in pork as an end-product-food-category, centuries of soy self-sufficiency came to an end in the mid-1990s, with soy import dependency following in subsequent years. After being a leading soy export country for decades, China became a net importer in 1996, and by 2003, had taken over as the world's largest importer of soybeans. In 2009 and again in 2010, China's imports accounted for more than half of the total global soy market (USDA, 2011). In the 2011-2012 trade year, China imported 56% of the total global soy market (USDA, 2012).

Given that soybeans are touted as the ultimate source of protein in modern feed mixes for shorter-cycle, leaner pork production, these developments might seem natural or expected. And surely most all of the rapid growth in soy imports is in response to increased domestic demand to feed the ever-growing national swineherd. But the shift to imported soy and the associated changes in China's feed industry are not because of the so-called invisible hand of the market. Rather, they are the direct result of a set of policies, agreements, and conflicts – some quite visible, and others less obvious – involving a diverse set of Chinese and international actors. For its part, the Chinese central government has enacted measures aimed at ensuring China's food security on a limited amount of land, supporting increased consumption of cheap pork, liberalizing the soy sector, and anticipating and abiding by WTO regulations. From the

perspective of soybean exporting countries and transnational agribusiness firms (and the institutions that regulate international trade), China was and remains a key site for investment and profit and a central component of future development plans. With soybeans, what is at stake is nothing less than control of the flow of soy into the country and throughout the food system.

Liberalizing and Industrializing Soy

To increase meat consumption for 1.3 billion people on only 120 million hectares of arable land, something has to give. For China's central authorities, a key "something" has been soybeans. Recognizing that domestic soy output would not be able to keep up with the massive growth planned for the livestock industry, the government moved to liberalize the soy sector starting in the 1990s, allowing imports to overtake both exports and domestic production.

Officials used a number of methods to open this market.

Central authorities implemented the VAT system in 1993 to encourage production and export of certain products¹¹, and as a key source of state revenue. For food and agricultural goods, the VAT rate is generally 13 percent (Gale & Hansen, 2003). In 1995, to spur the livestock industry and to get around limitations in domestic soybean crushing, the government lifted the VAT on *soybean meal*. As a result, meal imports surged to 3.6 million tons in 1996-1997, making China the world's largest soybean meal importer that year, and then to 4.2 million tons in 1997-1998. This increase in supply depressed domestic soy prices, reduced domestic crushing margins, and discouraged producers from planting soybeans during those years. As domestic crush fell, so too did soy oil production, since soybean meal and soy oil are co-products

¹¹ The VAT is not assessed on products sold by "agricultural producers", for instance the soybeans a farmer sells to a crusher or trader. When a trader sells soy, however, the VAT is assessed. In theory, the VAT makes imported products more expensive than domestic products, since domestic sales often are not assessed a VAT.

in the crushing process. Several sources reported edible oil smuggling in the country as a result of the shortfall.

In an attempt to correct these imbalances, the central government reimposed the 13 percent VAT on all imported soybean meal in 1999, a move that favored the import of unprocessed soybeans instead. Consequently, *soybean meal* imports dropped from 4.2 million tons in 1997-1998 to 0.1 million tons in 2000-2001, while *soybean* imports soared from 3.8 million tons in 1998-1999 to 10.1 million tons in 1999-2000 (USDA, 2001). Domestic soybean meal prices rose, crushing margins improved, employment increased, and edible oil smuggling stopped. To this day, China's soy import strategy is focused on whole, unprocessed soybeans, not soybean meal.

WTO and bilateral trade agreements were also important drivers of soy sector liberalization. In 1996, the government reduced the import tariff on soybeans from 40 percent to 3 percent in anticipation of accession to the WTO in 2001. The tariff rate on soybean meal was set at 5 percent, while soy oil was 9 percent (Provance, 2003). In 1999, China and the U.S. became closer trade partners when the two countries signed a bilateral trade agreement that contained a tariff-rate quota for soy oil (that would later turn into a bound 9-percent tariff rate), but excluded soybeans and soybean meal (Hsu, 2001). In 2003, Brazil came on the scene when China accepted the country's soy export application (Provance, 2003). These agreements defined the terms of trade and China's major trading partners for the next several years.

Changes in how soybeans and soybean meal are defined and regulated were also key policy maneuvers with important consequences for trade and domestic production. In 2002, in order to raise domestic soybean meal prices after supplies exceeded demand, central authorities defined soybean meal as an industrial, rather than agricultural, product. This language changed

the tax structure of soybean meal, giving it a 13 percent export tariff refund to encourage exports and to relieve excess supply on the domestic market (Provance, 2003). Redefining soy in this way was related to the government's more general reclassification of it as a "non-strategic" crop for food security. Upon accession to the WTO in 2001, China's overall strategy was to focus food security policy on maintaining strategic reserves of rice, maize, and wheat – crops considered important for direct human consumption – while liberalizing the markets for other non-staple crops in order to honor accession protocols and commitments. At that time, authorities liberalized soybeans from strict state control, and removed so-called trade distorting mechanisms (Solot, 2006). According to experts I interviewed within China, the main reason that soy was "cut loose" was to ensure adequate supplies of feed for industrial pork production.

As a result of this sectoral restructuring, soybean imports have been soaring since the late 1990s at an average annual growth rate of about 26 percent. Imported soy is crushed domestically to produce livestock feed (soybean meal) with soy oil as a co-product. China is now the world leader in both soybean meal and soy oil production, but it is important to remember that this output comes overwhelmingly from imported beans. In 2009, 73 percent of the soybeans consumed in China were imported (Ma & Yan, 2010). The United States and South America (Brazil and Argentina¹²) are seasonal complimentary soybean suppliers for China. Because of the "opposite" growing seasons in these two global locations, South America soy imports dominate from June to October and United States imports from November to May (Song et al., 2009). This system means that U.S. beans are in direct competition with Chinese domestic beans because they share the same growing season.

¹² Argentina was a major supplier of soybean oil until Chinese authorities suspended imports in 2010. Trade has yet to be restored, and as a result, domestic soybean meal supplies are outstripping demand since crushing has increased to make up for the shortfall in soy oil.

Soybean Wars and Foreign Crusher Dominance

The dominance of foreign firms in the Chinese soybean industry is one the most contentious issues in China soy policy and production circles. The situation is reported in the Chinese media as “Soybean Wars,” “Battle of the Beans,” and “Foreign Companies Eat Up Our Country’s Soybean Industry,” suggesting the conflict between transnational agribusiness firms and domestic crushers and producers. While foreign enterprises started to enter the Chinese feed industry in the 1980s through joint ventures with domestic mills, it was only after the soy crusher defaults in 2004 that these companies were able to take control of 80 percent of Chinese soy crushing, ushering in a new era of foreign domination.

After the 13 percent VAT on soybean meal was reimposed in 1999, there was an unprecedented crushing boom in China to accompany the surge of whole soybean imports. Investment in the sector soared and crush capacity expanded beyond production. At the same time, toward the end of 2003, China and the U.S. were on the brink of a trade war because of the U.S.’s growing trade deficit. Chinese Prime Minister, Wen Jiabao, made a trip to the U.S. and promised to send delegates the next year to purchase agricultural products, primarily “non-strategic” soy and cotton. The monthly average soybean future price on the Chicago Board of Trade (CBOT) at the time of Prime Minister Wen’s visit was US\$7.70 per bushel. In March and April of 2004, when Chinese buyers arrived in the U.S. to make the bulk of soy purchases as per the previous agreement, the price of soybeans had skyrocketed to US\$9.82 and US\$9.89 per bushel respectively. Average April prices in 2003 and 2005 were US\$6.04 and US\$6.23 per bushel respectively, so the almost US\$10 per bushel price was an anomaly (Wen, 2008).

When deliveries and payments came due from the Chinese buyers in June, July, and August of 2004, the price of soybeans had tanked to US\$5.93 per bushel. Rather than incur

losses from the radically different per bushel price at the time of purchase and the time of delivery, many Chinese importers defaulted on their contracts. Angry traders took the case to arbitration at GAFTA (Grain and Feed Trade Association) in London. Because price fluctuations are perfectly legal under the international pricing system based on CBOT futures, but defaulting on trade contracts is not, the final ruling was against the Chinese crushers. They were required to fulfill their contracts and pay for soy shipments at the abnormally high March and April prices. A Chinese Academy of Science study estimated that Chinese crushers overpaid for this soy by a margin of at least US\$1.5 billion (Wen, 2008).

The immediate result was that many Chinese crushers were forced into bankruptcy and had no choice but to sell to foreign firms. Predictably, the firms that made the most market headway after the crusher defaults were already leaders in the global soy trade (GRAIN, 2010). ADM, Bunge, Cargill, Louis Dreyfus (together, ABCD) bought over 70 percent of the shutdown Chinese crushers, and Singapore-based Wilmar also increased its market share at that time (PRL.org, 2009). It is important to note, however, that New Hope Group, a private domestic firm with annual feed production capacity of over 20 million metric tons¹³, is the largest feed producer in the country.

Official statistics on the number and type of feed enterprises in China also illustrate the continuing and growing prominence and concentration of foreign firm ownership. According to Ministry of Agriculture figures, there were 13,612 feed enterprises in 2008. This was 11.5 percent lower (1,764 fewer operations) than in 2007, and recorded the third consecutive year of diminishing numbers. The only enterprise categories that saw an increase in the number of

operations were foreign-funded and joint-stock enterprises. All other categories declined (Ministry of Agriculture, 2009).

Livestock feed is the main driver in the soybean crushing industry, but soy oil is also becoming increasingly important. Before industrialization of pig and feed production, small-scale farmers cooked their meals with fat from the pigs they slaughtered in the spring, or pressed a small amount of cooking oil from crops produced locally. Today, edible oils have also been largely commercialized, and soy oil is now the leading cooking oil in China, accounting for 40 percent of national use (USDA, 2008). While there is regional variation in household edible oil consumption, with rapeseed, palm, and peanut oil dominating in some parts of the country, soy oil is gaining more and more of the market. According to a scholar I interviewed at a leading Chinese agricultural university, virtually all restaurants in China today – from street vendors to upscale eateries – use soy oil for cooking. It has completely taken over this sector.

Foreign firms have an important presence in soy oil production, with several operating under their own brands within China. Jinlongyu (金龙鱼) has 30-40 percent of the total market for all edible oils in China, and is an important soy oil brand. Its parent company, Arwana, is owned by Kerry Oils and Grains, which was just purchased by Singapore-based Wilmar. Bunge started the Douweijia (豆维家) brand of soy oil in Nanjing in 2007. ADM and Wilmar have a joint venture in the Jinhai brand (金海) of products, including the Sania (莎妮雅) soy oil brand. Through a joint venture with China National Cereals, Oils and Foodstuffs Corporation (COFCO), ADM and Wilmar also own five companies of crushers and refiners. On its website, ADM notes that, “A key part of ADM’s Asia strategy today is our strategic ownership interest in Wilmar International Limited” (Archer Daniels Midland, 2010). Cargill and Dreyfuss don’t at

present have their own retail soy brands, but instead sell unrefined oil to local refiners or to ADM enterprises.

As a result of the crusher defaults in 2004, on top of crusher buyouts, half of all domestic soy oil refineries were forced to close. Transnational agribusiness corporations now control 80 percent of soybean crushing, and control 60 percent of China's soy oil refining (PRL.org, 2009). This means that the same firms that control soybean exports *to* China from production centers in the U.S. and South America are also the major *importers* that control the flow of soy through the Chinese food system.

Protecting Domestic Soy

Changes in the feed industry, including ever-increasing soybean imports and the dominance of foreign firms, have had definitive impacts not only on domestic soy crushing and oil refining, but also on domestic soy production and farmers. In 2009, Chinese farmers produced 16 million tons of soybeans on 9 million hectares, or 7.5 percent of the country's total arable land (Ministry of Agriculture, 2009). Liberalization of the sector has meant that surging soy imports have dramatically outpaced domestic production, and more and more farmers are opting out of planting soy.

Soy experts in China estimate that there are 25 million smallholder soy farmers in the country today (Ma & Yan, 2010). So while large-scale soy production is increasing – with groups like Beidahuang¹⁴, a state-owned conglomerate working to scale-up and mechanize production to increase per-acre productivity – smallholders play a vital role in the soy sector, acting both individually and through cooperatives. The real story behind domestic soy

¹⁴ Beidahuang Group is a conglomerate of state-owned agribusiness enterprises headquartered in Harbin City in Heilongjiang Province. See the company website (in Chinese) at: <http://www.chinabdh.com/>. Jiusan (93) Oil and Fat Company is a subsidiary of the Group, and is the country's largest domestic soy processor. According to a soybean industry expert I interviewed in Beijing, Beidahuang is actively investing in overseas agribusiness enterprises.

production, therefore, is the story of the struggles of smallholders whose livelihoods are endangered by changes in the soy industry and in soy pricing.

There are several reasons why farmers move out of soy production in China. One important factor is that the market price of imported soybeans is cheaper than that of domestic soy. A complex mix of subsidies, agricultural policies, and pricing schemes in the United States and South America keeps the market price of soybeans (and other agricultural commodities) artificially below the cost of production. This is a well-documented phenomenon that has led to unfair competition and/or dumping on world markets for decades (Murphy et al., 2005). When domestic farmers are undercut by cheap imports, one immediate result is that those farmers can no longer make a living from their crops, and are often forced out. On top of this, the foreign firms that control 80 percent of crushing and 60 percent of refining in China have the ability to import soybeans from their own production centers around the world at a price much cheaper than what domestic soybeans can sell for. In 2010, imported soybeans in China were 300 to 600 RMB cheaper per ton than domestic beans (Lan, 2010). This situation means that not only are domestic soy prices depressed, but that both foreign owned and domestic crushers are buying more imported beans in order to increase profits, or in some cases, to stay in business. Tian Renli, the president of Heilongjiang Jiusan Oil and Fats Company said, "It's not that the processors don't want to use domestic soybeans, but we can't at current prices" (Wang, 2010). Domestic crushers can buy soy from local farmer co-ops, but increasingly they are getting soy supplies from the same foreign firms that control the vast majority of the processing sector.

The GM issue, which is highly controversial in China, further complicates soybean pricing. Currently, the central government prohibits commercial planting of GM food crops, but

unlike most other countries with similar bans, allows imports (“Single year’s corn import,” 2010). In 2009, 90 percent of soy imports were GM (Ma & An, 2010). Given that 73 percent of the soy consumed in China in 2009 was imported, and that 90 percent of imports were GM, that means that 81 percent of all soy was GM. Clearly, this is a challenging market situation for domestic producers who grow non-GM soy that should fetch a premium price, but instead creates a barrier for them when they are faced with buyers who want (and/or need) the cheapest beans possible. There is little incentive for crushers to buy domestic non-GM soy because, on the other side of processing, the price of GM and non-GM soybean meal and soy oil is largely the same.

Farmers are having a hard time breaking even from planting soy, and for smallholders in particular, who have an average annual income of about US\$690 (4,616 RMB), the implications are especially serious. Experts estimate that 30 percent of soybean farmers have already left their homes and families to become migrant workers in China’s coastal cities. Liberalization of the soy sector, including the mass influx of cheap soy imports and domination by foreign processors, is linked to urban migration in complex ways.

The mix of low soy prices for domestic farmers, cheap GM soy imports, foreign domination of soy crushing and oil processing, and the exodus of soy farmers to labor in the cities has led to a domestic sector in trouble. In response, central authorities have taken measures to protect the soy industry, and experts have advised on alternative markets and strategies. 2008 was a particularly active year for soy regulation. On August 22, China’s National Development and Reform Commission (NDRC) issued a directive on the future direction of the domestic soy sector. Some of the key provisions included policies to further concentrate soy production and processing in the Northeast and in Inner Mongolia, to scale-up

and further industrialize the sector, to develop and improve the domestic soybean futures market, to establish a soybean reserve system for commercial circulation, and to develop soy industry standards. The aim of these measures was to support domestic production and maintain a consistent supply of soy.

Also in 2008, the central government imposed new restrictions on foreign investment in soy processing to limit the expansion of foreign control, and to try to level the playing field for domestic firms. By these provisions, foreign firms are not allowed to expand existing operations, invest in new operations, or have a controlling share (more than 50 percent) in new joint ventures.

To help alleviate downward price pressure on farmers in 2008, the central government started buying domestic soy at a minimum purchase price. At that time, international futures markets fell because of the financial crisis, initiating a flood of even cheaper soy into China (PRL.org, 2009). The state minimum purchase and storage price for 2008-2009 was 3.7 RMB per kg, and 3.74 RMB per kg for 2009-2010 (Wang, 2010). Between October 2008 and June 2009, the China Grain Reserve Corporation (CGRC) bought 7.25 million tons of soybeans in Northeast China at 3.7 RMB per kilogram (Cheng, 2010).

Protective purchasing since 2008 has helped to swell the state reserves in Heilongjiang Province. But the degree to which the minimum pricing scheme has helped smallholders and domestic processors is unclear. Many farmers couldn't afford to transport their beans to state warehouses to collect the higher payments. Additionally, the state reserve only bought the highest quality soybeans, and even at that, couldn't buy the total domestic harvest. Price alone, therefore, wasn't enough to save all of China's soy farmers. Some domestic processors didn't fare much better. The increased domestic soy price meant that processors' profit margins shrunk

(Xiang, 2010). Even after the government provided rebates to processors for buying domestic beans, they were still losing money. Further, protective purchasing in 2008 has been linked to another wave of processing plant closures in Heilongjiang that year, further challenging the ability of domestic producers, especially smallholders, to sell their soy.

The Chinese Soybean Industry Association (CSIA) has proposed alternatives for the soy sector. Along with other experts, the CSIA urges that China should develop new markets for domestic soy so that it doesn't compete directly with cheap GM imports. There are two main proposals on the table. One is to use domestic soy exclusively in the manufacture of foodstuffs such as tofu, soymilk, and vegetarian products to be marketed within China. This proposal could also include marketing sustainable soy products to link producers to the growing domestic market for sustainable food products. Presently, there are a handful of Chinese firms using this model. The other proposal is to (re-) develop the export market for non-GM soy to Japan, South Korea, and European countries. This would involve improving soy varieties and quality to internationally accepted standards, and implementing local monitoring and certification schemes. Both of these proposals aim at separating the markets for domestic and imported soybeans to benefit Chinese producers and processors. There are similar proposals for labeling and promoting non-GM soy oil.

The central government, it seems, has other plans for protecting domestic soy from cheaper and TNC-controlled beans, but their focus is on the soy industry, rather than soy producers. The state is expanding the reach of Chinese firms through the “go out” strategy (*zouchuqu* 走出去), a set of policies initiated in 2000 to encourage Chinese state and private firms to invest in operations and infrastructure abroad (see Armory & Strauss, 2012). The International Institute for Sustainable Development (Smaller et al., 2012) estimates that Chinese

enterprises have invested in soybean production in Brazil, Argentina, Bolivia, Kazakhstan, the Democratic Republic of Congo, Sudan, Zambia, and Russia. Scholars are only beginning to explore the terrain of these so-called landgrabs, but the logic of land and production acquisitions abroad is clear: the state is concentrated on continuing to increase meat (pork) production and consumption, fueled by soy (and maize) based commercial feed, and increasingly arranged by domestic agribusiness firms. The landgrabs are a way for China to navigate - at least for the moment - around the leading global grain traders for feed supplies, while also propping up Chinese firms as agents and sites of capital accumulation. They are also a way for state authorities to displace China's food security issues and some of the environmental consequences of industrial livestock production onto vulnerable populations of mostly smallholder farmers in places like Brazil, Zambia, and Sudan, who are being dispossessed in the rush to serve China's growing feed demand (see Chapter Six).

Pork and Beans...and Maize

Soybeans seem to be the most important livestock feed component in China, as evidenced by import figures, the attention and ownership of transnational agribusiness firms, and soy-related land deals. But maize is also a key feed crop, and one that is used in both industrial operations, and by smallholder farmers who grow and grind their own for supplemental pig feed. Maize has a very different political history as a feed, and as an import crop.

While soy is a native crop, maize was introduced from the Americas only during the Ming Dynasty, sometime in the early to mid 16th century (Ho, 1955). Maize and soybeans today are prime competitors for land and trade, and increasingly, as components in livestock feed. Considering productive area, both crops are grown primarily in the Northeast – the soy base is

Heilongjiang Province, while Jilin Province is the main maize-growing region. If farmers opt out of soy production, they often plant maize instead, and vice versa in some cases. Throughout the 20th century, maize has been more widely planted than soy, but in some places in the Northeast, officials encourage farmers to rotate the two crops. This is the dominant practice in the USA, but is not widely used in China.

In the early 2000s, maize and soy roughly offset each other in terms of value, largely because of massive soy imports coupled with the need for heavy subsidies for maize production and export. The central government, in other words, has devoted huge amounts of money to these two crops.

Regulating and Industrializing Maize

Unlike soy, maize is considered a strategic crop for food security, and so is more tightly regulated by the central government. China is a world leader in maize production, and has long been a regular net exporter with negligible imports. In the past ten years, however, the situation in the maize sector has started to change dramatically.

The structure of state support for maize production changed in 2001 when China joined the WTO. In order to fulfill commitments, China was required to eliminate export subsidies on maize and open a 5.85 million ton quota for maize imports at a one percent tariff rate (Gale 2002). These measures were expected to significantly decrease China's maize exports and increase imports, but much to the surprise of analysts and traders, China's maize exports in 2002 – the year after WTO accession – were the highest in the country's history. Maize imports in 2002 were also insignificant, meaning that in its first year as a WTO member, China remained, and even increased, its global position as a net maize exporter. In 2003, maize exports were even higher, supported not by the WTO-forbidden direct export subsidies, but by a package of

measures aimed at boosting maize sales to promote the livestock industry and domestic meat consumption. These measures included subsidies for maize sales from state grain reserves, railroad tax and grain shipment waivers, subsidies for port fees, and a VAT rebate for exported maize.

The above policies were so successful in promoting production that throughout the early 2000s, maize supply in China persistently exceeded demand, exports boomed, and maize prices rose steadily throughout the first years of the new millennium. In 2007, central authorities began to encourage and support industrial maize processing as a way to deal with excess supply. In the 2007-2008 market year, about one fourth of the country's total maize use was in industrial products such as maize starches, sweeteners, alcohols, amino acids, and citric acid. China also began exporting these products, changing its maize export profile from trading mostly in unprocessed maize, to exporting mainly industrial products. Industrial maize exports are now three times as high as unprocessed maize exports (Gale, 2010).

2010: From Leading Maize Exporter to Net Maize Importer

Perhaps the most profound change in the maize sector over the last decade is the 1.3 million tons of maize that China imported from the United States in 2010. While this amount is small relative to China's total maize production (158 million tons in 2009-2010, and expected 168 million tons in 2010-2011), it accounted for 1.4 percent of the total global maize trade. This was the first time since 1994-1995 that China was a net maize importer. At that time, central authorities cut off exports of maize and other grains because of widespread concerns about grain shortages and inflation (USDA, 2011).

The reasons for 2010's amped up imports are related to high domestic maize prices, though among analysts and officials there is disagreement about what drove prices up in the first

place. Government officials at the National Grain and Oils Information Center urged that rising maize prices were not the result of falling domestic supplies or reserves, but that market speculation was to blame (Xinhua, 2010). Central authorities seemed to be arguing that once they cracked down on illegal activities that force prices up (i.e., hoarding), China would return to being a net exporter, and maize self-sufficiency would be preserved (“Corn imports set to slow,” 2010). They insisted that the country would not continue to import significant amounts of maize in the future.

Analysts at the United States Grains Council (USGC) agreed that market speculation played a role in increasing maize prices, but argued that drought in 2009 coupled with cool and wet conditions at spring planting in 2010 also contributed significantly to the high price situation, as did increased processing demand for the livestock industry (USDA, 2010). These analysts, along with global grain traders, predicted that China would continue to import maize, mostly for feed, and would remain a net importer into the foreseeable future (Takada & Song, 2010). Hanver Li, the Chairman of Shanghai JC Intelligence Co, a Sino-U.S. joint venture agro-commodities investment advisor, went so far as to say that, “A new era of China importing corn is here,” calling 2010 a “turning point” at which China would become a regular maize buyer. Li and other experts predicted that China’s annual maize purchases will reach 15 million tons by 2015 (Javier, 2010b). Traders were also anxious for China to continue purchasing maize to help recover low international prices, and trade groups like the USGC were excited by the market opportunities. Thomas Dorr, USGC president, said, “There is evidence that [China’s] demand for high-quality proteins is going to require added energy for livestock rations and we believe it’s an excellent opportunity for the U.S. to provide those corn supplies as needed” (Javier, 2010a).

As for the mechanics of the 2010 maize imports, COFCO was the top buyer, and the New Hope Group was number two. COFCO didn't release plans for how it would use the imported maize, but the New Hope Group stated publically that it would use purchased maize in the manufacture of pig feed (Bin, 2010). Some imports likely went to restoring state stockpiles that were drained through auction to cool local prices earlier in 2010. From April 13 to May 25, the state sold 4.67 million tons of reserve maize, mostly to traders in the Northeast who quickly shipped it to Guangdong Province for livestock feed processing (Javier, 2010a). After six rounds of sales, maize futures on the Dalian Commodity Exchange rose to 1,984 RMB (US\$ 302) per ton on May 24, a two-year high. By opening the door to maize imports, the central government used the international market to stabilize the domestic market.

Aside from worries in Beijing that China will no longer be self-sufficient in grain, there are several other concerns associated with the possibility that China's maize imports might continue into the long run. First, in terms of global food supplies, if China becomes a major importer, there are fears that price fluctuations in global markets will become increasingly dramatic, as the world relies on an even narrower set of countries to supply maize. Jay O'Neil, an agricultural economist at Kansas State University in the United States, said, "This means there are fewer countries supplying the needs of a growing world and the potential for crop production shortfalls is a greater risk to everyone" (Associated Press, 2010).

There are also important climate and environmental concerns, particularly in terms of the deepening relations between pig production in China and soybean and grain production in South America. Tom Philpott (2010) argues that increased maize demand from China can only result in more land being cleared in South America for large maize plantations. Already, deforestation has claimed 528,000 square kilometers of the Brazilian Amazon as cattle grazing and large-scale

soybean fields have taken over. Soy production in Brazil quadrupled between 1995 and 2009, and almost half of all exports went to China for the feed industry (Gallagher, 2010). At the same time, almost half (1 million square kilometers) of Brazil's Cerrado, the most biologically diverse savannah in the world, has been burned for use as cattle pasture, sugarcane fields for ethanol production, and large-scale soybean and maize cultivation, primarily for export and the manufacture of livestock feed (MacDonald & Simon, 2011).

This conversion of mass tracts of land to intensive monocrop agriculture has threatened the livelihoods of many smallholder Brazilian farmers who are forced to move. At the same time, both the processes and long-term impacts of removing forest and burning grasslands contribute to climate change, as CO₂ stores are released and sinks are lost. On top of that, transporting massive amounts of feed around the globe, from Brazil to China for instance, further strains fuel demand and contributes even more GHG emissions. If South American countries pursue monocrop maize plantations that mirror the way soy has been developed there, these impacts will be even more serious.

Inside China, there are concerns around the GM issue, given that 60 percent of the maize imported in 2010 was genetically modified ("Chinese gov't 'has an open mind'," 2010). That said, in 2009 China's central government approved the first strain of homegrown GM maize to be grown for research purposes only (Niu & Miles, 2010). It also approved 11 varieties of GM maize for import. While the official stance on GM crops may be changing and perhaps moving toward acceptance, the general public continues to have reservations.

Finally, if maize goes the way of soy in China, and imports become a regular occurrence, what are the costs to China's small-scale producers? How will their livelihoods be affected? What will they grow if they can't compete with low market prices for either maize or soybeans?

Similarly, how do these changes in the structure of the maize industry affect food security, given that 64 percent of maize is being used as livestock feed, 25 percent for industrial uses, and only 11 percent as edible grain? Because maize is now primarily used for livestock feed, the central government is considering a revision to current trade policy, such that maize would no longer be regulated in the same way as grains intended exclusively for human consumption (Gale et al, 2009). I'll return to this point in Chapter Six.

The focus on developing a domestic maize processing industry, allowing GM imports, and the possibility that the central government will reclassify maize as a “non-strategic” crop, makes this sector sound quite similar to the soy sector. A feed mill executive in Guangdong Province said, “We think maize will follow soy, and imports will become a normal practice whenever there is need” (Niu & Miles, 2010). COFCO officials, however, maintain that maize imports will always be a supplement to domestic production, and that the central government is committed to regulating this sector.

Conclusion: Commodity Pork and Human-Nature Relations

The process of making modern meat in China hinges importantly on state management of domestic and imported technologies and resources. As diverse and locally-adapted Chinese pigs are replaced by imported and genetically-uniform DLY breeds, swine become less valuable agroecologically, but more valuable as sources of profit for firms. As CAFO production and the need for imported feed grains and oilseeds increases, small-scale domestic soy and maize farmers are leaving the countryside in search of jobs, while the state reorganizes production into vast monoculture frontiers. In both of these cases, as Harriet Friedmann (2000) is quoted at the beginning of this chapter, “Plants and animals have been turned into homogenous rivers of grain

and tides of flesh, more closely resembling the money that enlivens their movement from field to table, than their wild ancestors” (p. 481). In a similar vein, Jeremy Rifkin (1992) said, “The devolution of cattle from the status of a divinity to the status of currency and commodities serves as a historical mirror to our own changing relationship to nature” (p. 3). In the next chapter, I examine how industrial commodity pork is changing agricultural practice, knowledge, and human-nature relations in China today.

Chapter Three

The METABOLISM of MEATIFICATION

"The fast development of livestock breeding and aquaculture has produced a lot of food but they are also major sources of pollution in our lives."

Wang Yangliang, of the Ministry of Agriculture
cited in Davison (2013)

"People come together and pigs come together. That's the idea."

I asked Dr. Zhang, a prominent swine expert in China, why backyard pig farms were declining in Sichuan Province, the country's long-standing pork production leader. He told me the primary reason is that the government is separating people and pigs, and putting them back together in new configurations. He said, "People come together and pigs come together. That's the idea." He was referring to two instances. First, the particular way that the state moved farmers into urban apartment buildings following the May 12, 2008 Wenchuan earthquake that killed 69,000 people and left 5 to 11 million people homeless¹⁵. Second, Dr. Zhang elaborated the more general process of concentrating pig production on specialized and commercial farms, while funneling "surplus" rural residents to large cities on the coasts as migrant workers, or as more permanent urbanites in regional small and mid-sized cities. In both cases, as people come together in "modern" urban apartment buildings, pigs come together in "modern" pig barns. These movements condition the making of "modern" meat that I detailed in Chapter Two for especially urban consumer markets.

Dr. Zhang's statement is a clear expression of the relationship between urbanization and the industrialization of pig farming in China's meatification project. It also suggests processes and consequences of China's metabolic rift: as human and porcine populations are becoming increasingly concentrated and urban, the toxic effects of ruptured nutrient cycles are expressed in polluted waterways, polluted soils, and polluted bodies.

Although he is a strong proponent of commercial swine production, working as both a university professor of swine genetics and a paid consultant for a leading agribusiness firm, Dr. Zhang betrayed an uneasiness to me in several of our conversations about the development of the industry. On the condition of smallholder farmers, he told me that big companies want small farms to go out of production, and are opposed to any government measures that support them. He went on, "People [smallholders] have no choice in Sichuan. It is very terrible. They have to raise pigs to eat themselves, so they can't stop." Dr. Zhang was not opposed to the idea of state money subsidizing smallholders because "the government giving money to pigs being produced is always a good thing."

In another exchange, while on a tour of a government demonstration farm, Dr. Zhang expressed concern about the environmental implications of large-scale production. He said that the "traditional" method of growing two to four pigs per year and using manure to fertilize crops is the "true way" to raise pigs. He added, "People think, 'Easy. Cake. Liquid goes to the river and solids to the land.' But this is one hundred percent wrong: liquid and solid both going back to the land is the true way. We have to put it all back to the land." Later that day we visited Golden Age Livestock Company, the commercial breeding farm where Dr. Zhang works as a consultant. Golden Age is a private agribusiness firm that operates with state financial support

¹⁵ These figures are from Baidu Baike <http://baike.baidu.com/view/3486152.htm?fromId=1587399> (in Chinese) and the New York Times (Hooker, 2008).

and through partnerships with state institutions as a Dragon Head Enterprise (see Chapter Five). From their stock of more than 10,000 exotic breed boars and sows, they produce over one million piglets annually to sell to other commercial operations from their 250 mu (17 hectare) production base. The water under the bridge that we crossed to reach the breeding farm's entrance was completely covered in a slick of lime green algae, the result of excess nitrogen and phosphorus coming from the company's production facilities. Far from the "true way" of pig raising that Dr. Zhang identified, Golden Age uses the "modern way," which consists of raising thousands of exotic breed pigs together in enclosed structures, using commercial soy-and-maize-based feed, and dumping manure and liquid effluent onto surrounding land and into surrounding waterways.

This chapter picks up on Dr. Zhang's seemingly conflicting sentiments about the modernization of pig farming, and explores how the political economic mechanisms of China's meatification project that I discussed in Chapters One and Two are transforming agricultural practices, knowledges, notions of value, and agroecosystems. My argument is that the meatification project in reform era China – including the relations that condition modern meat production, as well as shifting meanings of value – is enabled by, and deepens, the metabolic rift. In other words, the process of industrializing meat production is at the same time a process that separates humans from the biogeochemical cycles within which social reproduction takes place. The separation, however, is more epistemic than material; humans are not distinct from nature, and attempts to construct the two as separate realms create rupture, or rifts, in human-nature relations and cycles, with uneven and unjust implications.

As I'll discuss in Chapters Four and Five in more detail, the state takes as a development goal eliminating self-sufficient peasant farming and economies, replacing them with

agribusiness-led and vertically integrated large-scale commercial agriculture. In the process, farmers become concentrated in urban areas, hogs in confined animal feeding operations (CAFOs), and an ever-narrowing range of firms come to control swine breeding, feeding, processing, and sales. At the same time, smallholder systems that operate on locally-embedded agricultural practices, knowledges, and resources are being replaced with industrial systems that rely on long-distance trade and production methods that attempt to overcome agriculture's embeddedness in ecological cycles. As a result, modern meat appears in the market as a commodity unencumbered by the confines of a particular agroecosystem, symbolizing progress from periods of want, and from a "backwards" agrarian social form (see Chapter Four). But modern meat embodies agri-food politics, ruptured nutrient cycles at local and global scales, and "rifts" in human-nature relations.

To theorize the ecology of the meatification project, the "metabolic rift" can be deployed in a double sense: first, as a concept that describes "how the logic of accumulation severs basic processes of natural reproduction leading to the deterioration of ecological sustainability" (Clausen, 2007, p. 40), and second, as an analytical frame to interrogate an "epistemic rift" that artificially separates social and natural worlds in thought and practice (Schneider & McMichael, 2010).

In discussing agricultural practices and systems in this chapter, and as a way to avoid reproducing the epistemic separation of humans and nature, I use *agroecology*, or the ecology of food systems (Francis et al., 2003), as an analytical frame. As John Vandermeer (2011) states,

The study of agroecosystems is unusual in that it sits on the border of the social and natural sciences. Agriculture is not planting a seed and harvesting a crop. Agriculture is making a contract among people to provide for one another, using seeds and harvests to do so. Studying agroecosystems is not simply studying the way a crop uses nitrogen. It is studying the way, for example, an economic blockade by the United States plus the failure of the Soviet Union plus the geological background that led to oxisol formation

plus the culture of eating sweet potatoes together resulted in the development of new strains of *Azotobacter*, which provides nitrogen to the sweet potatoes growing on Cuba's inherently poor soils today (p. 26).

Agroecology, in other words, is about how humans interact with nature in the process of producing food, and how these interactions simultaneously alter natural systems and cycles, as well as social bodies and ideas. Based as it is in ecological science, agroecology also frames the biogeochemical cycles that underlie agricultural systems as fluid, rather than as being in a static state of equilibrium. As Behnke and Scoones (1993) argue, ecosystems are ever-changing *with or without human intervention*, such that farmers have to adapt to their environments and respond to imbalances, just as ecosystems respond differently to different agricultural the practices.

The empirical material presented here is based on my ethnographic field research, supplemented with secondary data. The chapter begins with a brief review of Karl Marx's metabolic rift concept, particularly as John Bellamy Foster (1999; Foster & Magdoff, 2000) develops it in relation to two historical breaks in nutrient cycles, and as I have tried to frame it with Philip McMichael as a concept to analyze not only the organization of production, but also its practice (Schneider & McMichael, 2010). I then describe restructuring in the swine sector, and raise categorical issues to which I return in the end. Next I describe my study sites, and provide ethnographic accounts of a backyard farm in Sichuan Province and a commercial pig breeding operation in Guangdong Province. I discuss the agroecological transformations that the shift to CAFO production brings about, focusing on what is particular in China's meatification project. Finally, I conclude with a section on the epistemic rift, relating it to issues of categorization and measurement.

The Meatification Project and the Metabolic Rift

Marx originally posed the metabolic rift concept to explain declining soil fertility in 19th century Britain as a rupture in nutrient cycling brought about by a ‘rift’ in the ‘metabolism’ between human beings and the land. In *Capital*, volume 3, he wrote,

Large landed property reduces the agricultural population to an ever decreasing minimum and confronts it with an ever growing industrial population crammed together in large towns; in this way it produces conditions which cause an irreparable rift in the interdependent process of the social metabolism, a metabolism prescribed by the natural laws of life itself. The result of this is a squandering of the vitality of the soil, which is carried by trade far beyond the bounds of a single country. (Liebig)... Large-scale industry and industrially pursued large-scale agriculture have the same effect. If they are originally distinguished by the fact that the former lays waste and ruins the labour-power and thus the natural power of man, whereas the latter does the same to the natural power of the soil, they link up in the latter course of development, since the industrial system applied to agriculture also enervates the workers there, while industry and trade for their part provide agriculture with the means of exhausting the soil (quoted in Foster 1999, 379).¹⁶

John Bellamy Foster (1999) reconstructed the mechanisms of the metabolic rift along three key proposals: First, that the town-country division of labor created an irreparable rift in the metabolism between humans and nature. Second, large-scale agriculture and long-distance trade intensified the rift. Third, the corollary to the problem of declining soil fertility in the countryside was the accumulation of human waste pollution in towns.

Along with Fred Magdoff, Foster (Foster & Magdoff, 2000) argues that the metabolic rift as Marx originally proposed it describes the first historic break in nutrient cycling. The penetration of capital into agriculture pushed rural farmers to the cities in search of waged employment, which increased the distance between food production and consumption, and so increased the distance nutrients travelled from soil to food to human bodies to environment.

¹⁶ The International Publishers edition of *Capital* omits use of the term ‘metabolism.’ A similar meaning is implied in ‘an irreparable break in the coherence of social interchange prescribed by the natural laws of life’ (Marx 1967, 813).

Labor migrants took with them nutrient-rich humanure, leaving behind unreplenished land in the countryside, further degraded by the industrial agriculture that replaced them.

In more recent history, Foster and Magdoff argue that the second major break in nutrient cycling came about in relation to the post-World War II nitrogen fertilizer boom in the United States. While grain production had previously depended on manure and/or crop rotations that included nitrogen-fixing legumes, the arrival and widespread availability of synthetic fertilizer broke the reliance on integrated systems. Farms could specialize in either crop or livestock production as separate enterprises, and large-scale processing firms could co-locate with concentrated animal production in certain concentrated regions. In this second nutrient cycling break, as livestock were separated from cropland – and simultaneously, from the ecological limits of what a particular land area can produce – the amount of manure produced exceeded what surrounding land could absorb. At the same time, specialized crop farmers came to rely increasingly on synthetic fertilizers and monocropping, which depleted rather than replenished soil nutrients.

The parallels between these formulations of the metabolic rift and Dr. Zhang's explanation of the state's development plans of bringing people together in urban settings, and pigs together in concentrated and often peri-urban spaces, are clear. But in China, the two breaks that Foster and Magdoff describe are happening in tandem. The state-led meatification project is simultaneously separating people from land and livestock from feed, with declining soil fertility on the one hand and toxic nutrient overload on the other.

But as I argued with Philip McMichael, focusing only on these nutrient pathways without specifying the farming practices that underlie them produces disembodied analyses of the metabolic rift (Schneider & McMichael, 2010). In the next section I describe the restructuring of

pig production to lay the foundation for my examination of farming practices on backyard farms and on commercial CAFOs. My intention is to show how, in addition to the separations and rifts that Foster and Magdoff propose, the meatification project also separates agricultural practices from agroecological processes, and food production from agroecological specificity and limits. The result is an epistemic rift that conceals (or disregards) the role of agroecological cycles in structuring farming, diets, and economies.

Restructuring Pork Production from Farm to Factory

For thousands of years, small-scale farmers raised all of the pork in China. As recently as 1985, these so-called backyard farmers who raise fewer than five pigs per year, in addition to crops and other livestock on about half an acre of land, produced at least 95% of the country's pork. Throughout the reform era, however, the number of backyard farmers and their share of production has declined precipitously as state policies and investments support the industrial operations that have catapulted China's pork production to its current world dominant position. In 2008 alone, the number of rural household that raise pigs dropped by 50 percent (Li, 2010). By 2009, analysts estimate that government policies to encourage scaled-up production after the PRRS epidemic in 2006 were so successful that farms raising more than 50 hogs a year accounted for almost 60% of total slaughter, up from less than half in 2007 (Woolsey & Zhang, 2010).

Li Jian, an anthropologist at the University of Northern Iowa, studied the decline of household pig farming in Sichuan Province in particular. He found that labor shortages, low cash returns, disuse of pig manure in lieu of chemical fertilizers, lack of veterinary services, and policy failures contributed significantly to household farmers giving up pig raising (Jian, 2010).

Jian's study specifies some of the proximate causal factors behind the broader reorganization of the swine sector, or what I'm calling the meatification project. The key process underlying these causes is the scaling up and industrialization of production, which is accomplished through the metabolic rift that separate people from agriculture, livestock from feed sources, and agricultural practices from ecological cycles.

Scaling-up from backyard pig farming takes two primary forms. First, central and local governments have aggressively subsidized *specialized household farms* (*zhuanyehua de jiatingshi yangzhichang* 专业化的家庭式养殖场). There is some disagreement about how to define the farm size parameters of this category, through annual production of 10 to 500 pigs is the standard (INFORMA, 2009). The general idea of the specialized household farm is that pig raising is a professional endeavor based on production for sale instead of self-consumption. Operations may be run by individual families, by small-scale companies, or by several backyard farmers who have come together to focus on pig raising more exclusively. Some specialized household farmers produce under contract with large commercial farms, while others sell piglets and meat pigs to local dealers who then sell pigs to slaughter, processing, and retail firms.

The government incentivizes this scale of production primarily through investments in infrastructure. Whereas backyard farmers typically use a single pen for pigs, and often allow them to roam the farm and graze, in order to encourage scaling-up to specialized households, central and local governments subsidize the building of "pig barns" that have more than 10 pens. According to Dr. Zhang, subsidies don't typically go directly to farmers. Rather, local governments use state funds in two ways: they either build larger-scale pig barns, which they maintain ownership of and rent to farmers, or they invest in buildings along with private investors, hiring farmers to raise pigs for a wage. In addition to subsidies, specialized household

farms are also supported through the “company and farm” contract model, which I’ll discuss in detail in Chapter Five.

The second form of scaled-up production, a scale that is intended to work in concert with specialized household pig farms, are large-scale *commercial farms* (*daxing shangye yangzhichang* 大型商业养殖场). Commercial farms breed, feed, rear, slaughter, process, and market pigs and pork. They do so in a variety of ways, from being specialized in one particular phase of production, to operating in some or all phases, to managing contracts with other farms and companies to produce and sell an end product. The scale of production on these farms typically ranges from 500 to 50,000 pigs per year, but is rapidly increasing. It is not uncommon for a single farm to produce 100,000 hogs in one year, either through contracts or in a single production facility. Some firms have plans to produce as many as one million pigs on mega operations (People’s Government of Jilin Province, 2012).

Commercial farms resemble, or perhaps reproduce, the so-called “factory farm” model that dominates pig production in the United States, Europe, and increasingly in global locations around the world (GRAIN, 2008; Nierenberg, 2005). Industrial facilities in China use the same production technologies and equipment as similarly-sized facilities elsewhere. Firms purchase equipment from international dealers like Big Dutchman, from Chinese copycat companies like Big Herdsman, or from non-copycat Chinese firms.

From Farm to Factory: Some Categorical Considerations

While these three farm categories are consistently used in analyses of China’s pork industry, the boundaries between them are anything but fixed. During my fieldwork, I found specialized household farms particularly difficult to identify and access. Surely, this was related

in part to the contacts I was working with: my university and agribusiness contacts were reluctant to show me any farms outside of the large-scale, as they considered farmers to be backwards and an embarrassment. Even Dr. Zhang, who confessed some concern for the conditions smallholders face, consistently denied my requests to visit a specialized household farm. My NGO and farmer contacts, on the other hand, worked in areas with or as small-scale backyard farmers exclusively.

But even when I visited farms that would seem to be specialized household farms on paper – based mostly on their annual pig production numbers– I was uncomfortable classifying them as such. Official reports, media reports, and experts who I interviewed defined this mid-scale form of production as one in which pig raising became *the* professional activity, while cultivation of other crops and livestock was abandoned. I interviewed farmers who raised 50 pigs per year, putting them in the specialized household category by size, but all of them also maintained other agricultural activities. From my experiences, these livelihoods don't fit neatly into the prevailing farm type classification schemes, suggesting that those schemes need to be reconsidered.

In East Creek Village, a study site that I detail below, two farmers who I visited raised more than 10 pigs per year, but they did not receive subsidies for their barns, did not rent barns from the government, did not work for a wage, did not operate under contract with an integrator, and did not concentrate their activities solely on pig raising. They operated much more like backyard farmers, but on a slightly larger scale, and using more purchased feed grains and additives. In both cases, the farmers did raise primarily for the market. Mr. Lan, for instance, raises 30 meat pigs per year, only one of which is consumed by his household at Chinese New Year. He occasionally buys meat from the local butcher.

In another village about 50 kilometers from East Creek, I visited Ms. Xiang's farm. Before 2008, Ms. Xiang and her family raised 10 pigs each year in addition to other crops and livestock. But with money they saved from her husband's work as a migrant laborer, they built a brick pig barn and increased their production to 100 pigs per year. I asked Ms. Xiang if she received any subsidies for her building or her swine: she laughed and said, "No. Subsidies are only for big farms. Everybody knows that." I asked if she produced under contract. She said, "no." I asked if her life and livelihood had improved since scaling-up. She told me, "the life of peasants (*nongmin*) is always full of suffering." I asked what she meant, but she didn't care to elaborate.

By saying that I couldn't find the specialized household farms that Dr. Zhang described to me, I don't mean to suggest that they don't exist, or that they aren't necessarily as prevalent as reports on the structure of the industry detail (INFORMA, 2009). My experiences do, however, indicate that the boundaries between farm types are hazy, and analyses based on strict size categorizations should be read with caution. It is more useful analytically and politically to consider farm types in terms of agricultural practices and associated metabolic rifts, as I'll detail below.

Another categorical issue has more critical implications. Analysts routinely site the dominance of smallholder production as a significant limitation and vulnerability in the development of China's pork industry. They count specialized household farmers along with backyard farmers as "small-scale producers," arguing that industrialization cannot proceed quickly enough to overcome the challenges associated with such dispersed, uncoordinated, and unregulated production. Lumping these two forms and scales of production together, however, blurs the important differences between them. Based on my fieldwork and the meatification and

metabolic rift approach, it is my contention that the relationship between agricultural practices and agroecological cycles is the most appropriate proxy for categorizing farm types. To get a better sense of the organization and socio-ecological impacts of particular types of farming, farms should be defined not only in terms of where and how they produce and sell their products, but also the practices and resources they use to produce them.

The next sections provide ethnographic accounts of a backyard farm in East Creek Village in Sichuan, and a large-scale commercial pig breeding and production operation in Guangdong Province. I use these two cases to specify the changing practices and values that accompany the political economic restructuring of pig farming. I'll return to the measurement issue at the end of the chapter.

Study Sites

During my fieldwork, I visited 29 farms, most of which were located in Sichuan Province in China's southwest region where I lived for 9 months. I also went to farms and agribusiness firms in Guangdong Province in the southeast, Hebei Province in the north, Heilongjiang Province in the northeast, and the Beijing, Shanghai, and Chongqing municipalities. I went to 15 smallholder farms that raised pigs, 11 of which I feel comfortable labeling as "backyard farms" as I'll detail below, and 4 that fall somewhere between backyard and specialized household farms. I visited 8 large-scale commercial farms, with no doubt as to their category. I also went to 2 organic farms, 3 government demonstration farms, and 3 farmer cooperatives (there is some overlap in these categories). My sketch of farming system categories in this section is based on observations and interviews on these farm visits, as well as interviews with university researchers, government officials, agribusiness executives, and researchers at domestic and

international agricultural organizations. I've supplemented primary data with secondary data in the form of government documents, academic and media articles, and agribusiness reports.

The majority of smallholder farms I visited were in East Creek Township in Sichuan Province. East Creek is a 50 square kilometer area that encompasses 21 small villages. It is located less than five kilometers from a small (by Chinese standards) city of 1.5 million, and 50 kilometers from Chengdu, the provincial capital. It is typical of villages in terms of population composition, with the majority of able-bodied workers away working as migrant laborers in urban centers, leaving mostly young children and grandparents to tend to farming and rural communities. East Creek is on the Chengdu Plain with a subtropical climate and alluvial soils¹⁷. Smallholder farmers there grow a diverse mix of crops including grains, vegetables, and fruits, in addition to raising pigs, chickens, ducks, rabbits, and fish. Maize, rice, and sweet potato are the primary crops planted in the spring, and wheat and rapeseed are sown in the fall and winter.

I visited East Creek Village on three separate occasions, twice on my own, and once with Betty, a college student I hired to accompany me as a research assistant and help with translation from the local Sichuan dialect into Mandarin Chinese and into English. Because she was from a small city near East Creek Village, Betty could easily understand the local dialect. Because she was a college student, she could translate into Mandarin Chinese. And because her English was a bit better than my Mandarin, we were able to conduct interviews and discuss our findings in a Mandarin-English mix. Betty also accompanied me to an agribusiness firm near Chengdu to help with interviewing. At the time, she was majoring in veterinary science at a provincial agricultural university. She's currently a graduate student in pharmaceutical science in Chengdu.

On each visit to East Creek, I was invited and hosted by Mu Song, a local farmer I met at an agricultural expo in Heilongjiang Province where we were both guests of a "sustainable

soybean” delegation. Mr. Mu is a farmer-entrepreneur who operates a farm cooperative concentrated on specialty organic soy foods. Over the past ten years, Mr. Mu’s operation has developed in conjunction with funds and support from Dr. An Ying, a plant breeder at a major agricultural university in southern China, who Mr. Mu met through a contact at a Sichuan university. Dr. An breeds non-GMO soybeans for organic farming systems in particular, and for different regions and environments across China. The two of them have a mutually beneficial relationship in which Dr. An provides soybean seeds, financial backing, and food processing equipment, while Mr. Mu provides the land and labor to grow and harvest the soybeans, and to turn them into packaged foods to be sold in urban supermarkets. At the same time, Mr. Mu provides feedback on which varieties grow best on his small farm and the farms of others who produce for the cooperative. Dr. An’s program provided 20,000 RMB (\$3,300) to Mr. Mu to purchase food processing equipment in 2007. In the near future, they plan to pursue another grant to begin processing organic soy milk.

I first met Mr. Mu and Dr. An on a van ride from the airport in Qiqiha’er in southwest Heilongjiang Province to the *First International Soybean Industry Expo and Beidahuang Soybean Festival* in Jiusan (九三), about two hours away. As we drove through the Heilongjiang countryside, I marveled at how much the landscape and the sky reminded me of my hometown in Nebraska: Heilongjiang is part of the China’s new maize and soy frontier, brought about by policies and investments that have pushed smallholder farmers off the land in favor of large-scale monocrop production (Ma & Yan, 2010). On either side of the highway, there were neat rows of crops as far as the eye could see. Above was blue sky and puffy clouds, a far cry from the at times crippling pollution in Beijing and Chengdu, the two cities where I’d been living. My

¹⁷ Baidu Baike entry for *Chengdu Plain* (in Chinese).

surprise and fascination at seeing *this* China opened up conversations with Dr. An about agronomy and plant breeding, and soon after, with Mr. Mu about living in Sichuan. I shared with Mr. Mu about the challenges I'd had finding villages to visit and small farmers to talk to about their production systems. He graciously invited me to his home in East Creek, which I accepted enthusiastically just days after returning from the conference. Mr. Mu took me to a commercial pig breeding farm near his village, to the homes of his friends and family, and on my third trip with Betty, he asked his friend Mr. Xiu to accompany us for a day to conduct interviews in the small villages that make up East Creek. With Mr. Xiu we visited 10 households, eight of which raised pigs as their primary source of income. My sketch of smallholder farmers is based largely on these visits.

Backyard Farms (*houyuanshi siyangchang* 后院式饲养场)

“Raising pigs is easy. There are no problems other than price. Price is the most important thing.”

Mr. Bao, smallholder farmer
East Creek Village, Sichuan Province, November 2010

Bao Farm, East Creek Village

As we approach Mr. Bao's farm, he's carrying manure out to the small field next to his house in two buckets attached to a pole over his shoulder. Mr. Xiu yells to him to ask if he has time to talk with me, an American friend of Mr. Mu who is interested in pig farming. He responds favorably, and we continue on to the house where Mr. Bao invites us to sit in the courtyard, and offers us oranges as a snack. He has a bushel-sized basket full of oranges, like all the houses we've been to this day. Mr. Xiu tells us later that the price for oranges is so low at the moment, that people are eating as many as they can from their personal orchards, and throwing

the rest away. They have no market, and the trees are still laden with fruit. Betty and I both left East Creek with a pig feedbag full of oranges.

As we sit down, a neighbor called Mr. Li arrives to join the conversation. Mr. Bao's four grandchildren are inside the house. The oldest, a six year old boy, is working on math homework while the three younger children are playing and eating oranges. Their parents, Mr. Bao's children, are working in Guangdong Province, and only come home once a year at Spring Festival. Their earnings, however, arrive back in East Creek more frequently to pay for the children's' education and contribute to the household.

On their half acre (3 *mu*) farm, Mr. Bao and his wife (who I didn't meet) produce fruit, vegetables, grains, chickens, and pigs. Pigs are their most significant source of agricultural income, and they raise about 10 per year. Mr. Bao began breeding his own pigs several years ago when he got hybrid boar semen from the local government veterinary station, and used it to inseminate his local, indigenous sow. After making this initial cross, he's continued the practice, keeping only one or two sows to hybridize for four to five years. He sells piglets to other farmers in the area when they reach 15-17 jin (7.5-8.5 kg), and meat pigs to local dealers when they reach about 200 jin (100 kg) around 4 months of age. Pig feed primarily comes from the farm: the Baos grow *niupicai* (no translation), sweet potato vines, squashes, and melons as "juicy" feed plants, and grind maize to feed at key times in the production cycle. They purchase some additional feed and feed additives from local dealers, but are almost fully self-sufficient. They spread manure from pigs and chickens on their crop fields, and use very little purchased chemical fertilizer.

Mr. Bao and his wife do not produce under contract with integrators, and don't know of anyone in the area who does. I asked how he sells his pigs, and if he ever encounters any

problems at the point of sale. He said there are no problems: when you are ready to sell, you just call around to the local dealers and sell to whoever is offering the highest price. When the price is good, he can make a profit of 300 RMB per head on meat pigs, and slightly more on piglets. When the price is bad, he makes only 100 RMB per head or may lose money if the price of purchased feed additives are factored in. He said, "Raising pigs is easy. There are no problems other than price. Price is the most important thing." Especially since Reform and Opening, commodification of pigs has meant that they are both an important source of farm income, and a gamble for smallholders, whose annual incomes fluctuate according to market prices for pigs, pork, and feedgrains.

Farm income is supplemented by remittances from migrant labor in the family. Income is not, however, typically supported by the increasing farm subsidy packages that central and provincial governments administer. The Baos received sow subsidies in 2008 as part of government efforts to reinvigorate pig production after the PRRS epidemic in 2006. For each of their two sows, they gave the insurance company 12 RMB. The insurance company then gave the Baos 100 RMB per sow, and if they had lost a sow that year, the company would have paid out 800 RMB each. This program lasted only one year for smallholders, and was the first and last time the Bao family received government support for agricultural production. These are the kind of government supports Dr. Zhang told me that his agribusiness friends vehemently oppose.

The Bao farm is typical of the backyard farms I visited in Sichuan Province during my fieldwork, and of smallholder integrated crop-livestock farms in China more broadly. This is the form of production that has predominated in China for thousands of years, and historically produced the country's pork. Like the Baos, backyard farmers in general raise fewer than 10 pigs per year in addition to crops and other livestock on small plots of land, using locally occurring or

produced feedstuffs and centuries of accumulated agricultural knowledge and practice. Pigs are valued for their manure as much as for their meat, converting weeds, crop residues, and kitchen scraps into nutrient-rich fertilizer for crop fields and orchards. Raising pigs for manure, combined with the use of “night soil” (humanure), crop rotations, and nitrogen-fixing legumes, enabled production of what was long considered one of the healthiest diets in the world, from one of the most enduringly sustainable agricultural systems (Campbell & Campbell, 2006; King, 1911; Netting, 1993).

Today, smallholders typically raise indigenous-exotic hybrid pigs. They keep one or two local sows as breeding stock, and either purchase hybrid boar semen from other farmers, receive semen from the state through breed improvement programs, or hire a boar from neighbors to service their sows.

Commercial Farms (*daxing shangye yangzhichang* 大型商业养殖场)

Mindi: “*What are the biggest challenges facing your company in the next five years?*”

Ms. Da: “*First, land resources. Second, environmental protection and water pollution. Third, feed supply. Fourth, human resources. Fifth, disease issues.*”

Mindi: “*And the biggest opportunities?*”

Ms. Da: “*The market is very good. And policies too.*”

From an interview with the General Manager of Precious Treasure Animal Husbandry Company
Guangdong Province, June 2010

I opened the previous section on backyard farms with a quote from Mr. Bao that his only problem in pig production is price. Like the other smallholders I interviewed, his concerns center on whether or not he can make money from his pigs at the point of sale. In stark contrast, the excerpt above from my interview with Ms. Da, the General Manager of a livestock breeding farm in Guangdong Province, illustrates the many production challenges that large-scale commercial operations face. In addition to these five core issues, managers I interviewed at other

commercial enterprises also added food safety standards to the list, and favorable markets and government policies were always mentioned as the biggest opportunities.

It is certainly no coincidence that market price is the greatest challenge for Mr. Bao, while it is the greatest opportunity for Ms. Da's company. It is also no coincidence that pollution, feed source, and disease problems plague large-scale operations, while backyard farmers with diverse farming systems rarely or never encounter these issues, at least not of their own creation. The political economic mechanisms of the meatification project that I discussed in Chapters One and Two – namely state support for scaling-up and industrializing pig production, selectively liberalizing feed markets, and replacement of indigenous pigs with exotic breeds – condition the changing practices and problems that emerge as the swine sector is restructured from the backyard to the factory farm. In this section I outline the operation of Ms. Da's commercial operation to demonstrate the metabolic rift as a result of agricultural practices being disembedded from agroecological cycles.

Precious Treasure Animal Husbandry Company

Dr. Zhang, the swine expert I'd been working with in Sichuan Province, invited me to accompany him to Guangzhou in Guangdong Province (southeast) where he would attend a national swine breeding meeting with Ministry of Agriculture officials and other scientists. I wouldn't be allowed to go to the meeting myself, but his colleague at a local university would arrange for me to visit a nearby commercial farm, and I would also get the chance to attend the Guangdong Pig Industry Association's Annual Swine Expo. I accepted the travel invitation, and on the day after our arrival in Guangzhou, Dr. Zhang's colleague arranged for a driver and a graduate student from the local agricultural university to accompany me to Precious Treasure,

located in a small city about 60 kilometers from Guangzhou. Ms. Da, the General Manager, had agreed to meet me for an interview. She also agreed to let me record our conversation, she provided me with company brochures, and she showed me a short film about the operation. My sketch in this section is based on these materials.

Precious Treasure's history is typical of many agribusiness firms in China. The company was founded in 1958 as a state-owned enterprise, and became a private joint-stock company in 2000. It is a commercial livestock breeding farm with over 200 employees. They currently raise 120,000 head of Duroc, Landrace, and Large White pigs per year, in addition to one million head of exotic breed chicken at the company headquarters. At the time of my interview in 2010, they were in the process of building another facility in western Guangdong Province that will produce an additional 400,000 pigs annually. Their three major markets are selling breeding stock to Chinese farms, exporting breeding stock to Hong Kong and Macau, and selling pork under their own retail brand.

Precious Treasure uses CAFO (confined animal feeding operation housing) production technologies, including pig housing, feeding, prophylactic antibiotic use, and manure management. In this system, feed is their most significant production cost, as it is at every commercial firm I visited. Soy is the main feed component, followed by maize. Ms. Da said that eight large-scale soy processing firms in Guangdong crush soy for livestock feed, and about 70 percent of the beans are imported from the U.S., Brazil, and Argentina. I asked if she viewed imports or the foreign ownership of soybean processing as a threat. She said, "In my personal view, because China has very limited arable land, we have to import soybeans." She went on to say that profits for domestic soy went down when China began importing more than 10 years

before, so farmers now plant maize instead. Because maize prices are high, she predicts that the government will start importing it in earnest as well.

On describing the operation, Ms. Da said, “Our system is drastically different from the traditional way in China, we are more like the system in the U.S. now.” She added that while this system is superior for high productivity, it comes with challenges, as in the interview excerpt above. Environmental problems associated with manure and urine management are among the most pressing. Ms. Da told me that the company has a sewage treatment plant, a fermentation pond built with the help of government subsidies, and a biogas generator. Additionally, surrounding crop farms use some of their manure as fertilizer, and some of their urine in irrigation water, but output is so much that there is not enough local land to absorb it. They also dry manure in the sun so that it meets discharge requirements. I wasn’t clear about the meaning of this last point, and whether Ms. Da meant that they could dump dried manure onto land or into waterways without concern for violating regulations. Whatever the case, managing manure is a significant part of the company’s operation.

I was not allowed to see the pigs at Precious Treasure. In fact I was never allowed to see any pig at any commercial farm I visited in China, other than viewing them on closed circuit television in conference rooms. Because industrial swine are genetically near identical, if a disease causing organism finds its way into their closed production environment, it can easily wipe out the entire herd. This reluctance to allow outsiders entrée into pig barns is not unique to China. When I toured CAFOs in Iowa in 1999 and 2002 as part of agroecology field school, most farms similarly denied access, and those that did allow us a peek inside required that we either wrap our shoes in plastic, or wear full body suits inside the building.

China's Metabolic Rift

Scaling up and industrializing hog production is a steady progression of disembedding agricultural practices from agroecological cycles. As Harriet Friedmann argues, this is a central paradox in what she calls human “food getting” (2000). In the process of agricultural production, humans inevitably alter “webs of living cycles and material cycles of air, water and soil,” but many production practices especially since the 16th century, “have flowed from the illusion of transcendence over these webs and flows” (p. 481). CAFO production operates on this illusion, deepening the metabolic rift.

The environmental problems associated with CAFOs in China are the problems associated with CAFOs everywhere (Imhoff, 2010). Put another way, the crises of industrial hog production in China are its crises in general, and are conditioned by the disembedding of practice from agroecological webs and cycles. Chinese commercial producers use the same technologies, resources, and logics as those in the U.S. and elsewhere, and the managers I interviewed all discussed the U.S. model as a form of agriculture that China should emulate. While the business of industrial production in China includes unique challenges for securing land use rights, and unique opportunities for taking advantage of focused government support programs, the practice of CAFO production is a shared process among industrial operations worldwide.

Still, China's meatification project, of which CAFO production is its technical arm, has particular characteristics. First, the shift is a profound departure from centuries of smallholder agroecosystem reproduction with pigs at the center. Restructuring and industrialization not only create ruptures in nutrient cycling and more general deterioration of ecological sustainability, they also transform cultural meanings and values. Second, the scale of production, the scale of feed inputs and toxic outputs, and the scale of rifts and disembedding in China's system are

unprecedented. Discussing scale is not the same as equating ecological crises to population size, or to demonizing China for following a model used internationally. But taking a planetary view that considers these processes and crises at a global scale, China's world-leading soy imports, pig production, and pollution cannot be dismissed as *rights* to development, understood in a as a uni-dimensional path that countries inevitably follow in the process of modernization. How the government, agribusiness firms, and farmers in China resolve the problems of CAFO production – or not – will have impacts around the world, and domestically. This section details what is already taking place.

Feeding: From “poor method” to “rich method”

There are a number of changes in agricultural practices, resources, and meanings that accompany the industrialization of pig farming and the enactment of the meatification project. Changes in feeding practice and materials, however, are at the very heart of the transformation, and are in fact the logic that animates it. Both scaled-up “pig barns” on specialized household farms and large-scale commercial “factory farms” are forms of Concentrated Animal Feeding Operations, or CAFO's. These systems concentrate animals in enclosed structures, such that all feed (or the vast majority in the case of smaller-scale specialized household farms) must be provided for the animals inside. More importantly, the logic of these systems is that they overcome land-based limitations on meat production by spatially separating animal raising from feed production. Raising more animals on less proximate land equates to substituting feed crops grown alongside livestock with purchased feedgrains and oilseeds shipped to the farm from other more distant locations.

In simplest terms, CAFOs replace the “poor method” of pig raising with the “rich method.” In their well-known book from 1987, *Feeding a Billion: Frontiers of Chinese*

Agriculture, Sylvan Wittwer, Yu Youtai, Sun Han, and Wang Lianzheng describe differences between the two forms. The “poor method,” used by smallholder farmers throughout China’s more than 7,000 years of agricultural history, is based on raising pigs as part of integrated crop and livestock systems that rely on local resources, labor, and knowledges. This method recognizes that pigs are omnivorous creatures that will eat both plant and animal materials of all kinds, and that in doing so, they produce nutrient rich fertilizer for crop production. The authors outline the this system as follows:

The “poor method” can be summarized in five words: “reserving,” “planting,” “collecting,” “storing,” and “processing.

“Reserving” means to reserve or save certain amounts of grains and legumes (beans) for fine feedstuffs.

“Planting” means to plant green and juicy feed plants, especially for pigs. Green feeds are numerous and vary with different locations in China. They include many aquatic plants, leafy plants such as the sweet potato, green manure plants, and green cut soy beans and corn plants. The juicy feeds include many kinds of root and tuber plants such as the sweet potato, different types of squashes and melons, and various waste and cull fruits, melons and squash.

“Collecting” means to collect various kinds of herbs, terrestrial or land weeds, aquatic weeds, trees leaves and fruits.

“Storing” means to ensile and to use fermented and dry feeds for winter and spring time.

“Processing” means to use for pig feed the byproducts of processing agricultural products such as in grain processing, oil pressing and starch manufacturing; sugar plant residues and byproducts; and winery and bean curd by-products. All of the above are important sources of feedstuffs in China (p. 320).

The authors call this the “poor method,” presumably because it relies on feed resources from the farm, rather than those purchased from a market. In this system, especially before pork became a commodity with Reform and Opening, farmers value pigs most for their manure production as fertilizer (Schmalzer, 2002).

In East Creek, the backyard farmers I met used all of the “poor method” practices in pig raising. They reserved maize and beans, planted green and juicy plants such as *niupicai* and sweet potatoes, collected fruit tree leaves and spent fruits, stored maize, and used by-products for

feed. In these small, but highly diverse agroecosystems, farmers use intercropping, composting, green manuring, and legumes, all scientifically recognized methods of sustaining soil fertility, diversity, and resilience (Olson & Francis, 1995). From identifying crops that I could recognize in their fields, and from talking to farmers about their production systems, I counted 21 crops in production on the 11 farms that I visited on my third trip to East Creek. Given that farmers plant vegetables extensively according to season, manage fruit trees and bushes throughout the year, and vary juicy feeds for livestock, my cursory crop inventory is an underestimate. My point is that these are diverse systems in which crop and livestock integration are key to managing agroecosystems in ways that enhance soil health, while producing a varied plant-based diet.

On the other extreme, CAFO production is the ultimate expression of the “rich method” of pig raising, as it relies entirely on “fine or rich feedstuffs (grains) and thus neglecting cost considerations” (Wittwer et al., 1987, p. 319). Commercial pig farms use commercial pig feed exclusively; from farrow to finish, pigs in these system eat only processed feedstuffs from the market and/or from vertical integration arrangements. Depending on size and availability of capital, specialized household farms may use commercial feeds exclusively, or in combination with their own self-produced feeds. For those farms that produce under contract with firms, feeding is typically part of their agreement, with the firm either supplying feed to the farmer at a set price, or mandating the kind and brand of feed that farmers must use. All of the eight commercial pig farms I visited had these kinds of feeding stipulations in their contracts.

As I detailed in Chapter Two, feeding China’s CAFO pigs is only made possible by importing massive amounts of soy, and increasingly maize, from monocropped fields in North and South America. The ecological and climate implications of industrial crop production and

the long-distance grain trade are well-rehearsed, and I will not reproduce them here¹⁸. Rather, my point is that the scale of China's feed imports is expressed in a global scale metabolic rift, with declining soil fertility in the global locations where farmers grow crops to feed China's pigs, coupled with excess nutrients inside China where those pigs eat and defecate. The millions of tons of soy and maize (both imported and domestically produced) being pumped through CAFO pigs creates millions of tons of modern pork and billions of tons of manure. While the corporations and farmers who produce industrial livestock feed douse their land with nitrogen fertilizer to overcome the limitations of soils that are either inappropriate for producing annual crops (like the oxisols in South America's newly cleared forests), or degraded from decades of industrial practices (as in parts of the United States), manure from industrial hogs (and chickens) has become China's number one source of water pollution.

Manure: From Resource to Waste to Toxic Nightmare

When the pig is a commodity, its highest value comes in the form of the pork it produces, as expressed in price. The state and private firms that control its production, distribution, and sale benefit most directly from this form of value, while for smallholder farmers "there are no problems other than price" (Mr. Bao, 2010). Replacing the manure value of pigs with the price value of pork ruptures agroecological cycles, as manure shifts from being a valuable resource to a toxic waste. The dangerous condition of China's waterways is the clearest evidence of this rift.

In February of 2010, the Chinese government released results of the first ever national pollution census¹⁹ (*zhongguo wuran yuan pucha* 全国污染源普查). The most startling finding

¹⁸ See for example, the FAO's (2006) well-known report, *Livestock's Long Shadow: Environmental Issues and Options*.

¹⁹ *China Pollution Source Census* (in Chinese), <http://cpsc.mep.gov.cn/gwgg/> (accessed June 1, 2010).

of this nearly 3-year, 737 million RMB (\$110 million) investigation was that agriculture is today a bigger source of water pollution in China than industry. Researchers found that farming was responsible for 44% of chemical oxygen demand (C.O.D. is the main measure of organic compounds in water), 67% of phosphorus discharges, and 57% of nitrogen discharges into bodies of water. The Ministry of Agriculture immediately recognized that these findings were the direct result of the shift to intensive farming methods over the past 30 years. The Ministry's Wang Yangliang said,

Fertilizers and pesticides have played an important role in enhancing productivity but in certain areas improper use has had a grave impact on the environment. The fast development of livestock breeding and aquaculture has produced a lot of food but they are also major sources of pollution in our lives (Watts, 2010).

Fertilizer and pesticide-containing runoff from crop fields (vegetables, grains, oilseeds, cotton, etc.) is an important source of this water pollution. Greenpeace estimates that China uses 35 percent of the world's fertilizer, and pesticide use is increasing every year. In 2006, Chinese farmers used 1.2 million tons of pesticide on approximately 300 million hectares of farmland and forest. As a result of increased fertilizer and pesticide application, at least seven percent of arable land is polluted from improper use, in addition to significantly increased water pollution levels throughout the country (Yang, 2007).

Manure, the very resource that used to fertilize Chinese farmers' fields, is an even more important source of pollution. Experts warn that the massive increase of animal waste from the livestock industry is *the* main source of water pollution in China today. According to Ministry of Agriculture statistics, in 2000, China's livestock produced 3.8 billion tons of manure, and by 2008, the figure was 4.8 billion tons (Zhu, 2010). The sheer volume of manure shifts it from being an important resource, to a waste management problem with severe ecological consequences. Such massive amounts of manure contribute to nutrient overload on land and in

waterways, which is particularly evident in the rapidly increasing incidence of blue-green algae outbreaks in China's lakes and streams. Eutrophication results when industrial livestock farms, which generally lack effective water treatment methods to deal with the rivers of manure coming out of them, deposit excessive amounts of phosphorus and nitrogen in nearby bodies of water (Zhu, 2010). The problem is exacerbated when inland water flows to coastal areas. As a direct result of runoff containing excess nutrients from fertilizers and manure carried by the Changjiang (Yangtze) and Huanghe (Yellow) Rivers, a dead zone has developed in the East China Sea, with serious consequences for ecosystem functioning (Diaz & Rosenberg, 2008).

Because the government has failed to institute regulations to strictly manage manure runoff (technological problems that in and of themselves do not solve the problem), industrial pig operations are not being forced to internalize the environmental costs of production and manure treatment. Instead, they are operating in a way that challenges social reproduction for rural populations and smallholder farmers in particular. First, the contamination of China's waterways by industrial manure exacerbates water challenges in the countryside, where at least 300 million people are already without access to safe water (Xie, 2009). This is a problem for household water needs, which for smallholder farmers, includes the need for non-toxic water to grow crops and raise livestock. Second, and related, polluted water contributes to the already shrinking land base for agricultural production in China. When water is rendered unusable, people can no longer "live on the land," and are further compelled to move to the city.

Water pollution from industrial manure is results from and deepens the metabolic rift in both its material and epistemic forms. Disembedded and non-adaptive agricultural practices lead to nutrient overload in water, pushing people from the land and alienating human interactions with nature. Perversely, this separation is equated with progress, and although backyard farmers

practice a form and scale of agriculture that is more agroecologically sound, they are cast as enemies of development, and throwbacks to a backwards and shameful past. This association of people with the soil (*tu 土*) is an insult that further contributes to the urbanization drive (see Chapter Four). It also reflect the epistemic rift in human-nature relations.

Epistemic Rift

When I visited smallholder farms in Sichuan and elsewhere, I marveled at how the production systems and practices I observed were living examples of principles I studied in Agroecology courses during my Agronomy master's degree program, and in many ways, operational models of what the organic farmers I worked for in Nebraska were striving to achieve. I shared these insights with Ms. Fang, a smallholder farmer I stayed with for a week in Hebei Province in 2010. As we were walking back to her home in Big Mountain Village after buying vegetables at an open market in the neighboring village about five kilometers away, I told her I thought her way of farming was the best way to farm. She laughed, and insisted that she was just a "backwards peasant" who didn't know anything about anything. She had a very low level of education, after all, and was a farmer because she was poor, and was poor because she was a farmer. I argued with her that she knew as much about farming as the people who wrote the text books I studied in school, and that farmers like her should be paid much more for growing the food that feeds us. She smiled, shook her head back and forth, and laughed again, dismissively.

I had similar conversations with smallholder farmers in East Creek Village, with the same reaction. My ideas of sustainability and value seemed to fly in the face of dominant discourses in China that define "peasants" (*nongmin* 农民) as "low quality" country bumpkins with nothing to

contribute to a modern China (see Chapter Four). I knew that this was the prevailing sentiment from interviewing people in agribusiness, university research, and government, but these conversations with smallholders seemed to indicate that many farmers themselves internalized the discourse as part of their sense of identity. Yan Hairong (2008) argues that this is the result of both the cultural and material construction of rural places and rural people as backwards (*luohou* 落后). In the first sense, discursive representations of backwardness come from television and other media, and through interactions with mostly young return migrant laborers who come back to the countryside with new “urban sensibilities.” Materially, the lack of financial and policy support for farm households and rural areas, combined with the withdrawal of the state from social supports, creates a countryside characterized by low income, low education, lacking health care services, and lack of opportunities.

In these exchanges, I was very aware of my social position as a graduate-educated researcher from a place where my life chances were significantly higher in terms of education, income, and opportunities. Did this position, combined with my study of agroecology, mean that I was romanticizing peasant production? I’ve been criticized for this when talking about my work with friends, colleagues, and other researchers. The standard line of critique is first that I can only discuss smallholder farms as sustainable because I don’t have to be a smallholder farmer myself. Their lives are terrible, they have no money, and they don’t want to be in the countryside. Second, I’m typically asked, rather condescendingly, what I’m willing to give up in my quest to transform the world into smallholder farming, since clearly, smallholders can’t produce everything I want or need, or in the quantities that I want and need them.

It is crucially important for a researcher to constantly check in with how her own position vis-à-vis the people she encounters in the process of research shapes her perceptions and

understandings. My point in writing about and working on issues surrounding smallholder farmers and small-scale production is not advocate “keeping people poor,” as I’ve been accused of, or confining the world to a constant state of want. It is, however, about taking to heart the idea that smallholder farmers have the knowledge and practices that provide the best opportunity for producing food in ways that repair the metabolic rift (Clausen, 2007; Wittman, 2009), and actively address environmental and climate crises (Altieri, 2008; ETC, 2009; Lin et al., 2011). I’ve come to see these critiques, and the economic ideologies and/or scholarship that underlie them, as an expression of the epistemic rift that arises from the metabolic rift.

As our food getting (Friedmann, 2000) increasingly occurs under the illusion that we have transcended agroecological webs and cycles, social thought has also attempted to disembed from natural or biological bases. This is the episteme at play when people argue that smallholders can’t feed the world; they can’t conceive of the fact that smallholders already do, in fact, feed the world, or that feeding humanity necessarily takes place inside of agroecological cycles. It is also the form of knowledge that animates the Chinese state’s focus on continually increasing pork production by further scaling up production, “going out” for feed, following a “pollute now, clean up later” (Day, 2005) approach to the socio-environmental impacts of the meatification project. Reembedding agricultural practice in agroecosystems, as Rebecca Clausen argues has happened in Cuba, offers the best opportunity to repair the metabolic rift. At the same time, agroecological management will reveal how much meat is feasible. It will not, however, solve distribution issues, which is a much larger political question (Lappé, 1971).

Conclusion

By way of conclusion, I want to argue that classifications of Chinese pigs farms that are based on either annual production numbers or whether or not pig raising is the farmers' primary professional activity do not capture the character or the trajectory of the swine sector. In addition to considering the organization of the household, farms should also be classified *metabolically*, taking into account feed sources, manure management, and agricultural practice. For example, while large-scale commercial farms are considered paragons of efficiency for practices that quickly convert feed into meat, they are also the operations most responsible for ruptured nutrient cycles and associated environmental and social harm, especially when feed is off-shored, as in China's case. What's more, the industrial practices of the CAFO are defined as efficient in part because they are rationalized, specialized, and standardized to be carried out as general practices in any given global location or environment. The very logic and structure of the CAFO, therefore, makes these systems incapable of responding to the dynamics of particular and shifting agroecosystems, which as Behnke and Scoones (1993) argue, is vital for sustainably managing inherent ecological imbalances. On the other end of the spectrum, a metabolic classification brings to light the sustainability of small-scale farming based on locally-available and -produced resources, practices that are embedded in agroecological webs and cycles, and levels of production that are commensurate with local conditions.

With a range of farm organization and practices in between these two types, this broader classification not only reveals the varieties of the metabolic rift, it also defines the limits to increasing meat consumption: in order not to destroy the biological base within which social reproduction takes place, and in order not to deprive already vulnerable populations of basic food getting for the sake of middle and upper class meatification, humans can only eat as much meat

as can be produced in a way that responds to ecological shifts and complexity without rupturing nutrient cycles and creating inexorable imbalances. A “metabolic” farm classification is a step in the direction of defining those limits, and highlights the ways in which locally-embedded and ecologically responsive practices of smallholder farmers are valuable for “rethinking development” along lines that unify social and natural worlds.

Chapter 4

NONGMIN DISCOURSES

CONSTRUCTING a PROBLEM for INDUSTRIAL AGRICULTURE to SOLVE

“China is the land par excellence of smallholder intensive cultivators. No other society on earth has the same unbroken history of a dense rural population practicing permanent, sustainable agriculture in the context of a great and enduring civilization.”

Robert McC. Netting (1993, p. 232)

“农民 *nongmin*: peasant, farmer, rural folk generally.”

Definition of “*nongmin*” from Kieran Broadbent’s (1978)

A Chinese/English Dictionary of China’s Rural Economy

***Nongmin* and Development**

Small-scale agroecological farming is the best hope for repairing the metabolic rift and avoiding long-term food and environmental crises. Research increasingly demonstrates smallholding to be a highly productive and resilient form of agriculture that is not only a solution to hunger and malnutrition in the poorest regions of the world, but also contains the best chance for reversing agricultural pollution, reducing agriculture-related greenhouse gas emissions, and mitigating the effects of climate change (Altieri, 2008; DeSchutter, 2011; Holt-Giménez, 2002; Pretty, 2007; Rosset, et al. 2011; Lin et al., 2011). At local levels, this means re-embedding agricultural practices in agroecological cycles and relying on local resources and knowledges for food production; in national context, it means recasting agricultural development in ways that

recognize and enhance agroecological systems and limits, rather than trying to overcome them using industrial notions of efficiency, as in the CAFO model of pork production.

In China, where industrial agriculture is wreaking havoc on the country's water and soil quality, and where roughly half of the population resides in smallholder farming communities, efforts to support small-scale agroecological farming would seem a logical development objective. As Robert McC. Netting (1993) argues in the quote above, "China is the land par excellence of smallholder intensive cultivators" and "[n]o other society on earth has the same unbroken history of a dense rural population practicing permanent, sustainable agriculture in the context of a great and enduring civilization" (p. 232). But rather than benefitting from the knowledges and practices that smallholders have accumulated over centuries for achieving high agricultural production without deteriorating local resources, political and economic elites in the reform era propose a development trajectory that instead aims to eliminate smallholding as a social form. Decreasing the rural population through labor migration, and industrializing agriculture through support for agribusiness firms and vertical integration are the mechanisms and the *raison d'être* of the contemporary agricultural development model (see Chapter Five).

Certainly this industrial fixation is not unique to China, nor is the idea that agricultural modernity means replacing smallholder farming with large-scale commercial agriculture. The political economic mechanisms of these transformations are captured by David Harvey's (2003) concept of accumulation by dispossession (McMichael, 2006), and are debated in scholarship on the agrarian question as global processes (see for example Akram-Lodhi & Kay, 2009), and in China in particular (LeMons Walker, 2006, 2008; So, 2007). But in addition to conceptions of these material mechanisms that describe the reproduction of capitalism, there are also discursive constructions that coproduce them. The ways in which elites define peasants in policy and

practice, in other words, influences how and why smallholders leave farming for industrial employment. In this chapter, my intention is to analyze how the process of defining smallholder farming is a political act in and of itself that directly relates to the framing and practice of agricultural development, and consequently, to opportunities for repairing – or deepening – the metabolic rift.

My argument is that in order for the state to propose industrial agriculture as China's food security and development solution, smallholder farmers need to be cast as the problem. At the same time, political and popular discourses of the constitution and meaning of smallholder farmers is directly related to the material conditions of their reproduction. More specifically, the word *nongmin* in China, which signifies both farmer and peasant, is associated with ignorance and backwardness, and is considered a traditional social form that should be abandoned as quickly as possible. This discursive construction, and others that similarly employ *nongmin* as an unsavory backdrop against which to gauge progress, is expressed in policies that serve to eliminate, dispossess, or integrate smallholder farmers vis-à-vis industrial agriculture. In this way, *nongmin* discourses underlie political economic restructuring, and at the same time, new capitalist logics reproduce those discourses, making them seem "true." In other words, smallholder farming is not supported in the current model, and smallholder farmers have most acutely felt the withdrawal of state support for social services such as health care and education. The idea that farmers are "backwards" is a cultural and historical construction, but the reality that farmers lack basic supports is a material certainty.

The following excerpts from the *Baidu Baike*²⁰ entry for “*nongmin*” illustrate some of the most pervasive discourses in China on rural and agricultural livelihoods and people, and reveal the term’s discursive importance:

In China, the evolution from “peasants to farmers” (nongmin to professional farmers) is far from complete. The existence of a large number of farmer-identified people, more than the fact of China’s large population of people actually working in the farm fields, deeply reflects our country’s current state of underdevelopment. Or, more precisely, if the latter fact signifies that industry is underdeveloped, then the former means that society is underdeveloped. The proportion of people identified as “nongmin” far exceeds the proportion of people actually engaged in agricultural business, clearly illustrating that China’s social development has lagged behind industrial development²¹.

Whether in research or in the context of everyday life, when people discuss “farmers” (nongmin) what comes to mind is not just a type of occupation, but also a social rank, an identity or quasi-identity, a mode of survival, a community and social organization, a cultural mode, and a psychological structure²².

There is an idea here that what defines a peasant (farmer) and who is included in the category is contested, but that whoever the peasants are, they are members of a low-status, low-value, pre-modern group, and their existence symbolizes a state of underdevelopment and backwardness in Chinese society. The language in these entries also demonstrates that a central goal of contemporary agricultural development is to eliminate non-market economies and move peasants from the fields to the factories. Building on my argument in Chapter Three, this separation of people from agriculture – both materially and epistemically – is an expression of the metabolic rift that animates the meatification project, and China’s development trajectory more broadly.

²⁰ *Baidu Baike* is China’s largest online encyclopedia.

²¹ From *Baidu Baike* (in Chinese). The English translation above is my own, from the original text: “从农民到农业者”的演进在我国远未完成，我国存在着大量的农民身份者，这一事实比我国有大量人口实际上在田间劳作一事更深刻地体现了我国目前的不发达状态。或者更确切地说，如果后一事实意味着产业上的不发达，那么前一事实则意味着社会的不发达。而身份性“农民”比重之庞大远远超过实际务农者的比重，则说明我国社会的发展已经明显滞后于产业的发展。

²² From *Baidu Baike* (in Chinese). The English translation above is my own, from the original text: 无论在研究中还是在日常生活的语境中，人们谈到“农民”时想到的都并不仅仅是一种职业，而且也是一种社会等级，一种身份或准身份，一种生存状态，一种社区乃至社会的组织方式，一种文化模式乃至心理结构。

In addition to illustrating common constructions and meanings of *nongmin* (peasants or farmers), the above statements also suggest the social and political context within which policy to regulate rural people and rural practice is made. Put another way, *nongmin* constructions are part of the dominant political discourses of development in China today.

In order to better understand the ways in which *nongmin* is framed in popular and political discourse, and how these constructions relate to policies that for industrializing agriculture and rural livelihoods, I conducted a critical discourse analysis, which is the centerpiece of this chapter. Before detailing the methods and results of that study, in the next section I provide a brief overview of the occurrence and use of the word *nongmin* in China since the 20th century. The historical context within which *nongmin* emerged as a concept, and through which it has been reproduced as a multi-layered category, is crucial to capturing its significance in the present moment.

A Brief History of *Nongmin*

Popular imaginations have it that China's long history is filled with peasants, and defined importantly by intermittent peasant revolution. Despite these fantasies, *nongmin*, the word used to denote peasants in Mandarin Chinese, is relatively new. Myron Cohen (1993) sites *nongmin*'s first appearance in written and spoken Chinese in the early 20th century when Meiji-era Japanese modernizers translated literary works from the West into Mandarin. Before this time, terms were for rural and agricultural identities and relations had no feudal referent²³.

The emergence of *nongmin* in China paralleled the shift from "farmer" to "peasant" in the English language work of authors writing about China from outside the country. Charles Hayford (1998) traces this shift, arguing that before the 1920s, both foreign Orientalists (who maintained

that China didn't need the West) and foreign Progressives (who wanted reform in China) used "farmer" to describe rural populations. After 1920, "peasant" was more commonly used, and by the 1940s, it was the predominant way to describe and construct the countryside.

In this context, *nongmin* emerged in Mandarin Chinese as a social construction with the purpose of defining and politicizing not only farmers and rural people, but also China as a whole. Cohen argues that Chinese intellectual elites in the early 20th century used *nongmin* as part of a larger cultural project to redefine a new and modern China in relation to an old, traditional, and unpleasant one. Similarly, Hayford argues that *nongmin* became the "man with the hoe" (1998, p. 161) as part of a political project to construct China as "feudal," such that revolution would become essential to cure this "structural malady" (p. 161). Kathy Le Mons Walker (1999) echoes these ideas, arguing that essentialized images of "unchanging, immutable, and prepolitical" (p. 4) peasants in the Yangtze delta in the late 19th and early 20th century set the scene for instituting Western-based constructions of modernity that did not have a place for peasants. In these ways, intellectual elites used the "solution" to frame the "problem," with *nongmin* signifying backwardness as part of broader efforts to shape the future trajectory of the country. *Nongmin*, in other words, constituted an important piece of the traditional backdrop against which a modern China could emerge. This relationship continued throughout the 20th century, and into the present day.

From its beginning as a social category, the idea that *nongmin* meant "backwards" and "ignorant" unified the various ways in which it was used. This was true even when the "peasant" was a literary hero or the object of sympathetic political campaigners (Han, 2005). In the 1920s, when *nongmin* were the subject of political and academic works, the term expressed the character of a villager as "victim and perpetrator of ignorance and darkness" and as

²³ These words included *nongfu*, *nongding*, *nongjia*, *nongren*, *zhuanghu*, and *zhuangjiahan*.

“superstitious, ignorant, and inert” (Hayford, 1990, p. 113). By the 1930s, *nongmin* stood for a pitiable and powerless victim of oppression. For all but a handful of Chinese anthropologists and sociologists writing at the time, *nongmin* meant,

a culturally distinct and alien ‘other,’ passive, helpless, unenlightened, in the grip of ugly and fundamentally useless customs, desperately in need of education and cultural reform, and for such improvements in their circumstances totally dependent on the leadership and efforts of rational and informed outsiders (Cohen, 1993, p. 154).

Xiaorong Han (2005) details cultural, political, and academic representations of *nongmin* during the pre-PRC 1930s as variously “the ignorant,” “the innocent,” “the poor,” and “the powerful.” Cohen argues that Mao Zedong and other mid-century communist intellectuals reproduced many of these sentiments, believing that cultural destruction of the peasantry was the only way to bring out its liberation, and therefore, the revolutionary force of history.

In the post-Mao era, *nongmin* became a taken-for-granted term, still associated with backwardness, but perhaps with even more negative connotation as the failed “class” in Mao’s revolution. At the time of Cohen’s writing on *The Case of the Chinese ‘Peasant’* in 1993, he proposed that the Chinese peasant had two functions. First, the term was an administrative unit associated with growing rural-urban differentiation and used to define agricultural households. This function is related to *hukou*, the household registration system in China, to which I will return below. Second, *nongmin* was a distinct cultural category that government officials, intellectuals, and the general population reproduced as a backwards group, quite unfit for political participation; it was a mechanism of othering (Cohen, 1993). These understandings of *nongmin* continue to be relevant today, and the use and meaning of *nongmin* in the current century still very much reflects its legacy in the last, particularly as a signifier of backwards people, places, relations, and even states of development.

In addition to its use in legally differentiating rural and agricultural households as part of the *hukou* system (Zeuthen & Griffiths, 2011), *nongmin*, in many of its categorical manifestations, is about expressing a lack of *suzhi* (素质), or quality. Tamara Jacka (2006, 2009) has written extensively on *suzhi* discourses as they relate to and define *nongmin* – and particularly rural women – as low-quality, ignorant, and backwards (see also Kipnis, 2006; Murphy, 2004; Yan, 2008). Taken together, these various categories, meanings, and uses of *nongmin* indicate that as much as a historical category for analyzing capital-labor relations, or as a farm-size classification²⁴, it is a social construction enacted in service of othering, denigrating, and expressing underdevelopment. *Nongmin* constructions, especially in relation to *suzhi* discourse, are powerful. Tamara Jacka and Hairong Yan (2008) find that ideological forces, articulated in discourses of low-quality and backwardness, play important and reinforcing roles in the perpetuation of material conditions of poverty in rural areas, they do so by shaping individual beliefs, preferences and choices, and through policy. My analysis in the next section reveals that these discourses animate China's rural and agricultural development policy, and as I'll return to in Chapter Five, the agricultural development model.

***Nongmin* Discourse Analysis: Methods**

In order to understand the major *nongmin* discourses in China today, and how those discourses are expressed in policy, I conducted a critical discourse analysis following van Dijk (2003). This approach allows for a study of the way social power, dominance and inequality are enacted, reproduced, and resisted through text and talk in social and political contexts. Because the present study is concerned primarily with policy and political discourse, the discourse

²⁴ For uses of *peasant* in these typical analytical categorizations, see for example Akram-Lodhi & Kay (2009), Bernstein (2010), Bramall & Jones (2000), So (2007), and Zhang & Donaldson (2010).

producers of interest are politicians and representatives in government bodies. I conducted the analysis in four stages.

First, I identified recurring and dominant discourses about *nongmin* by reading policy documents, speeches, and statements from officials in the central government, including the Ministry of Agriculture²⁵. I coded these texts by looking for language, words, and ideas that were common across the documents (Adler and Clark, 2003). I then collected similarly labeled passages into categories, and consolidated, organized, and distilled them into the six discourses identified in the next section. Throughout the process of coding, I focused only on those passages that related directly to smallholder farmers and rural and agricultural livelihoods²⁶.

After identifying the main *nongmin* discourses, I studied their appearance in political documents and media. I searched *Baidu* (百度, the number one search engine in China) for the occurrence of the six main discourses in major Chinese online newspapers²⁷. I also searched *Baidu Baike* (百度百科), the country's leading online encyclopedia²⁸, for words and concepts related to the discourses. Because *Baidu Baike*'s more than 3.5 million articles are built by registered users, and are heavily censored to be in line with government regulations (Woo, 2007), they provide highly relevant insight into the reproduction of discourses in widely

²⁵ I used the following documents to identify the main discourses: texts from the Ministry of Agriculture website, central policy documents (11th Five Year Plan, 12th Five Year Plan, the Outline for Development-Oriented Poverty Reduction in China's Rural Areas, 2011-2020, and the Provisional Measures for Administration of Identification of National Leading Enterprises of Agricultural Industrialization and their Operation Monitoring), statements and speeches from Ministry of Agriculture and central government officials found online, and *Baidu Baike* entries.

²⁶ Other prominent discourses deal with scientific development, creating a harmonious society, sharing common prosperity, ensuring food security, promoting ecological and safe agriculture. All of these discourses arguably impact rural and agricultural development policies, however, in order to produce a more focused analysis, I included only those discourses with the most direct relevance to understanding constructions of *nongmin*.

²⁷ There are over 2,200 newspapers in China today (<http://www.kidon.com/media-link/cn.php>). I limited my search to Xinhua News, the official press agency of the central government and the largest news agency in China.

²⁸ *Baidu Baike* is the second largest internet encyclopedia in the world, after the English language version of Wikipedia (Woo, 2007).

accessible Chinese media. I also consulted interview transcripts and notes from my fieldwork, as well as discourse analysis research conducted by other scholars.

The next step was to locate the six discourses in actual policy. I read central policy texts - including official documents, white papers, speeches, and regulations – and analyzed the use of the discourses in policy directives. The materials I selected for analysis follow Kevin O’Brien and Lianjiang Li’s (2006) conception of central policy, which they argue, must be understood in its broad, Chinese sense. They state that central policies “include essentially all authoritative pronouncements, ranging from Party documents, laws, State Council regulations, and leadership speeches to editorials by special commentators in prominent newspapers” (p. 5). The authors go on to say that central policies can be both general guidelines and/or specific regulations.

Finally, I analyzed how the discourses work together to form a coherent “master discourse” that effectively communicates central government and Ministry of Agriculture definitions, plans, and goals for regulating and structuring the roles for smallholder farmers and rural livelihoods in the management of modernization and development. The next section explores each of the six discourses in turn.

***Nongmin* Discourse Analysis: Results**

My analysis revealed three main and three supporting *nongmin* discourses. The main discourses are: (1) “Peasants are Low Quality,” (2) “Relieve the Peasants’ Burden!” and (3) “Peasants are Surplus Labor”. Sub-discourses that relate to and support the main discourses are: (1b) “The Countryside is Backwards, Traditional, and Ugly,” (2b) “Peasants are Passive” and (3b) “Peasants are Rural Consumers.” Individually, each discourse shapes and is enacted in specific policies and regulations. When combined, the discourses outline a particular model of

development, with explicit goals, methods, and outcomes. I summarized the “master discourse” from my analysis as follows:

In the post-reform era, and particularly in the context of increasing inequalities between people in urban areas and the countryside, China’s so-called “three rural problems” (*sannong wenti* 三农问题) of agriculture, farmers, and rural areas are best solved using a model that integrates urban and rural development (*xietong fazhan* 协调发展). Measures that link industry and agriculture; that equalize land rights, financing, services, infrastructural development, and dividends across urban and rural areas; and that modernize agriculture and transfer surplus rural laborers to work in cities will bring about positive changes. Namely, these coordinated urban-rural development directives will increase rural income, relieve peasants’ burdens, and transform agriculture, farmers, and the countryside from a “traditional,” “backwards,” and “low-quality” state into one that is decidedly modern, and increases China’s global competitiveness.

In the sections that follow, I detail each of the six discourses, including a summary of the discourse, where I located it in political documents and widely accessible media, and the policies that enact it.

(1) *The “Peasants are Low Quality” Discourse*

The discourse that most pervasively and profoundly shapes definitions, understandings, and regulations of smallholder farmers and rural livelihoods is the “*Peasants are Low Quality*” discourse. It is found in both explicit and somewhat veiled forms in policy, media, and everyday conversation. As a particularly powerful discourse, the ideas and meanings contained within it structure not only how government authorities propose policies and regulations for rural development, but also how everyday people think about rural people and spaces.

As the statement from the *Baidu Baike* entry for *nongmin* in the opening section of this chapter indicates, the concept of “peasant” or “farmer” in China is better thought of as a social category that signifies a particular identity, status, way of life, culture and psychological state of being. It is not merely the title for an occupation, nor is it a fitting reference for people engaged

in agriculture as a business. As an identity category, *nongmin* carries meanings and signifiers that are broadly used to define the rural poor, as I'll discuss below.

The low-quality discourse fits well with the notion that, “in post-Mao China, quality (*suzhi*) has become a key element in a range of discourses on development and the achievement of modernity and national power” (Jacka, 2006, p. 589). As such, this powerful discourse can be found in a number of places, including Chinese popular culture, widely accessible news media, academic papers, official speeches, and central policy.

The “Peasants are Low Quality” Discourse in Popular Culture and Everyday Conversation

I found the most explicit expression of the low-quality discourse in the language of Chinese popular culture and everyday conversation. The word *nongmin* itself, which is often used to connote that a person is backwards, unsophisticated, uncultured, ignorant, and of “low quality” (*mei suzhi* 没素质). Interestingly, these same connotations apply to the word for “dirt” or “earth” in Mandarin Chinese (*tu* 土), which is commonly used disdainfully to indicate that a person is from the countryside, and lacking in intelligence and sophistication (Chao, 2009, p. 26-27). This use of *nongmin*, and the simultaneous reproduction of the low-quality discourse, can be found in Chinese movies, television, literature and conversation.

I frequently encountered the low quality discourse in my fieldwork. It came up during interviews with university researchers, managers and executives at large-scale pork production and processing companies, individuals involved in framing and/or analyzing agricultural policy, representatives from various agribusiness firms, migrant workers, and smallholder farmers themselves. In almost all cases, when I asked about smallholders, I was told that rural areas were backwards (*luohou* 落后), that smallholder farmers were of low quality (*mei suzhi*) and in need of training and “civilization,” and that the large *nongmin* population was one of China’s biggest

problems. These statements were typically accompanied by a grimaced facial expression, revealing disgust and disdain. That farmers themselves shared these ideas with me as statements of “fact” indicates that many have internalized this particularly powerful discourse. When I asked a smallholder farmer in Hebei province if I could interview her, she said, “Why would you want to interview me? I don't know anything. I'm just a *nongmin*.”

The *Baidu Baike* entries for *peasant* (*nongmin* 农民), *backwards* (*luohou* 落后), *rural way of life* (*nongcun shenghuo fangshi* 农村生活方式), *Three Rural Problems* (*sannong wenti* 三农问题), and *modern agriculture* (*xiandai nongye* 现代农业) all contain elements of the low quality discourse. The basic idea reproduced in these articles and definitions is that peasants are of low cultural and psychological quality, are traditional and incompetent, and need training and support in order for China to achieve a modern agriculture and society.

The “Peasants are Low Quality” Discourse in Politics and Media

Whereas the low-quality discourse is enacted in ways that are overtly condescending in popular culture and everyday conversation, it is often more polite in the media and in central policy. In a white paper issued by the Information Office of the State Council in 2001 titled, *Rural China's Poverty Reduction*²⁹, the following is given as one of the main difficulties in rural areas:

Although the development-oriented poverty reduction drive has greatly changed the poverty and backwardness of the vast impoverished rural areas, there has been no qualitative change either in the basic production and living conditions of the poverty-stricken peasant households, or in the *social, economic and cultural backwardness* in those areas (emphasis added).

²⁹ This white paper is related to *Outline 1* (2000-2010).

In this passage, *low-quality* and *backwardness* are used to describe social, economic, and cultural conditions, separate from poverty reduction and improving rural livelihoods. This suggests the deeper meanings of the discourse, which defines peasants as systematically and structurally deficient.

Today, the discourse is largely expressed in policy context in the language of *need* rather than *deficiency*. For instance, a Ministry of Agriculture (2009) document on rural development lists the existence of “more competent farmers” (read: farmers who use industrial practices) as evidence of positive changes in the appearance of some rural areas. This notion is more explicit in the calls for improving rural education and training in order to improve the quality of farmers (rural people). The following passages, taken from statements made by government officials in reference to the *Building a New Socialist Countryside* policy (Beijing Review, 2008), illustrate the point:

“[Measures need to] improve population quality through education, health care and labor training,” Liu Jian, Director of the Poverty Alleviation Office of the State Council.

“To a certain degree, the success of building a new socialist countryside depends a lot on the quality of farmers, technical capability and ideological standards,” Zhou Xiaozheng, Professor at Renmin University.

“At present most farmers live in areas poor in transportation and information, so they lack modern concepts matching a market economy. We can’t teach farmers these modern concepts; they must learn these through practice,” Xiong Qinghua, Secretary of the CPC Baoshan City Committee, Yunnan Province.

To varying degrees, these political elites reproduce the low-quality discourse in ways that are paternalistic and/or derogatory toward farmers. The problem here is not that calls for improvements in systems of education and social services are misplaced. Quite to the contrary, as investment and attention to improving conditions in rural areas has long lagged behind urban bias. Rather, the low-quality discourse is often used in reference to the quality of *people*, rather

than *systems*. Even where there is recognition of problems in, for instance, the agricultural extension system, the solutions to those problems are framed in top-down terms, such that the state (or private actors) will sweep in to fix the (ignorant, worthless, backwards) farmers (Yuan and Niehof, 2011).

The low-quality discourse, especially in its more polite formulation, is also pervasive in widely accessible news media, including Xinhua news outlets and CCTV 7, the agricultural channel on China Central Television.

The “Peasants are Low Quality” Discourse in Policy

Scholars have analyzed *suzhi* (quality) discourses, and how they relate to peasants and rural migrants, government policies, and discourses of modernity, civility, and development in contemporary China (Jacka, 2006, 2009; Yan, 2008; Sun, 2009). Among other things, they find that ideological forces – articulated in popular discourses of low-quality and backwardness – play important and reinforcing roles in the perpetuation of the material conditions of poverty in rural areas, through policies and through the shaping of individual beliefs, preferences, and choices.

In the course of the present analysis, I found that policies and measures related to the low-quality discourse can be categorized around two major goals: first, to improve the quality of farmers through education and training; and second, to modernize agriculture. The first goal is articulated in the following policies: the 11th Five-Year Plan, Building a New Socialist Countryside, Two Exemptions and One Subsidy (free rural compulsory education), the 12th Five-Year Plan, the Outline for Development-Oriented Poverty Reduction in China’s Rural Areas

2011-2020, and the Provisional Measures for Administration of Identification of National Leading Enterprises of Agricultural Industrialization and their Operation Monitoring.

The second goal, of constructing a modern agriculture to improve the quality of farmers, can be found in any and all current central policies relating to agriculture, including those listed in this section. Chapter Five analyzes the central government's conception and model of modern agriculture, which is based on vertical integration, contract farming, and Dragon Head Enterprises. This model is based on the idea of using "modern" methods, techniques, and tools to transform and improve the quality of agriculture, peasants, and the countryside. In order for the model to appear as the solution, backwards farmers need to be cast as the problem.

(1b) Supporting Discourse: "The Countryside is Backwards, Traditional, Ugly"

The notion that smallholder farmers are backwards, of low-quality, and not modern is mirrored in a related discourse that the countryside shares similar features. *Sannong wenti*, or the "Three Rural Problems," is used in China to signify that the problems of agriculture, villages, and farmers are the most pressing problems for the countryside. In discourse surrounding *sannong wenti*, the problems of rural areas are largely identified as problems of tradition. For example, in the *Baidu Baike* entries for *sannong wenti*, *rural way of life*, and *modern agriculture*, the countryside is defined as an antiquated place where traditional agriculture and forms of cultural and economic exchange reign supreme, resulting in a kind of backwardness that is a drag on efforts to modernization. In more polite political conversation, former Premier Wen Jiabao, for instance, talks about the need to improve the appearance of the countryside, and Zhong Hongyu of the Ministry of Agriculture urges the adoption of modern technology to transform traditional agriculture (Beijing Review, 2008). These same sentiments are expressed in Xinhua

News and on CCTV 7, especially in programs about improving the quality and appearance of the countryside.

This discourse plays out in policy aimed at improving the appearance of the countryside, sometimes in ways that could actually improve the lives and livelihoods of rural people, other times in ways that seem more likely to increase profits for the agribusiness firms that sell inputs and control value chains, and still other times in ways that seem more about “saving face” than making real progress in reducing poverty.

When “improving the appearance of the countryside” means improving rural infrastructure – as in the 12th Five Year Plan, Building a New Socialist Countryside, and the Outline for 2011-2020 – then rural people are more likely to benefit. However, when this idea means “adopting modern technology to transform traditional agriculture,” as in Ministry of Agriculture documents, there is some question as to whether this transformation is in the best interest of smallholder farmers, or is primarily a way to increase agribusiness profits and corporate penetration in rural markets (see Chapter Five).

Another enactment of this discourse in policy comes in the form of developing rural tourism and leisure, and constructing “clean and tidy” (*cunrong zhengjie* 村容整洁) and model villages for aesthetic improvement. These measures appear in the 12th Five Year Plan and Building a New Socialist Countryside. While they potentially create income opportunities for the few households that can become involved in rural tourism through *nongjiale* (农家乐, rural bed and breakfast-like operations) and related businesses, they seem more likely to be a way of keeping up appearances. In the worst cases, these models can conceal the reality of rural poverty by presenting a well-manicured experience of the countryside for (mostly urban) visitors to enjoy.

(2) *The “Relieve the Peasants’ Burden!” Discourse*

While smallholders are approached with disdain in many expressions of the low-quality discourse, they are also variously characterized as the people who have borne the brunt of government taxes and political corruption in discourses that call to “*Relieve the Peasants’ Burden!*” This notion appears in the *Baidu Baike* entries for *nongmin* (peasant) and *sannong wenti*, and is also a common theme in Xinhua news items and in studies of rural development and policy. The discourse is enacted in policies that call on governments to either increase farmers’ income, or reduce their financial stress by making public services more accessible. The Rural Tax and Fee Reform, New Rural Cooperative Medical System, Rural Social Security System, Two Exemptions and One Subsidy (free rural compulsory education), Farmers’ Professional Cooperative Law, and agricultural subsidies are all directly intended to “reduce the peasants’ burden.” Alexander Day’s forthcoming work (2013) provides a critical analysis of these policies.

(2b) *Supporting Discourse: “Peasants as Rural Consumers”*

As central authorities try to reposition the country in the global economy, they have taken up the task of constructing the rural consumer. Officials want China to move from being a “developing country” that relies on an export-led economy, to becoming a “developed country” with substantial domestic markets. An important part of the process of expanding domestic demand is increasing rural purchasing power. In 2005, although rural China had 60 percent of the national population, rural consumer spending accounted for only 33 percent of total retail sales (Su, 2009, p. 133). In addition to building a “harmonious society” and improving rural livelihoods, policies in Building a New Socialist Countryside to increase rural incomes are at the same time aimed at expanding rural (market) consumption and creating a class of rural

consumers to help fuel the country's economic growth. The 12th Five Year Plan also calls for increased domestic consumption (Casey and Koleski, 2011).

(3) The “Peasants are Surplus Labor” Discourse, or The “Coordinated Urban-Rural Development” Discourse, or The “CURD” Discourse

While the previous discourses relate primarily to definitions of farmers and rural livelihoods, this third discourse adds conceptions of how to define and manage development, how to integrate rural and urban places and people, and how the three rural problems fit into the resulting model. According to the Ministry of Agriculture (2009),

A strategic task that China is facing in the next step is to build the new socialist countryside, pursue a path of modern agricultural development with Chinese characteristics, strive for integrated development between cities and countryside, economy and society.

Emergence of the “CURD” Discourse in Policy

At the 17th National Congress of the Chinese Communist Party in 2002, authorities declared for the first time that the countryside was key to achieving moderate prosperity, and that socio-economic development must incorporate both urban and rural areas. Since that time, a series of goals intended to promote urban-rural integration have been rolled out in central policy documents, including the Number 1 papers from 2004-2009, the Outline for 2011-2020, the 12th Five Year Plan, and the “Decision by the Central Committee of the Chinese Communist Party on Some Important Issues Regarding the Promotion of Rural Reform and Development” in 2008. Today, coordinated urban-rural development (CURD) is one of the leading discourses coming from the central government, the Ministry of Agriculture, widely accessible news media, and central policy.

The “CURD” Discourse as a Development Model

According to Professor Ye Xingqing (2009) of the Department for Rural Economy at the Research Office of the State Council, the basic tenants of the CURD plan are to use urban industry to support rural agriculture, equalize rights and services across rural and urban areas, and modernize agriculture to release surplus rural laborers for employment in urban areas. Some scholars argue that these moves signal that China’s national development policy may be shifting away from rural extraction for industrial production and urban bias (Looney, 2011; Su, 2009). Surely this idea is one of the goals of the discourse. However, while it may be true that CURD is a profound departure from the Maoist conception of agriculture supporting industry, this argument only holds if extraction refers only to money and financial flows. Considering the discursive elements of CURD as a development model, it seems that rural extraction remains, but is taking a human form: CURD calls for surplus laborers to migrate from the countryside to the city in support of industry.

As a development model, CURD aims to improve poor rural and agricultural livelihoods by relieving peasants’ burdens, modernizing agriculture (see Chapter Five), and importantly, increasing household income through migrant labor. These plans fit with the call to eventually abandon self-sufficient agricultural production altogether, in exchange for wages and industrial labor. Put another way, CURD (and related policies) proposes that the best way to improve agricultural livelihoods is to eliminate them.

The “CURD” Discourse, Surplus Labor and Hukou

Efforts should be made to speed up the development of the non-agricultural sector in rural areas, thus shifting surplus rural laborers out of agriculture into mid-size and large cities.

– Ministry of Agriculture, 2009

CURD, especially as a development model, is complicated by *hukou*, the household registration system in China, which assigns different legal classification to rural and urban citizens. *Hukou* classification for rural people is related to the difficulty in defining who counts as farmers. People born in rural areas, regardless of the family's occupations, are classified as "agricultural," while those born in cities are "urban." Many of the inequalities expressed along urban-rural lines are the direct result of *hukou*, as social and public services like education, health care, and pensions may be unavailable to rural residents, or available only in vastly inferior forms. *Hukou* is particularly problematic for migrant workers who, even if they have worked in a city for 10 years, are still legal residents of their home village, and entitled to social services only in that place. This has resulted in mass inequality, exploitation, and poor conditions for migrant workers from all parts of China (Shi, 2010; Wong, 2011).

Despite these challenges, CURD is based precisely on the notion of peasants as surplus labor for work in the cities. Labor migration has been so successful as a development scheme that that share of income in a rural household that comes from non-agricultural sources – mostly wages from migrant work – is rising rapidly. In 1990, the figure was 22.3 percent, and by 2004, it had risen to 52.4 percent (Zhong, 2011). The figure is no doubt higher today, and will continue to rise as peasants are increasingly transformed (discursively and materially) into surplus labor for urban factories, construction sites, restaurants, and sex work (Pai, 2012; Shi, 2010).

Hukou classification is important when considering the lives and struggles of the rural poor and migrant workers, and is also vitally important to include in analyses of the effectiveness of rural policies. *Hukou* elicits a number of puzzles in this context. For instance, if counted according to *hukou* classification, do rural population statistics reflect the reality of the number of people living in the countryside? When statistics show increased rural income, do those

numbers reflect successes in rural development policies, or are they more the results of remittances from migrant work?

CURD (and related policies) does address some of the issues surrounding *hukou*. In recent years, *hukou* reform has been on the central government's docket, with pilot projects in several cities including Chongqing. Authorities are experimenting with allowing some rural residents to change to urban *hukou*, especially in small- to medium-sized cities (Zhong, 2011). Presumably, persons of "higher quality" will have the opportunity for urban *hukou*, while those of "lower quality" will remain rural peasants and migrant workers.

(3b) *Supporting Discourse: "Peasants are Passive"*

The discourse of integrated urban-rural development, which relies on the existence of a mass of surplus rural laborers for industrial production, rests on the assumption that those farmers-turned-laborers are passive. This discourse is related to the top-down nature of policy implementation in China, and here, in Building a New Socialist Countryside and CURD in particular. In these plans, the central government defines objectives and guidelines, and is the ultimate evaluator of success or failure. Provincial governments set up broad development programs based on central directives, which they pass down to cities and counties for further specification. County governments then translate guidelines into specific projects that are executed in townships and villages. In this last stage, county officials are expected to cooperate with township and village officials, though this is a goal more in theory than in practice (Ahlers and Schubert, 2009). In any case, villagers have very-little-to-no voice in the process of reform (Su, 2009, p. 6), even as rule is increasingly decentralized.

The notion that peasants are passive recipients of regulations and developments that come down from above (a directive disguised as an observation) is especially visible in discourses, policies, and controversies surrounding farmers' professional cooperatives. For example, the National Development and Reform Commission (NDRC) reports that local governments have directly set up approximately 70 percent of the country's rural cooperatives (Ma, 2008). Similarly, Han Jun (2007), a central policy researcher from the NDRC, found that most cooperatives in China were established either by government agencies or leading enterprises, and that very few were set up by ordinary farmers (Han, 2007). These top-down procedures relegate smallholder farmers to ever-more subservient positions with little control over their own livelihoods.

The *passive peasant* discourse is relevant here, as policies are framed in a way that assumes—and in fact relies on the idea—that villagers will accept what is defined for them, and should not be consulted or empowered in the process of development. The incidences of rural protest and petitioning on the one hand (Chen & Wu, 2006; O'Brien & Li, 2006), and the emergence of the New Rural Reconstruction Movement on other (Day & Hale, 2007), challenge this discourse. The New Rural Reconstruction Movement includes experimental farmer-led cooperative programs, which specifically target villages that experienced high levels of peasant petitioning and protest prior to Rural Tax and Fee Reform.

Gender: The Missing Discourse

Gender is conspicuously missing in discourses and policies regarding smallholder farmers and rural livelihoods. Lin Zhibin, the director of the Migrant Workers Action Research Center in Beijing, says that, “Although poverty-alleviation policy documents do not yet reflect

the concept of gender, the introduction of the idea of ‘regarding people as central’ has obviously served as a turning point in advocating women’s empowerment and gender equality” (Lin, 2008, p. 28). In 2011, in the State Council white paper that summarizes the Outline for Development-Oriented Poverty Alleviation in China’s Rural Areas (2011-2020), there is passing mention of gender. The document reads,

The state has included development-oriented poverty reduction schemes for ethnic minorities, women and the disabled in its planning, made unified arrangements for their implementation, given priority to their implementation when all conditions are equal, and strengthened support for these groups.

The inclusion of women as a group with ethnic minorities and disabled persons is telling of how the central government considers women in policy. Rather than engaging with gender in terms of the different roles, expectations, opportunities, and constraints for men and women, the language in this document suggests that women are disadvantaged in ways similar to ethnic minorities and the disabled. This does little to address the real needs of women, who are responsible in large part for rural agricultural production, as well as the reproduction of rural households. It also makes assumptions about men, what they want, need, and are capable of.

Gao Xiaoxian, the secretary general of the Shaanxi Research Association for Women and Family, argues that in mainstream Chinese discourse, “women have low quality,” and that the tone of the discourse is one of blaming women for situations like poverty (Gao, 2008, p. 21). Especially in agriculture, women’s income is significantly less than men’s income. They are less educated as a group, and are subject to patrilocal residence after marriage, which often breaks their social networks. Land and asset ownership is also unequal along gendered lines, with women who marry outside of their home villages missing out when land is redistributed, leaving them and their children landless (Li et al., 2008). At the same time, there is a historical legacy that treats women as “the second gender,” subordinate and inferior to men. This, when combined

with the *Peasants are Low Quality* discourse described above, creates a double negative for rural women in policy and in lived experience.

Conclusion

The discourse analysis presented in this chapter illustrates that *nongmin* has multiple meanings and uses. Table 1 below details the various categories that *nongmin* can express. I constructed that table from *Baidu Baike* entries, Chinese policy documents, media reports, scholarship, and conversations with government officials, academics, farmers, and people in rural and urban China.

Table 1. *Nongmin*: Analytical categories, meanings, and uses in contemporary China.

Analytical Categories	Meanings and Uses
occupational category	“farmer”
legal/administrative category	“holder of agricultural <i>hukou</i> ”
identity category	“farmer” / “peasant” / “rural” / “migrant”
social category	“peasant” (low social rank)
political category	“unfit for politics” / “uppity”
historical category	“pre-capitalist” / “transitional”
cultural category	“backwards” / “low quality”
psychological category	“ignorant”
way of life category	“subsistence”
farm size category	“small-scale farmer”
farm labor category	“householder” / “family labor”
farm production category	“subsistence” / “petty commodity producer”
development category	“underdeveloped”

In this chapter I’ve argued that the ways in which *nongmin* is constructed has important political significance, and relates to the management of material conditions in the countryside. CURD policies and the Building a New Socialist Countryside policies that are continued in the 12th Five-Year Plan for 2010-2015, are intended to restructure agriculture in such a way that the economy of agricultural self-sufficiency prevalent in rural areas is eventually abandoned in

exchange for urbanization and subsequent depeasantization. Central authorities hope that these processes will at once alleviate rural poverty, develop a robust and vertically integrated domestic agro-industrial sector, further promote urban industrial development, and enhance China's competitiveness in global markets. These goals, and the measures enacted to achieve them, rely on a set of ideas about smallholder farmers and rural livelihoods that are embodied in political discourse. As my analysis reveals, these discourses suggest that smallholders are backwards (lagging behind, traditional, detestable), of low quality (culturally and psychologically deficient and in need of improvement), passive (enough to be herded into migrant work without complaint or preference, and with very little political interest or participation), and form both an army of surplus labor for industrialization and a pool of untapped domestic consumers who will help shift China's import-export balance. The policies that result often look more like policies to create wealth for a few, than to create the "common prosperity" called for in the 11th Five Year Plan (Fan, 2006).

China's industrial agricultural development model is proposed as the modern solution to the traditional *nongmin* problem. Cast in this light, Dragon Head Enterprises – state-supported and vertically integrated agribusiness firms – emerge as the rural and agricultural development leaders. As the same time that state policy props up the Dragon Heads, it also displaces, dispossesses, and/or eliminates smallholder farming. This transformation, a profound departure from the once "unbroken history of a dense rural population practicing permanent sustainable agriculture" (Netting, 1993, p. 232), deepens the metabolic rift, positioning industrial agriculture as its solution.

**DRAGON HEAD ENTERPRISES
and the
STATE of AGRIBUSINESS in REFORM ERA CHINA**

“To support industrialization is to support agriculture,
to support enterprises is to support farmers.”
Ministry of Agriculture, PRC
Research Center for Rural Economy (2010, p. 6).

Introduction

The statement above succinctly describes the Chinese state’s approach to agricultural development: industrialization is the goal, and agribusiness is the mechanism. The idea of what it means to “support farmers” here has a very specific meaning that hinges in part on the *nongmin* discourses I analyzed in Chapter Four. Simply put, the state-led model is intended to replace small-scale farming and self-sufficient rural livelihoods with vertically integrated agribusiness firms, contract farming, and strategic agricultural trade. This is a model that sees smallholders as backwards; a drag on both national-level development, and in terms of China’s changing role in the global agro-food system. The excerpt below from the *Baidu Baike*³⁰ entry for “*nongmin*” is telling:

Another issue for agricultural industrialization in China is that today, the country’s agriculture can be classified as basically a self-sufficient peasant economy, with no economies of scale. After joining the WTO, how should we deal with the challenges associated with intensive-style agriculture in other countries? As a large agricultural country, this will be a serious problem for China to face. From now on, it seems that at the same time that China liberates surplus labor by accelerating agricultural

³⁰ *Baidu Baike* is China’s largest online encyclopedia. The 3.5 million articles are built by registered users and censored to be inline with government regulations and discourses (Woo, 2007).

*mechanization and improving productivity, China should also abandon the self-sufficient peasant economy in order to meet WTO challenges*³¹.

In addition to transforming farmers into migrant laborers, agribusiness-led vertical integration is the primary mechanism for abandoning the self-sufficient peasant economy. In the meatification project in particular, state-supported agricultural processing firms called Dragon Head Enterprises (*longtouqiye* 龙头企业) lead the march. Dragon Heads are tasked with the dual role of developing markets for economic growth and profit on the one hand, and improving the quality, or *suzhi* (素质), of farmers on the other. Vertical integration in the Chinese sense means coordinating production, processing, distribution, and sales of agricultural products, or in the language of Sinograin, the China Grain Reserves Corporation³², “Constructing the industrial chain from field to dining table” (*jianshe cong tianjian dao canzhuo chanyelian* 建设从田间到餐桌产业链). As a form of rural development, vertical integration means *value chain integration*, with farmers at one end of the chain producing primary products, and Dragon Heads at the other end processing and selling value-added commodities on local, regional, and national markets.

Dragon Head Enterprises are at the intersection of state socialism and neoliberal logics. The state supports Dragon Heads through direct subsidies, tax incentives, favorable loans, and certifications that increase the firm’s legitimacy in the market. In exchange, Dragon Heads are expected to play a role in rural social welfare through contract farming, as well as create new arenas for profit and accumulation. In the pork sector, large-scale production, processing, and

³¹ From *Baidu Baike*: <http://baike.baidu.com/view/24915.htm> (in Chinese). The English translation above is my own, from the original text: 农业产业化的另一个问题是中国农业目前基本上属于自给自足的小农经济, 没有形成规模经济。加入世贸组织后, 如何应对国外的集约型农业的挑战? 这将是中国作为一个农业大国面临的严峻问题。从现在看来, 目前中国应在解放剩余劳动力的同时, 通过加快农业机械化提高农业劳动生产率, 抛弃小农经济的自给自足, 迎接入世挑战。

³² Sinograin website: http://en.sinograin.com.cn/eng/index_Eng.jsp (in English).

retail operations take many forms. They may be state owned, privately owned, partnerships between private and state owned firms, or joint ventures between Chinese and foreign firms. Most, however, are domestic agribusinesses, and most of the industry's biggest players are Dragon Heads. As expressions of both socialist governing and neoliberal thinking and strategies, analyzing Dragon Heads is also analyzing the form and trajectory of China's development model.

To date, there are few studies of agribusiness politics in China, or of the impacts of the country's agribusiness-led development model. One reason for the lack of China-specific examinations is that literatures on agrifood firms in the neoliberal era have focused on transnational corporations (TNCs) as central actors in global governance (Clapp & Fuchs, 2009; Cutler, 1999; Sklair, 2002) and as the key players in creating a global agrifood system (see, for example, Bonanno et al., 1994; Lang and Heasman, 2004; Magdoff, Foster, and Buttel, 2000; McMichael, 2005). If China is mentioned in these literatures, it is characteristically framed as an emerging economy that TNCs are keen to enter, and *not as a new site of agribusiness development in its own right*. Where governance related literatures have touched down in China, scholars concentrate on how TNCs operate through foreign investment, joint ventures, and wholly-owned subsidiaries, typically focusing on retail, food service, and high-value-added food sectors (Hu et al., 2004; Wilkinson, 2010). But these studies do not adequately reflect the mechanisms or relations of China's agricultural development model, its social implications at home, or the way that its operation is recomposing the relations of the global agrifood system itself.

Dragon Heads, as expressions of multifaceted public-private relations, also complicate notions of China's development model more generally. While scholars from various fields

disagree over the proper designation of China's political economic form and trajectory, they tend to agree that privatization is an orienting logic. Deng Xiaoping initiated Reform and Opening in 1978 on the idea that "Socialism with Chinese Characteristics" would use markets to develop productive forces and eliminate poverty (Deng, 1984). After 30 years of reform, however, Richard Walker and Daniel Buck (2007) argue that because of its close parallels to the development of capitalism in Europe and North America, "capitalism with Chinese characteristics" is a more apt moniker. In a similar vein, David Harvey (2003), following Wang Hui (2003), refers to China's system as "neoliberalism with Chinese characteristics," echoing Martin Hart-Landsberg and Paul Burkett's (2005) argument that China's so-called market socialism has "led the country down a slippery slope toward an increasingly capitalist, foreign-dominated development path" (p. 13). Aihwa Ong and Li Zhang (2008) challenge what they call Harvey and others' "homogenizing view of neoliberalism" (p. 9) by arguing that China's system is (a) "socialism from afar," in which "the adoption of neoliberal reasoning has made possible a kind of socialism at a distance, in which privatizing norms and practices proliferate in symbiosis with the maintenance of authoritarian rule" (p. 4). Whether articulated in terms of socialist or capitalist primacy, all of these approaches hinge importantly on practices and logics of privatization, an assumption that conceals the complexity of Dragon Heads.

In this chapter, my intention is to provide a more detailed treatment of agribusiness politics in China today and how those politics relate to the country's development trajectory. My argument starts from a fairly straightforward premise that state and private elites in China are working together to consolidate a robust domestic agribusiness sector, as both an arena for national-level rural and economic development, and as a new frontier for access to resources and markets abroad. In the first sense, government funding supports agricultural processors to use the

“company and farm” model of contract farming as a way to source primary products from rural producers. In exchange for being put in a position to profit from their heightened control in the food system, the state mandates that lead firms disseminate technologies, training, information, and market opportunities to farm households through “radiation driven” development, which is akin to “trickle down” development, but with an explicit state directive. In the second sense, the state increasingly supports agribusiness firms to invest in feed and agricultural resources abroad, to set up food processing operations in other countries, and to export processed meat products. Through this “go out” (*zouchuqu* 走出去) strategy, the state intends to expand the global reach of Chinese state and private firms, a process which is beginning to challenge TNC hegemony in the global agri-food system (see Chapter Two). As a result, China is turning into an important new site for agribusiness development in its own right, not just a destination for transnational capital.

The sections in this chapter alternate between general treatments of China’s agricultural development model and specific instances from the pork sector. First, a section that introduces and defines Dragon Head Enterprises, followed by an analysis of the extent to which Dragon Heads have come to define the pork sector. Next, a discussion of vertical integration and the “company and farm” model in central policy, and how those logics play out in the pork industry. Finally, a section that predicts that state support for Dragon Head-led vertical integration is conditioning a bifurcated, yet self-reinforcing, national-global development trajectory.

Developing Domestic Agribusiness: Dragon Head Enterprises³³

³³ Throughout the chapter, I use *Dragon Head Enterprise*, *lead firm*, and *leading firm or enterprise* interchangeably. All signify the Mandarin word, *longtouqiye* (龙头企业).

In Chinese culture, the dragon is a symbol of both the Han majority and the Chinese nation as a whole, and is thought to embody power, wisdom, and auspiciousness. The name “Dragon Head Enterprise” comes from the dragon dance, a universally-recognized ceremonial dance in China, which dates to the Han Dynasty, and continues to be a fundamental performance at festivals and holiday celebrations³⁴. In the dance, one performer wears a fierce dragon head, leading others who are bent over each other to make up the dragon’s body, in a long line of coordinated and undulating movement. Inspired by this imagery and meaning, central authorities empower Dragon Head Enterprises to don the “head” of the dragon in order to guide masses of farmers on the path of industrialization, and to lead the nation on the path of modernization.

Dragon Heads first appeared in central policy in 1998³⁵, when authorities proclaimed that lead firms would be the key for modernizing China’s agriculture by integrating and scaling-up production (Zhang & Donaldson, 2008). Then in 2003, eight government institutions³⁶ jointly issued a document for identifying and monitoring lead firms, with an update following in 2010³⁷. Most recently, in March of 2012, the State Council issued “Views on Supporting the Development of Lead Enterprises for Agricultural Industrialization.”³⁸ In addition to outlining the current phase of state support for agribusiness, this document was also the precursor to establishing the “China Association of Leading Enterprises for Agricultural Industrialization” (*Zhongguo nongye chanyehua longtouqiye xiehui* 中国农业产业化龙头企业协会), or the

³⁴ For a detailed description of the dragon dance, see <http://baike.baidu.com/view/102578.htm> (in Chinese).

³⁵ “Decision of the Central Committee of the Chinese Communist Party on Several Major Issues in Agriculture and Rural Work,” issued by the Third Plenary Session of the 15th Central Committee of the Chinese Communist Party, October 1998.

³⁶ The “Provisional Measures for the Administration of Dragon Head Enterprise Identification and Operation Monitoring” document was jointly issued by the Ministry of Agriculture, the National Development and Reform Commission, the State Economic and Trade Commission, the Ministry of Finance, the Ministry of Foreign Trade and Economic Cooperation, the People’s Bank of China, the State Administration of Taxation, and the China Securities Regulatory Commission.

³⁷ Full text is available at: <http://wenku.baidu.com/view/090cc1e96294dd88d0d26be4.html> (in Chinese).

³⁸ Full text is available at: http://www.gov.cn/zwggk/2012-03/08/content_2086230.htm (in Chinese).

“Dragon Head Association,” in November of 2012³⁹. With each set of pronouncements, government support for agribusiness grows, as does the power of these firms in restructuring agricultural economies, production systems, and livelihoods. The new Dragon Head Association in particular provides an institutionalized space for state and private enterprise to work together in the construction of an integrated and increasingly consolidated domestic agribusiness sector.

According to the State Council in 2012, Dragon Heads are “the major agents for constructing a modern agricultural system, and are the key to advancing agricultural industrialization⁴⁰.” They 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’ income⁴¹.

The Dragon Head label entitles a company to government programs that subsidize these responsibilities, and to bragging rights as a lead firm, which translates into enhanced legitimacy as a trustworthy company in the market. Today central, provincial, and local governments can bestow Dragon Head status, with national-level designation being the most honorable and profitable⁴².

To become a Dragon Head, a firm must meet a set of operational, financial, and farm integration criteria, as outlined in the 2003 and 2010 “Provisional Measures” documents.

Operationally, a company must primarily function as an agricultural processor, distributor, or

³⁹ See the Association’s *Baidu Baike* entry at <http://baike.baidu.com/view/9676144.htm> (in Chinese).

⁴⁰From “Views on Supporting the Development of Lead Enterprises for Agricultural Industrialization” policy document. Retrieved from http://www.gov.cn/zwggk/2012-03/08/content_2086230.htm (in Chinese).

⁴¹ From *Baidu Baike* entry for Dragon Head Enterprise, <http://baike.baidu.com/view/125729.htm> (in Chinese). The English is my translation of the original text: 它不同于一般的工商企业，它肩负有开拓市场、创新科技、带动农户和促进区域经济发展的重任，能够带动农业和农村经济结构调整，带动商品生产发展，推动农业增效和农民增收。

⁴² Criteria are less evident and financial support less assured at the local level, such that the Dragon Head title may be the only payout (Zhang & Donaldson, 2008).

intermediary, with processing and distribution accounting for at least 70 percent of the value of the company’s products. Also, it must have legal standing as a state-owned or private enterprise, a group or corporation, a China-foreign joint-venture, or a wholly foreign owned enterprise⁴³.

Financially, the state sets minimum asset and sales thresholds for attaining Dragon Head status, depending on a firm’s location, and operational type. Minimums for processors and distributors by region are as follows:

	Assets Minimum	Sales Minimum
East	150 million RMB (\$24 million)	200 million RMB (\$32 million)
Central	100 million RMB (\$16 million)	130 million RMB (\$21 million)
West	50 million RMB (\$8 million)	60 million RMB (\$9.7 million)

For wholesale firms, those in the East must have a annual sales transactions in specialty markets of at least 1.5 billion RMB (\$241 million), with 1 billion RMB (\$161 million) in the Central region, and 800 million RMB (\$129 million) in the West. Additionally, Dragon Heads must be profitable (returns on assets must be higher than interest on bank loans, etc.), have an asset-liability ratio under 60 percent, and a bank credit rating of at least A. Their products must be competitive in the market, and they must first have provincial Dragon Head status before applying for national-level designation.

In order to fulfill the rural development responsibilities that come along with the Dragon Head name, lead firms must have a strong “interest coupling mechanism” (*liyi lianjie fangshi* 利益廉洁方式) for integrating farm households into their operations and markets. Mechanisms include contracts, shareholding, and cooperation with rural households, and 70 percent of the primary products for the company’s processing and distribution must come through these

⁴³ Currently, it is not common for foreign firms to be designated as Dragon Heads. I analyzed 216 agribusiness firms from eight different agricultural sectors (pork, chicken, soy, maize, rice, wheat, peanuts, livestock feed) in 2011. Only one of the foreign firms had Dragon Head status (Schneider 2012). That firm was People’s Food Holdings Limited, which I discuss in the next section.

arrangements. Firms in the East are required to integrate 4,000 households, those in the Central region, 3,500 households, and in the West, 1,500 households. Whether or not these minimum thresholds are met, and more importantly, whether or not they are beneficial to farm households, are matters of debate to which I return in the below.

Measures to promote Dragon Heads since the turn of the 21st Century fall under two broad categories. First, there are supports for firms directly involved in agricultural processing and distribution. In the period from 2000-2005, the central government spent 11.9 billion RMB (\$1.9 billion) subsidizing construction and operation expenses of these large-scale, national-level Dragon Heads (Huang, 2011). In addition to direct payments, authorities also offer tax exemptions and reductions, export tax rebates, discount loans for export-oriented products, and access to special loans with little or no interest (Zhang, Fan & Qian, 2005). The second category of policy supports are to subsidize wholesalers and agriculture-related sectors, such as companies that specialize in frozen pork storage, product research and development, and sewage management (Zhang, Fan & Qian, 2005). Support programs for these firms are similarly based in financial, fiscal, and tax policies.

As a result of concentrated state support and industry cooperation, lead firms have expanded both in number and in the scope of agrifood system ownership and control. According to official figures for 2011⁴⁴, China had more than 280,000 enterprises engaged in agricultural industrialization, including 110,000 officially designated national-level Dragon Heads. These firms were working with 110 million rural households, following the model of “radiation driven” (*fushe daidong* 辐射带动) farming, in which technology, information, and market opportunities

⁴⁴ From the inaugural speech given by Hui Liangyu, Deputy Prime Minister of the State Council, at the launch of the *China Association of Leading Enterprises for Agricultural Industrialization* in 2012. Full text of the speech available at <http://baike.baidu.com/view/9676144.htm> (in Chinese).

radiate to farmers through their relationships with Dragon Heads. In 2011, this model was operating on 60 percent of the country's crop production area, and covered 70 percent of livestock (pigs and poultry) and 80 percent of aquaculture production. Combined sales revenue of Dragon Heads in 2011 was 5.7 trillion RMB (\$917 billion), and their products accounted for one-third of the country's supply of farm produce and processed foods, and two-thirds of the average food basket in major cities. While scholars argue that official statistics in China are not the most reliable measures of reality, even if these numbers are inflated to some degree, they demonstrate the scale and trajectory of Dragon Head power.

Dragon Heads and the Pork Sector

The pork sector illustrates the prevalence of domestic agribusiness firms, and the success of state support for agricultural processors in particular. Based on 2011 sales data, of the top 10 pork processing firms, 90 percent were Dragon Head Enterprises. Pork slaughter and retailing were similarly headed, with lead enterprises accounting for 80 percent of the top 10 firms in each. While processors are the focus of Dragon Head policy support, on the idea that these firms can most efficiently coordinate the agrifood system for modernization, companies involved in production are also increasingly designated as leaders. Sixty percent of the top 10 pig breeding and production firms were Dragon Heads in 2011.

Table 2 illustrates the dominant presence of Dragon Heads in the pork sector, as well as the relative absence of foreign firms⁴⁵. Combined with the predominance of Dragon Heads in the sector, the domestic nature of pork industry ownership suggests its political significance. Across the sector, only two firms have foreign involvement, though not in the typical joint-venture

fashion. First, in 2006, Goldman Sachs bought a 10 percent share in the Shineway Group (*Shuanghui jituan* 双汇集团), and then sold half of those shares in 2009 to CDH Investments, a Chinese private equity fund (“Goldman plans to sell,” 2009). Shineway is a former state-owned enterprise, now private, and one of the top three pork processors in China. Second, Jinluo Meat Products (*Linyi Xincheng Jinluo rouzhipin youxiangongsi* 临沂新城金锣肉制品有限公司) was founded by a medical doctor, a business entrepreneur, and an officer of the planning department of the Linyi Industrial Bureau in Linyi City, Shandong Province in the early 1990s. The three Chinese co-founders incorporated the company first in the British Virgin Islands, and later in Bermuda to form People’s Food Holdings Limited as a conglomerate⁴⁶. So while Jinluo is a wholly foreign owned firm, its origins are in China, and it is an officially recognized Dragon Head Enterprise. It is also one of the country’s top three pork processors.

Compared with the pork sector, chicken is most similar in terms of domestic ownership and control. All of the top firms in chicken slaughter and retailing are Dragon Heads, and two have foreign joint ventures. Xinchang Foods (*Shandong Taisen Xinchang shipin youxiangongsi* 山东泰森新昌食品有限公司), the tenth largest chicken processor and eighth chicken retailer, established a joint venture with Tyson Foods in 2009, in which Tyson took a 60 percent share of the company’s assets (Mickelson, 2008). Beijing Dafa Chia Tai (*Beijing Dafa Zhengda youxiangongsi* 北京大发正大有限公司), the sixth largest chicken processor and number one chicken retailer, is a joint venture with the Chia Tai Group of Thailand.

Dragon Heads are also embedded in feed and staple food processing, though to varying degrees, and in varying competition with foreign firms. These differences are related to the

⁴⁵ I compiled sales data from industry and government resources, and then cross referenced the top 10 firms in each sector with official lists of national-level Dragon Heads. Data sources are listed below the table.

⁴⁶ I have compiled Chinese agribusiness profiles at <http://pigpenning.wordpress.com/agbiz-profiles/>.

state's management of food security crops on the one hand, and selective liberalization of feed crops on the other (see Chapter One). In the first case, the state defines rice, wheat, and maize as “strategic crops for food security” because of their role as staple foods for human consumption. Even in the wake of WTO accession in 2001, the state has maintained tighter controls on their production, pricing, and imports (Solot, 2006). This political focus is evidenced by the relatively higher ratio of Dragon Heads to foreign firms in the rice and wheat sectors (Table 2). Maize, by contrast, with more foreign firms than Dragon Heads in processing and an equal number in retail, tells a different story. With its increasing management as an industrial and livestock feed crop, and as revealed by the massive spike in imports in 2010, maize may be falling out of strict government control. As I argued in Chapter Two, the state is likely to liberalize maize in a manner similar to soy – in large part to feed more pigs and increase pork consumption – with the effect of displacing smallholder maize production and shifting food security policy to an even narrower range of only two primary crops. Unlike soy, however, where TNCs are deeply embedded, Chinese domestic agribusiness firms like New Hope Group (*Xin Xiwang jituan* 新希望集团) are poised to be the key maize traders (GRAIN, 2012).

Table 2. Share of Dragon Head Enterprises and foreign firms in the top 10 of Chinese agricultural sectors, 2011.

	Dragon Heads Enterprises as a % of Top 10 Firms by sales in 2011	Foreign Firms as a % of Top 10 Firms by sales in 2011
Pig Breeding	60	0
Pig Production	60	0
Pig Slaughter	80	10
Pork Processing	90	10
Pork Retail Brands	80	10
Chicken Processing	100	20
Chicken Retail Brands	100	20
Rice Processing	80	10
Rice Retail Brands	60	0
Wheat Processing	50	20
Wheat Retail Brands	40	0
Maize Processing	10	30
Maize Retail Brands	20	20
Soybean Oil Processing	30	60
Soybean Oil Retail Brands	30	20
Soybean Meal Importers	0	0
Soybean Meal Exporters	10	80*
Soybean Importers	10	30
Feed Processing	50	40

*This figure is out of 5 companies, rather than 10.

Sources of data:

Pig breeding and slaughter: China Swine Health Net (www.1350135.com).

Pig slaughter, and chicken slaughter and retail: China Meat Association (www.chinameat.cn).

Pork processing: China Report Net (www.chinabaogao.com).

Pork and rice retail: Dete Market Research Network (www.detemr.com).

Rice and wheat processing: China Grain Industry Association (www.chinagrains.org.cn).

Wheat and maize retail, maize processing: Bosi Data Research Center (www.bosidata.com).

Soybean oil processing: Guotong Research Report Network (www.bjzjqx.com).

Soybean oil retail: Goukk Network (www.goukk.com).

Soybean meal importers and exporters: China Commodity Marketplace (www.chinaccm.com).

Soybean importers: Baidu documents (wenku.baidu.com).

Feed processing: AiKai Data Research Center (www.icandata.com).

The soy sector is an important exception to the domestic agribusiness rule, but is not a model that other sectors will follow. In his article on the globalization of agribusiness, John Wilkinson (2010) cites the estimate that global traders control 70 percent of China's soy crushing industry. While it may be tempting to generalize foreign investment and ownership in soy crushing to the whole of China's agrifood system, it would be a mistake to do so: soy sector restructuring in China has a unique history, and serves as an example of how the state does *not* want to proceed with agricultural development. I detailed the processes through which soy became transnationalized in Chapter Two, including selective liberalization in the early 1990s, the soy crusher defaults in 2004, and subsequent TNC ownership in soybean crushing and soy oil production. Responses from the central government, particularly restrictions passed in 2008 to limit the foreign investment in soy processing, suggest that if not for the crusher defaults in 2004, the soy sector too would be domestically owned and operated. Authorities are also taking measures to develop domestic soy crushing to compete with foreign firms, and ostensibly, to regain some lost ground. In other words, TNC control in soy crushing and oil processing is not a general process; rather, it is the result of a unique set of political economic circumstances and choices that should not be generalized to other areas of the food and agricultural system.

Dragon Heads, China's Agricultural Development Model, and Vertical Integration

Agricultural development is a political project. It is based on a set of logics and objectives, and enacted through a set of policies and relations, which are managed together to construct an agricultural development model. Understood in this way, models are constantly in the process of being made, and as such, are moving analytical targets, reflecting specific points in time. My analysis in this section reveals that China's contemporary agricultural development

model is based on agribusiness-led agroindustrialization, and the dual objectives of national-level development and global-scale access to resources and markets. The model is framed in central policy and enacted in a system of coordinated decentralization.

Modernization through Vertical Integration

Central authorities are the architects of agricultural development. They set the tone, language, and goals of the model, and delegate funds to provincial and local governments, agribusiness firms, and particular agricultural sectors. Officials in provincial governments interpret central directives, further specifying them to reflect local contexts before passing them along to county authorities for implementation. In agricultural development policy, Dragon Heads are increasingly recipients of state funds, as well as implementers of the model, operating from their position as lead firms that distribute information, technologies, services, and market access. Farmers, then, embody the model in the sense that their labor, and sometimes their land, are enlisted in the process of “agricultural modernization,” although typically not in a way that allows them control over production decisions. This coordinated decentralization in the practice and framing of agricultural development is related to more general reforms since the early 2000s, which have gradually converted the country’s fiscal structure into a transfer system that channels central funds to local governments where initiatives are carried out (Ahlers & Schubert, 2009).

Central policy is the primary arena that officials use to communicate the agricultural development model. As O’Brien and Li (2006) argue, central policy must be understood in the broad, Chinese sense:

Central policies, in this usage, includes essentially all authoritative pronouncements, ranging from Party documents, laws, State Council regulations, and leadership speeches to editorials by special commentators in prominent newspapers. Central policies can be both as general as ‘guidelines’ (*fangzhen*) that cadres should ‘develop the economy’ or

be ‘clean and honest’ or as specific as regulations prohibiting local fees from exceeding 5 percent of a village’s net per capita income the previous year...At the same time, central policies may be formally ratified, like the State Constitution, or only informally publicized, like Deng Xiaoping’s remark that “some people should be allowed to get rich first.” The scope of central policy in China thus encompasses what constitutes law in most other nations but also reaches into far murkier realms, such as pledges made by officials on inspection tours, Party propaganda, and the ‘spirit of the Center’ (*zhongyang jingshen*) (p. 5).

My analysis in the following sections is based on central policy in this broad, Chinese sense.

Throughout the reform era, authoritative pronouncements have expressed *modernization through vertical integration* as the state’s orienting logic for agricultural development. Zhang and Donaldson (2008) traced the history of central policies that articulated this logic, starting with Deng Xiaoping’s “first leap” to dismantle the people’s communes, and through the “second leap” to coordinate rural production. A brief review of these initial phases in model construction is useful for understanding more recent developments.

At the beginning of the reform period (early 1980s), central authorities implemented the Household Responsibility System (HRS) to divide communal land among individual rural households, giving farmers more leeway in selecting crops and selling surplus production. Referred to more generally as *baochan daohu* (turning over production to the household), this system, which Kate Xiao Zhou (1996) argues the state instituted only after farmers were already using it to organize production, made the household – not the collective – the dominant unit of production. When the state increased grain procurement prices after decollectivization, productivity increased initially, playing a role in poverty reduction for more than 200 million farmers⁴⁷. Also around this time, selective liberalization of agricultural markets and privatization of state-owned enterprises (SOEs) spurred the emergence of agribusiness firms that began to deal

⁴⁷ Several factors have contributed to poverty reduction in the reform era. See for example Ho, Eyferth, and Vermeer (2004).

in managing the sale of surplus farm production. Dismantling the communes was the so-called “first leap” in Deng Xiaoping’s vision for rural development.

During the first decade of reform, state investment in agriculture and rural development was spotty, and the productivity gains from the early-to-mid 1980s gave way to stagnation as investment dwindled throughout the 1990s. Then in 1998, under the leadership of Jiang Zemin, the central government embarked on Deng’s “second leap,” issuing statements and policies on developing a collectivized and coordinated rural economy. The “Decision by the Central Committee of the Chinese Communist Party on Several Key Issues in Rural and Agricultural Works” document described moving from “traditional” to “modern” agriculture as the broad development goal, and from uncoordinated and low-scale operation to coordinated and large scale operation. Authorities defined “modern agriculture” as commercialized (*shangpinhua* 商品化), specialized (*zhuananyehua* 专业化), scaled up (*guimohua* 规模化), standardized (*biaozhunhua* 标准化), and internationalized (*guojihua* 国际化), and “traditional agriculture” as the backwards opposite of these ideals. At the same time, they identified vertical integration (*chanyehua* 产业化) as the principal mechanism for achieving modernity, and appointed Dragon Heads as the vehicles to bring it about (Zhang & Donaldson, 2008).

Contract farming between Dragon Heads and smallholder farmers quickly became the state’s primary plan for coordinating rural production, and improving rural livelihoods along market-based lines⁴⁸. In the “Provisional Measures for the Administration of Dragon Head Enterprise Identification and Operation Monitoring” policy document from 2003, authorities

⁴⁸ Authorities also proposed farmer professional cooperatives as a way to scale-up and coordinate smallholder production. See Hale (2013), Huang (2011), and Looney (2011) for critical analyses of cooperatives.

formalized contract farming and the “company and farm” (*gongsi + nonghu* 公司+农户) model⁴⁹ for linking Dragon Head processors with rural primary producers.

The “company and farm” model originated in a chicken start-up operation in the early 1980s when Beiying Wen, an entrepreneurial farmer, contracted with other farmers in an effort to scale-up and standardize production for his broiler processing and sales business. Wen’s company supplied baby chickens, feed, veterinary supplies, technical training, and services to nearby farm households, and farmers in turn provided the labor and facilities for raising chickens. The company offered “protective prices” to ensure delivery and farmer loyalty, and to maintain a constant supply of birds for processing (Liu & Lu, 2008). This small start-up company is now one of the largest domestic agribusiness firms in China – the Guangdong Wens Foodstuffs Group (Wens) – and this early form of contract farming is now widely used across the country and across agricultural sectors (Zuo, Lu, & Ou, 2008). The “company and farm” model is perhaps the clearest expression of how the state proposes managing farmers and agricultural development, while promoting the domestic agribusiness sector.

It is important to note that “vertical integration” in the Chinese policy context refers to two parallel processes: regional scaling-up of production, and the integration of cultivation with processing and marketing (Zhang & Donaldson, 2008). In this way, the “company and farm” model is a form of vertical integration, as it connects producers (farmers) with processors and retailers (Dragon Heads). By official estimates, the model has been quite successful. The Ministry of Agriculture established the Office for Vertical Integration of Agriculture (*nongye chanyehua bangongshi* 农业产业化办公室) in the mid-1990s, with branch offices now in every

⁴⁹ Other variations of the model include “company and production base and farm” (*gongsi + jidi + nonhu*), “production base and farm and industry and processing” (*jidi + nonghu + qiye + jiagong*), and “company and farm and cooperative and production base” (*gongsi + nonghu + hezuo + jidi*).

province. The Office issued its first full-length report in April of 2008 (*Zhongguo nongye chanyehua fazhan baogao* 中国农业产业化发展报告), which stated that by 2005, fully one half of China's cultivated area and 36 percent of farm households (about 87 million) had been vertically integrated, either by lead firms, specialized co-ops (and other brokerage organizations), or specialty markets (Huang, 2011). Vertical integration has penetrated agricultural production even further today. As cited above, official statistics show that products from Dragon Head enterprises accounted for one-third of all farm produce and two-thirds of the average food basket in major cities in 2011.

Vertical Integration and Smallholder Farmers

While discursively framed as a plan to improve rural income and livelihoods, vertical integration is practiced in a way that consolidates power and control with agribusiness firms, to the detriment of farmers and rural environments via the metabolic rift. When I asked about vertical integration and rural development, a person involved in agribusiness in China answered, "The government is a little bit naïve. They think that this 'company and farm' model will benefit both big companies and small farmers, but it mostly benefits the companies." This sentiment, expressed by someone working *inside* agribusiness, was shared by the smallholder farmers I interviewed, none of whom operated under contract. University, government, and NGO researchers also expressed skepticism that the model was in the best interests of smallholders, citing lack of transparency in the operation of contract farming as an important problem. As one NGO researcher in Beijing commented, "Who knows what the 'company' side is doing?"

The contract farming system in China is plagued with serious challenges for smallholder farmers, the intended beneficiaries of the "company and farm" model as a rural development

mechanism. Based on increasing scholarship on the organization and impact of contract farming, these challenges can be divided into *problems of exclusion* and *problems of inclusion* to indicate both the difficulty in obtaining contracts, and the difficulties encountered if a contract is secured. Problems stem primarily from the ways in which the agricultural development model structures state-agribusiness-farmer relations, locating power and control with authorities and firms.

In the first place, smallholder farmers are excluded from contracts in a number of ways. The limited availability of contracts (Guo et al., 2007; Miyata et al., 2008; Stringer et al., 2008), combined with prohibitively high costs of participation (Guo et al., 2007; Lu et al., 2010; Miyata et al., 2008), unattainable market standards (Stringer et al., 2008), lack of farm labour (Miyata et al., 2008), declining soil and water quality for production (Miyata et al., 2008), and the preferences of firms to contract with larger farms (Stringer et al., 2008; Zhu, 2007) create often insurmountable barriers for smallholder farmers to enter into contract relationships.

These problems can be largely attributed to the vast power imbalance between the firm (supported by the state) on one hand, and the farmer on the other. Firms use deliberate exclusionary tactics to avoid contracting with smallholders, and then over-represent the number of contracts they hold with them when self-reporting to authorities (Zhu, 2007). The structure of incentive allocation and distribution also heavily favors firms, and consolidates power in their hands. For instance, firms set the terms of contracts, and have a monopoly on price setting. This reduces smallholder bargaining power, and often makes rural households dependent on firms as market outlets when other options disappear or become unviable. One study found that when there isn't a tax credit incentive to contract with smallholders, firms are likely to exclude rural households altogether (Guo, Jolly & Zhu, 2007). In Hui Liangyu's speech at the inaugural

meeting of the *Dragon Head Association*, he stated that increasing firms' self-monitoring and self-regulation was an important goal for the future, which will only exacerbate these issues.

In the second instance, even if they secure a contract, challenges for smallholder farmers don't necessarily end. Contract enforcement and breach is a problem (Yu et al., 2008; Zhu, 2007), smallholders can become dependent on contracts and stop growing food for home use (Lingohr, 2007, 2011), they frequently lose decision-making power (Hu & Hendrikse, 2009), often lack legal understanding which opens them up to being taken advantage of by firms, and they bear most of the risk in contract relationships when prices fall (Lingohr, 2007, 2011).

Taken together, these challenges of exclusion and inclusion raise serious challenges to claims that contracts improve smallholder livelihoods. What's more, studies of the impact of contract farming on smallholder income are inconclusive, and even in cases where positive effects have been found, authors caution that the number of households that can be brought into contract production is inadequate for this to serve as an all-encompassing model of rural and agricultural development (Miyata, Minot & Hu, 2008). Qian Forrest Zhang (2012) argues that although contract farming is increasing in China today, it is relatively undesirable compared with alternate forms of production, and it "primarily serves the interests of agro-capital and can hardly be considered pro-poor" (p. 482).

An anecdote from my fieldwork clearly illustrates these challenges and supports Zhang's claims. I interviewed an executive at a Dragon Head in Sichuan Province that specializes in pig genetics. When I asked about the "company and farm" model, the executive told me that the company doesn't encourage this model because "farmers (*nongmin*) always avoid their responsibilities," He also said that the firm's plans for the future do not include smallholder contracting. But, in addition to the preferential loans and tax breaks the company receives as a

Dragon Head, it also participates in a government-supported breed exchange project. The company sells “improved” pig varieties to smallholders for 1,000 RMB (\$161) per head, while receiving 2,000 RMB (\$322) per head from the government in subsidies. Here, the company is not only failing to fulfill its agreement to contract with rural producers, but is also profiting handsomely from the combination of state subsidies and sales to smallholder farmers.

Vertical Integration in the Pork Sector

Chinese scholars and policymakers celebrate the pork sector as a paragon of “modern agriculture,” and a shining example of successful and continuing vertical integration (Cui, 2009). In the pork sector, vertical integration is not only of the Chinese variety as detailed above, but also increasingly reflects the way the concept is used outside of China to connote the activities of single firms. William Heffernan (2000) states that, “vertical integration occurs when a firm increases ownership and control of a number of stages in a commodity system” (p. 68). Table 3 illustrates this kind of firm-level vertical integration and Dragon Head-ization among the top 10 firms in different stages of pork production and processing.

Table 3. Vertical Integration among the top 10 firms in pig breeding and production, and pork slaughter, processing, and retail.

	<i>Pig Breeders</i>	<i>Pig Producers</i>	<i>Pork Slaughter</i>	<i>Pork Processors</i>	<i>Pork Retailers</i>
1	Xunxin*	Wens*	Jinluo*	Shuanghui*	Shuanghui*
2	Tieji Lishi	Chuming*	Yurun*	Jinluo*	Jinluo*
3	Fuxin	Bohiya	Shuanghui*	Zhucheng*	Yurun*
4	Zhengyang ZhuMei	Neixiang Muyuan	Zhiyuan	Zhongpin*	Gaojin*
5	Beijing Capital Ag*	Xinwufeng*	Pengcheng*	Delisi*	Tangren Shen*
6	Zhongshan Baihe	Shuangge*	Gaojin*	Jinluo*	Meihao*
7	Shuangge*	Tianzhong*	Zhongpin*	Beixu*	Delisi*
8	Xinwufeng*	Huangjinxiang*	Panyu	Furun*	Ke'erqin Cattle*
9	Chanjiang*	Zhongshan Baihe	Delisi*	Weifang Legang*	Chundu
10	Tianzhong*	Luhuan	Jingyan*	Jitailong	Qianxihe

Firms that rank in the top 10 of more than one stage of production (vertically integrated) appear in bold. Dragon Head Enterprises are indicated by *. Data sources are provided in the notes to Table 2.

Three firms stand out as being on “the cutting edge of modernization” in terms of management, production, and marketing in the pork sector, and as vertical integration leaders. Over the past decade, Shineway (*Shuanghui*), *Jinluo*, and *Yurun* have shared the spotlight in pork processing and sales, vying for the number one position year after year (Cui, 2009). Their combined annual sales in 2011 were 115.6 billion RMB (\$19 billion), which accounted for 68% of total sales for the top 10 pork processors. Combined annual profits were 6 billion RMB (\$965 million), or 86% of total profits for the top 10 pork processors. Together, these three firms employ 119,000 employees, and are concentrating market share in pork processing and sales (Schneider, 2012). *Shuanghui* is a formerly state-owned enterprise, *Jinluo* is Chinese-founded and British Virgin Islands incorporated, and *Yurun* is a private firm founded in Nanjing. All three are Dragon Heads.

Current Agricultural Development Objectives and Trajectories

Recent central policy continues the *modernization through vertical integration* mantra from earlier in the reform era, as well as the centrality of Dragon Head Enterprises, and the assumption that smallholder farmers are redundant. The “Decision of the CPC Central Committee on Major Issues Concerning Rural Reform and Development,” which was adopted at the 3rd plenary session of the 17th CPC Central Committee in 2008,⁵⁰ is the most recent statement of China’s rural and agricultural development goals, as outlined in Table 4 below.

⁵⁰ The full text of the *Decision of the CPC Central Committee on Major Issues Concerning Rural Reform and Development* is available at http://english.agri.gov.cn/sa/ca/201112/t20111227_3751.htm (in English).

Table 4. Summary of the objectives of China’s current agricultural development model.

Goal	Description of Key Points
(1) Ensure sufficient supply of farm produce through domestic resources	Stable growth of grain production; ensure sufficient supply of major farm produce from domestic resources; food security policy focused on grain production & marketing, with measures also taken for edible oil, cotton, swine.
(2) Consolidate rural fundamental operating system	Maintain validity of land contracts; secure farmers’ rights for land contracting and operation; reform traditional agriculture; foster agribusiness; expedite farmer cooperatives.
(3) Upgrade the quality and safety of agricultural products	Improve agricultural standardization through quality and safety accountability systems, including examination & testing, and supervision & law enforcement.
(4) Increase farmers’ income and promote off-farm employment of rural laborers	Double 2008 net income of farmers by 2020, expand channels for income generation in agriculture, expand non-agricultural sector in rural areas to shift surplus rural laborers out of agriculture and into mid-size and large cities, remove urban-rural barrier, build integrated labor market.
(5) Advance agricultural science and technology	Boost independent innovation of agricultural science and technology; establish model for sci-tech advancement; educate farmers in business and technology; establish rural compulsory and vocational education and training.
(6) Build a new social service system for agriculture	Combine public services with for-profit services to provide distribution of agricultural supplies, extension of agricultural technologies, plant protection, disease prevention, agricultural information, product marketing and machine operation. Service provision by public service agencies, cooperative economic organizations, leading enterprises, non-governmental actors.
(7) Strengthen agricultural input and infrastructure construction	Increase subsidies for grain production, agricultural supplies, machinery; increase minimum grain procurement price; expand national reserves of grain, cotton, edible oil, and pork; increase investments in rural areas; encourage local banking and loans; develop agricultural insurance.
(8) Improve agricultural laws and regulations	Strengthen comprehensive law enforcement and education.
(9) Open agriculture wider to the outside world	Fundamental goals are to enhance agricultural efficiency, farmers’ incomes, and international competitiveness of agricultural products by building a modern agriculture. Mechanisms are strengthening South-South cooperation under the FAO’s Special Program for Food Security; participating in bilateral and multilateral agricultural cooperation; promoting agricultural trade and honoring WTO commitments.

Source: “Issues Pertaining to the Development of China’s Agriculture and Rural Economy” section of the *Decision* (2008) document, available at http://english.agri.gov.cn/sa/ca/201112/t20111227_3751.htm (in English).

The goals in the “Decision” document are best read in relation to the 2012 State Council pronouncement, “Views on Supporting the Development of Lead Enterprises for Agricultural Industrialization.” Where the former lays out policy objectives, the latter defines the agents and mechanisms for bringing them about: in line with earlier policies, Dragon Head Enterprises are the leaders and vertical integration is the means. Statements in these two documents echo much from the model in its 1998 frame, especially continuing state support of agribusiness for rural development. What is new in these directives, or at least much more pronounced, is the further

consolidation of Dragon Heads, and the focus on supporting lead firms for a combination of national-level and global-level developments.

National-level developments

For the task of improving conditions inside China, especially in rural areas, vertical integration continues to be the orienting logic in the current incarnation of the agricultural development model (see Goal 2 in Table 4 above). The 2012 “Views” document lists adhering to a household contract management system (*jiating chengbao jingying zhidu* 家庭承包经营制度) as the guiding principle of agricultural industrialization, based on instituting the market to allocate resources and improve rural livelihoods through increased income (see Section II of the “Views” document). In order to further this principle, authorities now propose the development of “lead firm clusters” (*longtouqiye jiqun* 龙头企业集群), composed of companies with complementary functions working together to create markets, construct large-scale and intensive production bases, standardize processing, and disseminate knowledge and technology to farmers through the radiation driven system.

Clustering is the next phase of vertical integration in Chinese agriculture, moving it closer to a model of agribusiness concentration in countries like the United States (see, for example, Heffernan, 2000), where a handful of firms control the lion’s share of agricultural production in sectors like pork and livestock feed. In China, the most powerful firms will be mainly domestic, and largely Dragon Heads. A pork industry insider in Beijing told me that he jokes with colleagues in the National Swine Industry Association that “soon you won’t need an association because you will only have one or two members!”

Agribusiness clustering and vertical integration are the primary *agricultural* means for improving rural income by connecting farmers with markets. It is important to note, however, that non-agricultural wages from migrant labor is the primary mechanism for increasing rural earnings (Goal 4). In 1990, the share of non-agricultural income in a rural household was 22.3 percent, and by 2004 had risen to 52.4 percent (Zhong, 2011). In 2011, the figure remained over 50 percent, and “The income of migrant workers has significantly increased in recent years and has become the main means by which farmers increase their incomes” (“Average monthly income,” 2011). The agricultural development model, therefore, is part of a broader set of policies and practices for rural development, both of which aim to abandon the “self-sufficient peasant economy.”

In the case of income and livelihoods, relying on non-agricultural wages for rural economic growth is discursively and materially framed in central policy as coordinated urban-rural development (CURD) (*chengxiang tongchou* 城乡统筹)⁵¹. The basic tenants of CURD are to use urban industry to support agriculture, to equalize rights and services across rural and urban locations, and to industrialize agriculture to release surplus rural laborers for employment in urban areas (Ye, 2009). Vertical integration and clustering work together with CURD initiatives in the sense that contracts restructure smallholder farming from a system of self-sufficiency to a system of market price payments, and consolidation of Dragon Heads at once drives migrant labor, as large-scale production bases displace smallholder economies, and is proposed as a waged employment destination for the “freed” surplus labor created in the process. CURD and

⁵¹ CURD initiatives are included in the Number 1 papers from 2004-2009, the 12th Five-Year Plan, the *Outline for Development-Oriented Poverty Reduction in China’s Rural Areas, 2011-2020*, the 2008 *Decision by the Central Committee of the Chinese Communist Party on Some Important Issues Regarding the Promotion of Rural Reform and Development*.

related policies propose that one of the best ways to improve agricultural livelihoods is to get rid of them.

The central place of Dragon Heads in food security policy, combined with the sectors highlighted as areas of policy focus, are also telling of the national development trajectory. Goals 1 and 7 designate pork, edible oil, and cotton as strategic sectors that are managed to guarantee domestic supplies and national reserves. As the so-called national food, ensuring increasing amounts of pork provides a platform from which the state can claim legitimacy for its role in progress, modernization, and construction of a generally improving society. Edible oil, on the other hand, is a sector that has been slipping out of domestic control since the soy crusher defaults in 2004 when foreign firms took majority control of soy crushing, and consequently, of soy oil production and sales. A focus on edible oil in recent central policy likely signals a renewed effort to increase domestic ownership and control of the soy sector. Finally, cotton seems out of place in objectives for food security and reserves, nevertheless its inclusion suggests the crop's increasing economic value for both domestic use and export, especially in China's Western region. But while cotton is most clearly included in the agricultural development model's goals for economic reasons, the pork and edible oil sectors are arguably also as related to economic growth and capital accumulation as they are to food security. Both are increasingly commercialized, both are increasingly controlled by agribusiness firms, both are increasingly profitable as middle- and upper-class products (see Chapter Six).

Global-level developments

The same rationale of vertical integration to propel the agricultural development model for national-scale developments also conditions global strategies. While the language of

“internationalized” agriculture has been written into central policy since at least 1998, both the 2008 “Decisions” document and the 2012 *Views* document more explicitly state that increasing international engagement is a fundamental goal of development policy and practice. Dragon Head firms are, again, at the heart of this goal.

Export promotion is one avenue of international engagement in the model. This may come in the form of direct subsidies for firms engaged in export markets,⁵² or in the form of standardization through food quality and safety certification measures⁵³. State and provincial authorities are increasingly adopting international testing standards to regulate the agrifood system, and HACCP (Hazard Analysis and Critical Control Points)⁵⁴, ISO9001 (International Organization for Standardization: Quality management), and ISO22000 (International Organization for Standardization: Food safety management)⁵⁵ are used by most commercial agribusiness firms in China today. In this era of food safety scandals (Wu, 2012) and declining consumer-citizen trust (Zader, 2011), using international standards allow firms to communicate to domestic consumers that they are following well-defined and institutionalized protocols. At the same time, adopting international standards primes domestic firms for selling their products on international markets. I interviewed general managers and CEOs of Dragon Head pork processing firms who told me that the primary reason they adopted ISO and HACCP standards was to begin exploring export markets.

Another avenue for global development in agriculture, and one that is drawing increasing attention in scholarly research and in the press, is related to state support for Chinese firms to invest in operations and resources abroad. The “go out” (*zou chuqu*) policy, officially launched

⁵² See 2003 and 2010 *Provisional Measures* documents, and the 2012 *Views* document.

⁵³ see Goal 3 in Table 3 above and the *Views* document.

⁵⁴ HACCP Alliance website: <http://www.haccpalliance.org/sub/index.html>.

⁵⁵ ISO website: <http://www.iso.org/iso/home.html>.

in central policy in 2000 and further spurred by the Ministry of Agriculture in 2008, is part of a business development strategy to expand the global reach of Chinese state and private firms and institutions (Hofman and Ho, 2012; Ping, 2008). According to the *Strategic Plan for Agricultural Going Out* (*nongye zou chuqu zhanlue guihua* 中国走出去战略规划), issued by the National Development and Reform Commission (NDRC), Chinese enterprises that invest in agriculture, forestry, and fisheries abroad can benefit from up to 30 million RMB (\$4.8 million) in fiscal and financial support, in addition to tax breaks and insurance (“Chinese agriculture goes global,” 2012). To date, the state’s agriculture-related “going out” focus has been on “strategic SOEs that Chinese policy-makers see as capable of rivaling established multinationals” (Cotula et al., 2009, p. 55). For example, *Beidahuang*, one of China’s largest state-owned agribusiness firms with operations in grain, soy, and livestock production and processing has reportedly invested in land and/or has interest in investing in land in Argentina, Australia, Brazil, the Philippines, and Russia⁵⁶. COFCO (the China National Cereals, Oils, and Feedstuffs Corporation, *Zhong liang jituan* 中粮集团), the Chongqing Grain Group (*Chongqing liangshi jituan* 重庆粮食集团), and the China National Agricultural Development Group (*Zhongguo nongye fazhan jituan* 中国农业发展集团) have also gone out for land and agricultural resources abroad (“Chinese agriculture goes global,” 2012). All are Dragon Head Enterprises.

In addition to enacting domestic measures to spur international engagement, Chinese authorities are also increasingly working through South-South cooperation, including bilateral and multilateral agricultural agreements. Goal 9 in the 2008 “Decision” document (Table 4) outlines these mechanisms, and suggests that the state is promoting agribusiness firms in ways that go around the confines of the WTO and the power of TNCs. It also suggests that building a

⁵⁶ See the *Beidahuang* page at Food Crisis and the Global Land Grab, available at

robust domestic agribusiness sector is about more than national-level development; the new relations that are currently emerging around the operation of Chinese state and state-supported firms in global agricultural systems may well define a new phase in global agrifood governance. *Beidahuang*, for instance, may become the “new B” in the A.B.C.D. of global grain traders (A.B.C.D. refers to the transnational firms, Archer Daniels Midland, Bunge, Cargill, and Dryfuss).

Self-Reinforcing Trajectories

The example of Jade Meat Processing Company, a provincial-level Dragon Head in Sichuan Province, brings several of these points together in a way that suggests both the general operation of the agricultural development model, and its trajectory. The case illustrates the process of coordinated decentralization for vertical integration, as well the self-reinforcing dual objectives of national- and global-level developments.

The Jade Meat Processing

The Jade Meat Processing Company is a private agribusiness firm located in Minxing Country near Chengdu in Sichuan Province. It was founded in 2000, and by 2005, was awarded provincial-level Dragon Head status, in addition to state-designation as a “Sichuan Famous Brand.” The company is vertically integrated, with operations in boar breeding, hog production and slaughtering, and pork processing, distribution, transport, and retail. Jade Meat slaughters 1.3 million hogs each year for its own-brand processing and retail businesses. The company’s sales network covers 26 administrative division (provinces, municipalities, autonomous regions) in China, and they market more than 130 kinds of products.

According to the firm's general manager, in 2009 central authorities earmarked 400-500 million RMB (\$64–80 million) to support animal husbandry nation-wide. Of that total, Sichuan authorities designated 8 million RMB (\$1.2 million) of the provincial pot to Minxing County, where local officials then allocated 5.8 million RMB (\$933,000) to the Jade Meat Processing Company for operating expenses. The general manager at Jade Meat said that these favorable government policies for agricultural processors were the most important opportunity in the business, citing their annual subsidies and no interest loans as key benefits.

The general manager reported that in 2010, the company contracted with 1,188 local farmers, and the “company and farm” model helped them increase household income. I asked to visit a farm household that the company held a contract with, but was told that would be too “difficult.” Because of this, I don't have a clear sense of the kind of farm that Jade Meat contracts with, whether they are so-called specialized household farms, or backyard farms.

The company plans to expand substantially in the next five years, increasing both their packaged pork business, and adding poultry processing. They are preparing to apply for listing on the Shenzhen stock exchange, have adopted HACCP and ISO standards, and have passed the national inspection to obtain an export certificate. They currently export packaged pork products to Hong Kong, Japan, and South Korea, and hope to greatly expand their exporting business in the near future.

The following excerpt from the Jade Meat's company brochure summarizes the self-reinforcing nature of national- and global-level agricultural developments in China today:

Focusing on economic globalization, Jade Meat Processing Company collects social funds, integrates county and municipal resources, and actively seeks national financial support in our effort to develop the hog industry in Minxing County, while forging ahead in the next 5-7 years to become Chengdu's largest pork processor, Sichuan's best Dragon Head Enterprise in boar breeding, and Western China's largest pork processing and export enterprise.

Jade Meat is just one example of a general trend in agricultural development. As policies locate power in state and private agribusiness firms, they become more vertically integrated domestically, and are also expanding their presence globally.

Conclusion

I have argued in this chapter that the structure of state support for Dragon Head Enterprises reveals the logics, mechanisms, and trajectory of China's agricultural development model. With the pork sector as an analytical lens, it is clear that China is a new site of agribusiness development in its own right, and not just a destination for transnational capital. It is also clear that private enterprise is not the only logic defining the present moment in China's modernization project. State-owned agribusiness firms are important loci of profit and accumulation, and state support for private firms through subsidies, financial incentives, and Dragon Head designation complicates a clear state-private division. As the state also increasingly supports firm to "go out," and companies like *Beidahuang* play an increasingly important role in international markets, private enterprise may no longer be the only logic animating global agrifood governance either. It seems likely that agribusiness politics in the future, both in China and on the world stage, will be increasingly Dragon-Headed.

CONCLUSION

MEATIFICATION TRAJECTORIES

My analysis up to this point has specified meatification in China as a state-structured, agribusiness-led project that aims to replace smallholder farming with vertically integrated commercial agriculture, in an attempt to increase commodity pork production and modern forms of meat consumption. The meatification project, I have argued, is enabled by and deepens the metabolic rift, as evidenced by the continuing shift from locally-embedded agroecological farming practices to global grain trades and toxic rivers of waste. In this concluding chapter, I propose that my study of meatification suggests the trajectory of China's (agricultural) development more broadly. My analysis here is both summative and predictive, and highlights newly emerging scholarship and questions that remain open for further investigation.

Meatification and Power: Industrialization, Consolidation, Vertical Integration

State support for industrial pork production will continue to increase, with subsidies and financial incentives awarded to large-scale commercial operations. Funds will be used for construction and expansion of CAFOs and processing facilities, and firms will grow in both number and scale. The largest domestic agribusiness firms will become further vertically integrated and consolidated. For instance, COFCO, China's largest grain trader, aims to also be the country's largest pig farmer. By 2015, this diversified state-owned enterprise plans to

produce 10 to 15 million pigs per year, and will invest 3.5 billion RMB (\$570 million) in swine and poultry slaughter facilities so that it can process the livestock that it raises (Martin, 2012). Other lead firms such as Shuanghui, Yurun, Jinluo, and the New Hope Group will also continue to expand.

The Ministry of Agriculture will continue to promote Dragon Head Enterprises and the company and farm model of contract farming. Lack of transparency in contract operation and reporting will continue to be a challenge, and power will shift even further to authorities and firms, as the agribusiness sector becomes further consolidated. From 2011 to 2012, I conducted research for Oxfam Hong Kong (OHK) on the impacts of vertical integration on poor rural and agricultural livelihoods. The work was commissioned to inform OHK in its advisory role with the Ministry of Agriculture on new regulations for Dragon Head Enterprises and contract farming. Because my analysis concluded that the company and farm model was not in the best interests of smallholder farmers, as I argued here in Chapter Five, OHK did not use my findings in their negotiations with the Ministry. The notion that supporting smallholder farmers to carry out agroecological farming at local levels is not inline with the logic or goals of the country's agricultural development model (Schneider, 2012).

Transforming *nongmin* into migrant waged laborers and/or into primary producers for vertically integrated agrofood processors, however, is part of the model. Following the discursive constructions of *nongmin* as a backwards drag on development that I detailed in Chapter Three, smallholders will continue to be transformed. The adoption of a Rostovian logic of development, however, will not result in a death of the peasantry in the near term, as evidenced by findings from two lines of current research. First, scholars are studying the role of China's unique system of collective land rights in shaping farmer-firm relations and providing farmers with bargaining

power to restrict overt dispossession (Gürel, 2012; Zhang & Donaldson, 2008, 2010). Second, researchers are analyzing farmer cooperatives as a “middle way” between individual backyard household farms and large-scale commercial farms. Philip Huang (2011) argues that small-scale family farms in China are better suited for what he calls “new-age” agriculture, a category that includes organic crop and livestock production that require a higher degree of hand labor than mechanized farming can provide. He sees vertical integration in the form of co-ops as the sustainable way forward, as opposed to the agribusiness-led form that dominates the current development model (see Chapter Five). Similarly, critical development scholars propose that farmer cooperatives associated the New Rural Reconstruction Movement are a potential socialist alternative to agribusiness-led vertical integration (Day & Hale, 2007; Hale, 2013). More research is needed in both of these areas to assess the potential of collective land rights and farmer-initiated coops in conditioning greater *nongmin* control over their livelihoods and production decisions.

Meatscapes and Meat Types

Meatscapes will begin to shift away from the urban street stall, and into the supermarket aisle. In addition to transnational retailers like Carrefour and Wal-Mart, domestic firms like Beijing Hualian Hypermarket and Lianhua Supermarket Holdings will increasingly become sites of modern meat commerce (Data Monitor, 2010). At the same time, the share of meat sold in wet markets will continue to decline, especially in metropolitan areas.

With increasing retail purchasing power, companies will continue to diversify pork products, especially for middle class consumers. Currently, about 85 percent of China’s pork is eaten fresh as butchered cuts (McOrist, Khampee & Guo, 2011). Retailers aiming to bring pork

indoors and under plastic for longer shelf life, combined with increasing investment in pork processing, will increase markets for packaged pork products. Urban domestic markets will be the primary focus, but companies will also export sausages and other packaged goods, first to other Asian locations, and then more broadly.

Consumer health and food safety concerns (Li, 2006; Yin et al, 2008), combined with concerns about food quality in the new consumer culture (Zader, 2011), will support retail sector expansion for “organic” and “sustainable” meat products (Sheng et al., 2009). Supermarkets currently account for 80 percent of organic retail sales, with Carrefour and Wal-Mart as the leaders (International Trade Center, 2011), but Chinese supermarkets and specialty shops will increasingly sell more foreign and domestic certified organic and “sustainable” meats. These markets will be exclusively urban and exclusively for the growing middle and upper classes.

Campaigns to promote lean pork as the modern, healthy alternative to China’s traditionally fatty pork will continue to shift consumer buying patterns, if not consumer preferences (McOrist, Khampee & Guo, 2011). While younger urban consumers as a market segment increasingly favor lean pork (Personal Communications, 2010), other wealthy consumers will have the option to buy more traditional forms of pork, re-defined as a sustainable and therefore, uber-modern, consumer product. So-called “boutique pork” markets are developing, in which small-scale farming operations use indigenous pig breeds and coarse, rather than fine, feeds to produce “specialty” pork. As a newly emerging market, more research is needed to understand the form and distribution of these farms, but it seems that they will be a niche market for capital, not for smallholders.

For example, I visited the Lucky Pig in Sunshine farm outside of Chengdu in Sichuan Province. The farm’s founder and operator, Mr. Ying, was a stock broker in China for years

before becoming a Taoist, biodynamic pig farmer. He told me that with the birth of his daughter, his life and priorities changed dramatically. Before, his focus was solely on making money, but in the context of mounting food safety scandals and agriculturally-based environmental pollution, concerns for his daughter's health and future persuaded him to leave his banking career and become a farmer. He started training in biodynamic farming, acquired land use rights in a village near Chengdu, bought an initial stock of local indigenous pigs, and opened a restaurant in Chengdu to serve as an outlet for his farm produce. His operation has grown, and he now works with pig breeders making several unique indigenous crosses that he raises on the farm. He also grows a variety of crops and raises chickens and ducks. In addition to his upscale restaurant, he sells pork and produce directly to a small group of wealthy Chengdu consumers who share his concern for the health and safety of their children, and who have the income to spend on high priced "specialty" pork.

Mr. Ying's brand of farming uses agroecological practices to produce clean, culturally appropriate pork. But this kind of boutique pork transforms what was once the "pork of the people" – namely, fatty pork produced from indigenous pig breeds raised by small-scale farmers on course feedstuffs – into a specialty product for exclusively upper class consumers. Systems like Mr. Ying's have important ecological benefits, but as a class project, offer little in the way of addressing the country's food needs.

Meatification Project and Class Diets

Boutique pork is only one expression of pork as a class issue. The way that the meatification project is structured and managed more generally constructs a basic diet bifurcation between *meat for the elite* and *grains for the masses*. "Elite" in this case has a double meaning: it

signifies both the state and agribusiness elites who structure and benefit from the operation of the project, and the urban middle and upper class consumers who are its intended target.

First, the meatification project creates new arenas for profit and accumulation, and for consolidating power. The state agencies that manage and regulate meatification, and the private and state-owned agribusiness firms that enact it, are the primary beneficiaries. The state not only acts as the architect of agricultural development, setting the goals and terms of the project, but also profits from the leading market position of state-owned enterprises like COFCO, Beidahuang, JiuSan, and the Chongqing Grain Group. At the same time, steadily increasing pork supplies help to legitimize the state for its role in providing a bountiful food agrifood system, and rising to meet consumer expectations. While a grain-based diet used to be “enough,” the famines and food rationing in the country’s not-so-distant past; combined with new consumer cultures, notions of modern diets and consumption, and a highly productive industrial food system have created new expectations for turning “meat dreams” into “meat realities.” The state plays an important role in both constructing and fulfilling this demand.

Second, agribusiness companies in general, and Dragon Head Enterprises in particular, lead the meatification project by owning and managing the means of production and arranging and controlling the sale of commodity pork. As I argued in Chapter Five, these domestic firms are becoming increasingly capitalized, consolidated, and vertically integrated. Commercial firms across the board are accumulating capital, but they are also giving rise to a new class of agricultural super-rich. Ironically, while China’s poorest people are smallholder farmers (Zhu, 2011), some of its richest are agribusiness tycoons. Among the ten wealthiest people in China in 2011, two were CEOs of domestic agribusiness firms involved in the meatification project (Forbes, 2011).

Urban middle and upper class consumers also comprise the elite in this scenario. Satisfying the changing tastes and expectations of these groups of people is a key political and economic priority. With the construction of a new consumer culture in which the form and content of individual purchases is used to express social position (Zader, 2011), urbanites are keen to participate in the meatification project, with daily meat consumption signifying class status. To repeat the particularly prescient quote from Mr. Bu, the agribusiness CEO and pig enthusiast from Shanghai, “Meat [pork] signifies wealth. The more money you have, the more [pork] you will eat.”

That the meatification project is uneven and urban-focused is evidenced by the unequal distribution of meat consumption across urban and rural populations, as well as by the emergence of diseases of affluence. People in China’s cities eat almost twice as much as those in the countryside. In 2008, average per capita urban meat consumption was 22.7 kilograms per person, while it was 13.9 in the countryside (Ministry of Agriculture, 2010). This measure includes pork, beef, and mutton, but pork is far and away the most important component.

The health consequences of uneven meatification are also uneven. A study in 2008 found that one in every four adults and nearly twenty percent of children under the age of seven in China are overweight. In 2005, the central government reported that 70 to 90 million Chinese people were clinically obese, accounting for one-third of the global total (French & Crabbe, 2010). The combination of increased consumption of meat, processed carbohydrates, sugars, and fats contributes to the fattening trend, as well as a range of diseases like type two diabetes, coronary heart disease, and diet-related cancers. More important analytically, the urban nature of diet-driven maladies further reveals the divergences that the meatification project - in conjunction with other similarly constructed dietary changes - creates.

While meat moves to the center of urban middle class consumption, grain continues to be the foundation of rural diets. Across most food categories, both rural and urban consumption are increasing: meat, poultry, aquatic products, dairy products, eggs, fruits, and vegetables intake are all rising across the population (Ministry of Agriculture, 2010). Grain, however, is an important exception. While grains are being displaced by other foods in the cities, as is expected according to nutrition transition theories, consumption of grains is rising in the countryside. The table below illustrates these trends, highlighting the *meat for the elite, grains for the masses* phenomenon.

Table 5. Rural and urban grain and meat consumption, 1991-2008 (kg/person/year).

	Grain		Meat	
Year	Rural	Urban	Rural	Urban
1991	255.6	127.9	12.2	22.2
1992	250.5	111.5	11.8	21.4
1993	251.8	97.8	11.7	20.8
1994	257.6	102.0	11.0	20.2
1995	260.1	97.0	11.3	19.7
2000	249.5	82.3	14.6	20.1
2001	238.6	79.7	14.5	19.2
2002	236.5	78.5	14.9	23.3
2003	222.4	79.5	15.0	23.7
2004	219.3	78.2	14.8	22.9
2005	208.8	77.0	17.1	23.9
2006	205.6	75.9	17.0	23.8
2007	199.5	77.6	14.9	22.1
2008	199.1	58.5	13.9	22.7

Meatification and Food Security

An important reason for the emergence of a bifurcated class diet – in addition to the meatification project – is the way the state defines and regulates food security as grain security in policy. The term “food security” (*shipin fangyu anquan* 食品防御安全) is a relatively new and

not yet commonly used concept in China. It is used primarily to translate policies and opinions from the United Nations and other foreign and development agencies, but it does not appear in Chinese policy (Christiansen, 2009). The concept of “grain security” (*liangshi anquan*, 粮食安全), on the other hand, has been an important and orienting component of agricultural development in China since at least the 1950s, when authorities worried that famines during the Great Leap Forward would lead to peasant revolt. In addition to recognizing the need to ensure grain for the population, central planners during Mao’s time were also committed to doing so without relying on foreign land, commodities, or capitalists. “Grain security” is used in policy to mean something akin to the idea of ensured food access, but from its inception as a political concept, it has meant “grain self-sufficiency” (Christiansen, 2009).

Today, grain security is defined as adhering to a 95 percent baseline of domestic rice, wheat, and maize production, primarily because of their role as staple foods for direct human consumption (Wong & Huang, 2012). Since accession to the WTO in 2001, while selectively liberalizing other crops the state has maintained tighter controls on production, pricing, and imports of these three “strategic crops” for grain security (Solot, 2006). Food security is grain security, and grain security is grain self-sufficiency. These three grains in particular are for the masses.

As a side note, these issues are often lost in translation from Mandarin Chinese to English. International commentators and analysts typically conflate the two when reporting on and in China, and even English versions of papers such as the *China Daily* use “food security” when they should use “grain security.” An additional translational challenge is that online tools such as Google Translate make no distinction between the two concepts. Zhou Zhangyue (2011)

attributes this to the fact that grains have long been staples in Chinese diets, and so the word *liangshi* (grain) is more commonly used than the word *shiwu* (food).

On the shifting policies of food security in China, John Wong and Yanjie Huang (2012) write,

It should be highlighted that food production in China is no longer entirely for human consumption, but also for production of animal feed and biofuels like ethanol. In fact, broadly defined, China's "food security" today means more than the provision of easy access to sufficient calorie intake. The objective now is to provide nutritious and diverse food to meet people's dietary needs for their active and healthy lifestyles (p. 120).

This broader conception of food security is more in line with the definition proposed at the 1996 World Food Summit in Rome, and used by development organizations internationally (Zhou, 2011). Ironically, "food security" is coming into vogue in China at precisely the moment when the terms of the global debate are changing to include the concept of "food sovereignty," and the notion that people and communities should control what food is produced, how it's produced, and for whom (Lawrence & McMichael, 2012). While the food sovereignty idea that countries have the right to consume what they produce (instead of trading it) resonates with the central government's discursive fixation on food self-sufficiency, the kind of democratic control of the food system at the heart of food sovereignty is antithetical to the Dragon Head-led, vertically integrated form of agriculture that is the logic of China's reform era development model.

Meatification and Inequality

The polarization of meat-grain diets reflects other broader inequalities in China today. Before Reform and Opening, China was one of the most egalitarian countries in the world. Today, with a Gini coefficient of 0.61⁵⁷, it is among the most unequal (Shen, 2012). In 2011,

⁵⁷ The National Bureau of Statistics stopped releasing official figures for the Gini coefficient in 2001, stating that income data for wealthy households was incomplete (Shen, 2012).

there 1.11 million millionaires in China (Balfour, 2011), and 115 billionaires (Flannery, 2011), ranking number three and number two in the world respectively. At the same time, there were 214 million people living under the United Nations poverty threshold of \$1.25 per day, 500 million on less than \$2.00 per day (UNDP, 2011), and 128 million under the Chinese central government's poverty line of 2,300 RMB (\$362) per year ("China raises poverty line," 2011).

In addition to the income extremes between poor rural farmers and billionaires in Beijing (and elsewhere), income inequality is also expressed in more moderate relations, especially along urban-rural lines. According to China's National Bureau of Statistics, the 2011 urban to rural income ratio was 3.13 to 1. In order to avoid further social conflict and (largely) rural unrest that have been persistent and increasing in the reform era, central authorities have made closing the income gap a political priority. They have implemented a number of measures aimed at increasing income levels for farmers and migrant workers in particular: these include direct farm subsidies, vertical integration and contract farming, abolishing agricultural taxes, and adjusting the legal minimum wage for workers at least once every two years. According to the State Council (2011), the annual rural income growth rate remained higher than six percent from 2006 to 2011, but scholars find that these increases resulted primarily from migrant labor remittances, rather than from the success of other government measures (Ahlers & Schubert, 2009; Göbel, 2010; Liu, Chen, and Long, 2011).

One of the places that migrant workers, farmers, and other poor populations are hardest hit is in food expenditures. According to the Ministry of Agriculture, 2008 average annual food expenditure in urban China was 4,260 RMB (\$636), compared to 1,599 RMB (\$239) in rural areas. While metropolitan consumers spend almost three times as much money on food, rural residents spend a larger share of their income fulfilling basic dietary needs (43.7 percent of rural

income, versus 37.9 percent of urban income). When food prices increase, therefore, those in already vulnerable positions vis-à-vis food markets are most affected. This is a general phenomena across the globe, but in China, the centrality of pork gives it a specific character. As the central component of the Consumer Price Index, pork prices are particularly important to state authorities, for whom pork price is both an important trace on inflation and a thing to be regulated to head off social unrest.

Pork price is also important to cash-poor consumers. I was project director for a study of wages and working conditions in the garment sector of two Special Economic Zones in southern China in 2010. Solidaridad, the NGO that commissioned me to conduct the study, wanted to gain a better understanding of whether or not minimum wage levels, which are considered by the government to be “living wages,” were adequate for workers. I administered surveys to 123 migrant workers, asking questions about their income levels, needs, and expenditures. The workers were half male and half female, with average ages between 26 and 30, and average households of five members. More than two-thirds said they were working in the factory to help meet their family’s basic needs in the countryside (food, education, health, housing), and the same number said that while their wages were rising, increases were not enough to keep up with inflation, especially for buying food. Several respondents provided written comments in addition to scripted questions that mentioned not being able to afford pork [meat] as one of their primary wage complaints (Schneider, 2011a).

Meatification and the Feed Import Regime

This idea of *meat for the elite* and *grains for the masses* is an expression of the tensions between meatification and food security. Central to Tony Weis’s original conception of

meatification is that land used to grow feed for livestock competes with land used to grow food for direct human consumption. In China, the state manages these tensions through a feed import regime that takes the form of both soy and maize imports, and more recently, land grabs at home and abroad.

The feed regime is based on, and justified by, a limited-land-high-population discourse that serves to promote an industrial “grain-livestock complex” (Weis, 2007) as the only solution to China’s food issues. Most discussions of agricultural development in China begin with a well-worn statistic: *China is feeding 21 percent of the world’s population on nine percent of its arable land*. This is the most powerful trope used to describe the country’s food security challenges, and to rationalize the measures enacted to overcome them. Government reports, official speeches, academic studies, and press pieces are replete with allusions to both the challenge of feeding China in this context, and the successes of food security policies in overcoming that challenge.

Timothy Mitchell (1991) argues that a similar “geography versus demography” discourse framed economic development in Egypt in the 1970s and 1980s. He details how development agencies used imagery of a rapidly expanding population on a limited land base in order to frame solutions the country’s food and agricultural problems as technological and managerial, rather than social and political. Mitchell argues that the shift to meat consumption in particular – rather than the increase in population – was the primary cause of dramatically increased grain imports starting in 1974. There are clear parallels here with Chinese meatification, but whereas Mitchell documented how international development agencies used the “geography versus demography” discourse to naturalize Egypt’s food problems from an outside perspective, in China, the discourse comes largely from the state.

The state has navigated around the limitations that the “21-9 challenge” would seem to impose on food security and meatification by importing feed for livestock. As I detailed in Chapter Two, starting in the early 1990s, officials liberalized the soybean sector, and redefined soy as an industrial crop for livestock feed production, instead of as an agricultural crop for human consumption. By 1996, China became a net soy importer, and by 2003, became the world’s largest importer of soybeans. In the 2011-2012 trade year, China imported 56 percent of the total global soy market (USDA, 2012). Because soy is no longer counted as a “grain,” these massive imports don’t appear on the balance sheets for grain security or food self-sufficiency. Soy imports, however, are the country’s single largest agricultural import category, so much so that China became a net food importer by 2004, and accounted for nine percent of total world agricultural imports in 2010 (Lohmar et al., 2009; Smaller, Qiu, & Liu, 2012).

From 2010, maize imports have also become part of the feed import regime. Because maize is increasingly used in industrial meat production, authorities seem poised to liberalize it in a manner similar to soy, removing it from the list of “strategic crops” for food security, and from the 95 percent baseline. In a People’s Daily interview on agricultural development in late 2011, Cheng Guoqiang of the PRC Development Research Council argued that China should continue to strive for food self-sufficiency, but also accept the inevitability of imports (Zhu, 2011). His comment that policies should focus on maintaining self-sufficiency in the country’s *two* staple crops – rice and wheat – seems predictive of the likely redefinition and liberalization of maize. If and when maize becomes part of the meat-based selective liberalization plan, Chinese domestic agribusiness firms will be in place to control its trade (GRAIN, 2012). The state does not want to reproduce the transnational takeover of soy crushing in the maize processing industry.

Scholars and analysts have begun to study China’s role as an investor in the global land rush (see for example Borras et al., 2012; Hoffman & Ho, 2012; GRAIN, 2012; Pearce, 2012; Smaller et al., 2012). Of particular interest for understanding the tensions between meatification and food security are land deals related to livestock feed. According to the International Institute for Sustainable Development (Smaller et al., 2012), Chinese enterprises have invested in, or are planning to invest in, soybean and maize projects in Latin America, Asia, Africa, and Latin America and the Caribbean (see Table 6). These are principally livestock feed-related land deals⁵⁸, supported by the “go out strategy” to expand the global reach of Chinese state and private firms and institutions (Armony & Strauss, 2012).

Table 6. Geography of Chinese investment in livestock feed-related land deals.

Soybean Investments	
Brazil	Democratic Republic of Congo
Argentina	Sudan
Bolivia	Zambia
Kazakhstan	Russia
Maize Investments	
Burma	Cameroon
Cambodia	Democratic Republic of Congo
Uganda	Sudan
Philippines	Tanzania
Bolivia	Zambia
Russia	Zimbabwe

*See Smaller et al. (2012) for size, status, and sources of investment information.

As Chinese firms continue to “go out,” their power in global markets will increase. As I argued in Chapter Five, state-owned agribusiness firms like *Beidahuang* will begin to reform the relations of global agricultural markets by directly investing in land and infrastructure in places like Brazil, in order to avoid the constraints and hegemony of the global grain traders. This will

⁵⁸ Energy corporations are also investing in maize projects in particular, suggesting that some land may be

be an increasingly important area of study in the coming years. This “state of agribusiness” elicits questions about the corporate food regime. As Philip McMichael (2009) argues, “The difference made by food regime analysis is that it prioritizes the ways in which forms of capital accumulation in agriculture constitute global power arrangements, as expressed through patterns of circulation of food” (p. 140). If China is a site of agribusiness development, and if some of its most powerful firms are state-owned enterprises, what does this mean for theorizing the corporate food regime? Do China’s agri-food politics constitute a new form of accumulation and new global power arrangements? Does this construct a corporate food regime with Chinese characteristics? And if so, what will be the implications?

Related to this line of questions, the role of *Beidahuang* in domestic land grabs for feed production also needs further investigation. On a trip to Heilongjiang Province, where I attended the *First International Soybean Industry Expo and Beidahuang Soybean Festival in Jiusan* (九三) in 2010, I began to see how state institutions and agribusiness firms are transforming China’s northeast region into an industrial soy and grain frontier. Questions about why, how, by whom, and to what effect for rural people and environments are questions that I plan to take up in my next research project.

Meatification and Metabolic Rift

CAFOs are another form of land grab, and another technical solution that the state proposes for overcoming the “21-9 challenge,” and managing meatification-food security tensions. CAFO facilities are celebrated as paragons of efficiency, as thousands of animals are packed into buildings, increasing the protein output per unit of land. To initiate this kind of

intended for biofuel production. Livestock feed, however, is the primary use.

concentrated production system in China, agribusiness firms procure land lease rights from village, township, or municipal governments before erecting buildings. Depending on social and political relations, this process may take years to complete, or may be done quickly and “behind closed doors.” Many of the agribusiness executives I interviewed were also local government officials. These kinds of overlapping roles and relations can quickly resolve the land question. Whatever the case, land deals for CAFOs are different from land takings for urban development that feature in the popular press (see for example Amnesty International, 2012). In most cases the process through which companies acquire land for CAFOs appears to be less coercive and violent than forced evictions, though the smallholder dispossession that accompanies these deals is arguably just a more subtle form of violence.

The amount of land needed for industrial meat operations is relatively small, ranging from a few to at most 50 hectares. But the environmental, and therefore social, impacts of industrial meat production spread far beyond the CAFO. The nearly five billion tons of largely untreated manure that CAFO operators flush into surrounding waterways every year (Zhu, 2010) has serious implications for smallholder farmers who depend on that water for agriculture and household use. The World Bank conservatively estimates that 300 million people in rural China don't have access to safe water (Xie, 2009), in part because of industrial livestock production.

Water pollution is a current and mounting problem, and manure from industrial livestock production is the most important source. This suggests China's food security politics, which produce environmental injustices (see for example Schroeder, St. Martin, Wilson & Sen, 2008). The development of industrial pork and the meatification of Chinese diets is a political and economic objective for creating and sustaining urban middle and upper classes, and for economic growth and capital accumulation for domestic state and private agribusiness firms. In the process

of developing this sector – both through the land deals for citing facilities and the increasing vertical integration and corporate concentration of agriculture – smallholder farmers are dispossessed. At the same time, the results, or externalities, of industrial meat production are also borne disproportionately by rural populations and smallholder farmers in particular. CAFO-related water pollution, for example, challenges smallholder agricultural and social reproduction: toxic water doesn't grow crops, and certainly doesn't serve household water needs. These distributional environmental inequalities are produced by the meatification project, at the expense of smallholder production and reproduction.

The environmental implications of China's meatification project – both presently, and more so in the future – are so severe that the further the project proceeds, the further it creates the conditions for its own demise. This too is paradox that needs tracking.

China's Meatification Project and the Global Food Question

Meatification is one aspect of contemporary agricultural, dietary, and political economic transformations in China, and globally. It is also importantly related to the so-called "food question," which was originally posed as a question of whether food is for people or profits (Bernstein et al., 1990). While this framework continues to be of central concern, the dichotomy does not capture the complexity of global food systems, either in terms of deepening class diets, or the associated environmental and food security implications. Massive increases in meat production and consumption in the past several decades is a primary reason for this, suggesting that in addition to people and profits, livestock also needs to be included in the frame of the food question in order to address and specify inequalities and injustices in the world economy. The

meatification project – as an analytical tool – allows for this kind of reformulation, including the all-important environmental dimension.

China's meatification project complicates global food questions in relation to the feed import regime in particular. Liberalizing soybeans (and perhaps maize) and "going out" for productive land are part of a state strategy of off-shoring feed production, which serves three related purposes that directly impact global food security. First, off-shoring feed allows Chinese urban middle and upper class consumers to join a growing global consumer class of meat eaters. From 1961 to 2009, average annual per capita meat consumption went from 23 to 42 kilograms per person worldwide. Given human population growth during the same time, this figure reflects a four-fold increase in world meat production during those five decades (Weis, 2013). Similarly, China's meat consumption has quadrupled since 1980 to its current average of 54 kilograms per person per year (Schneider, 2011). These increases mean diversion of more land, resources, and crops to feed *livestock* rather than *people*.

Second, in the process of deepening class diets around meat, off-shoring feed production serves as a mechanism for displacing some of China's food security issues onto vulnerable populations of mostly smallholder farmers in places like Brazil, who have been dispossessed in the rush to serve China's feed demand. According to GRAIN (2012),

When China began importing soybeans as animal feed in the late 1990s, it ushered in one of the most dramatic agricultural transformations the world has ever seen. On the other side of the world, 30 million hectares of farms, forests, savannahs and pastures in the Southern Cone of Latin America were converted to soy plantations to provide China's new factory farms with a cheap source of feed...rural communities, both in China and the Southern Cone paid the price (p. 2).

Third, off-shoring feed production is a means for externalizing some of the environmental harm that comes from industrial monocropping to producer countries and

agroecosystems thousands of miles away. It is well known that China faces serious environmental pollution problems from fertilizer and pesticide runoff, in addition to the manure threat. Off-shoring feed production is a place where Chinese elites can distribute the environmental damage associated with producing class diets. Within China and globally, the populations who suffer the most from industrial agriculture-related pollution are farmers who have to depend on toxic water and land to reproduce their livelihoods.

In each of these instances, increasing meat consumption in China impacts global food security. The impact, however, may not be expressed in the price of food, which is an argument that commonly appears in discussions of China's role in food crises. Rather, the costs of meat-based class diets are borne on vulnerable people and agroecosystems around the world in the form of dispossession and pollution. In other words, the displacement of China's food security politics can be read in the transformation of forests and grasslands in Brazil into soy and maize production centers: the diets of those who have the means to buy modern meat justifies the erosion of food getting for those who do not, both inside China and globally.

APPENDIX

Research Sites by Category	Subtotals	Total N	Locations
All Research Sites		120 +	
Farms		29	
Backyard farms	14 (or 11)		Sichuan, Hebei Provinces
Specialized household pig farms	1 (or 4)		Sichuan Province
Commercial pig farms	8		Sichuan, Guangdong Provinces
Organic farms	2		Sichuan Province
Government demonstration farms	3		Sichuan, Heilongjiang Provinces
Cooperatives	3		Sichuan, Hebei Provinces
Agribusiness Firms		17	
Domestic pig/pork	7		Sichuan, Guangdong Provinces
Domestic feed	1		Shanghai
Domestic online food network	1		Sichuan Province
State-Owned Enterprises (SOEs)	3		Heilongjiang Province
Foreign firms	5		Sichuan Province, Shanghai, Beijing
Dragon Head Enterprises			
Government Agricultural Institutions		6	
Veterinary and Animal Husbandry Stations	2		Sichuan Province, Shanghai
Ministry of Agriculture, National Animal Husbandry Service	2		Guangdong Province, Beijing
Research Department for Rural Development, Development Research Center - State Council	1		Beijing
National Center for Preservation and Utilization of Animal Genetic Resources	1		Beijing
Universities		8	
Beijing	4		Beijing
Sichuan Province	3		Sichuan Province
Guangdong Province	1		Guangdong Province
Agricultural Expos and Trade Shows		5	
Guangdong Pig Industry Association Expo			Guangdong Province
International Soybean Industry Expo and Soybean Festival of Beidahuang			Heilongjiang Province
VIV China			Beijing
Beijing Agricultural Products Trade Week			Beijing
China International Meat Industry Exhibition			Beijing
Agriculture and Agribusinesses Conferences		5	
IATP			Beijing
Ministry of Agriculture National Animal Husbandry Service			Guangdong Province
China Animal Husbandry Conference			Chongqing
Sino-European Discussion Forum for Agricultural Industry Investment			Chongqing
China Tea Association Annual Meeting			Guizhou Province

Food Markets		13+	
Wet markets	5		Chengdu, Beijing
Super markets	5		Chengdu, Beijing
Hypermarkets	3		Chengdu, Beijing
Corner stores (<i>xiaomaibu</i>)	numerous		Chengdu, Beijing
Street food vendors	numerous		Chengdu, Beijing
Restaurants	numerous		Chengdu, Beijing
Factories		4	
Sporting shoes, handbag, belt factories	3		Xiamen, Fujian Provinces
Sports apparel factory	1		Dongguan, Guangdong Provinces
Banquets		20	Sichuan, Heilongjiang, Guangdong, Guizhou, Provinces; Beijing, Shanghai, Chongqing
Non-Governmental Organizations (NGOs)		4	Beijing
U.S. Agricultural Trade Organizations		3	Beijing
Rural Farm Resorts (<i>nongjiale</i>)		2	Sichuan Province Shanghai, Beijing
Pig Culture Museum		1	Shanghai
Food and Agriculture Organization		1	Beijing
Migrant Worker Legal Support Center		1	Guangdong Province
Reuters Commodities Desk		1	Beijing

REFERENCES

- Adler, E.S. & Clark, R. (2003). *How it's done: An invitation to social research* (2nd Ed.). Belmont, CA: Wadsworth.
- Ahlers, A. L. & Schubert, G. (2009). "Building a New Socialist Countryside" – Only a political slogan? *Journal of Current Chinese Affairs*, 4, 35-62.
- Akram-Lodhi, A.H. & C. Kay. (Eds.). (2009). *Peasants and globalization: Political economy, rural transformation and the agrarian question*. London and New York: Routledge.
- Altieri, M. (2008, May 9). Small farms as a planetary ecological asset: Five key reasons why we should support the revitalisation of small farms in the Global South. *Food First*. Retrieved from: <http://www.foodfirst.org/en/node/2115>.
- Amnesty International. (2012, October 11). *China: Rise in forced evictions fuelling discontent*. Retrieved from <http://www.amnesty.org/en/news/china-rise-forced-evictions-fuelling-discontent-2012-10-11>.
- Anderson, E. N. (1988). *The food of China*. New Haven: Yale University Press.
- Anderson, E.N. & Anderson, M.L. (1977). Modern China: South. In Chang, K.C. (Ed.), *Food in Chinese culture: Anthropological and historical perspectives* (pp. 317-382). New Haven, CT: Yale University Press.
- Appadurai, A. (1996). *Modernity at large: Cultural dimensions of globalization*. Minneapolis, Minnesota: University of Minnesota Press.
- Archer Daniels Midland. (2010). *China overview*. Retrieved from <http://www.adm.com/en-US/worldwide/china/Pages/default.aspx>.
- Armony, A.C. & Strauss, J.C. (2012). From going out (*zou chuqu*) to arriving in (*desembarco*): Constructing a new field of inquiry in China-Latin America interactions. *The China Quarterly*, 209, 1-17.
- Asian Development Bank. (2010). *Integrated renewable biomass energy development sector project*. Retrieved from <http://www.adb.org/projects/40682-013/main>.

- Associated Press. (2010, August 6). U.S. corn farmers eye Chinese market. *Pork Magazine*. Retrieved from http://www.porkmag.com/news_editorial.asp?pgID=675&ed_id=9720&news_id=25420&ts=nl1.
- Average monthly income of migrant workers reaches 1,690 yuan. (2011, March 23). *People's Daily*. Retrieved from <http://english.peopledaily.com.cn/90001/90776/90882/7329296.html>.
- Balfour, F. (2011). China's millionaires leap past 1 million on growth, savings. *Bloomberg*, June 1. Retrieved from <http://www.bloomberg.com/news/2011-05-31/china-s-millionaires-jump-past-one-million-on-savings-growth.html>.
- Behnke, R.H. & Scoones, I. (1993). Rethinking range ecology: Implications for rangeland management in Africa. In Behnke, R.H., Scoones, I. & Kerven, C. (Eds.). *Range ecology at disequilibrium: New models of natural variability and pastoral adaptation in African savannas* (pp. 1-30). London: Overseas Development Institute.
- Beijing Review. (2008, October 10). New Socialist Countryside - What does it mean?: Views on implementing the government's plan. *Beijing Review*. Retrieved from http://www.bjreview.com/special/third_plenum_17thcpc/txt/2008-10/10/content_156190.htm.
- Bernstein, H. (2010). *Class dynamics of agrarian change*. Sterling, VA: Kumarian Press.
- Bernstein, H., Crow, B., Mackintosh, M. & Martin, C. (Eds.). (1990). *The food question: Profits versus people?* London: Earthscan.
- Bin, J. (2010, May 24). China's import of transgenic corn raises health concerns. *The Epoch Times*. Retrieved from <http://www.theepochtimes.com/n2/content/view/36091/>.
- Bonanno, A., Busch, L., Friedland, W. Gouveia, L., & Mingioni, E. (Eds.). (1994). *From Columbus to ConAgra: The globalization of agriculture and food*. Lawrence, KS: University Press of Kansas.
- Borras, S. M. Jr., Franco, J. C., Gómez, S., Kay, C., & Spoor, M. (2012). Land grabbing in Latin America and the Caribbean. *Journal of Peasant Studies*, 39(3-4), 845–872.

- Bramall, C. & Jones, M.E. (2000). The fate of the Chinese peasantry since 1978. In Bryceson, D. Kay, C. & Mooij, J. (Eds.), *Disappearing Peasantries? Rural Labour in Africa, Asia and Latin America*. London: Intermediate Technology Publications.
- Broadbent, K. (1978). *A Chinese/English dictionary of China's rural economy*. Oxford, England: Commonwealth Agricultural Bureaux.
- Campbell, T. C., & Campbell, T. M. (2005). *The China study: The most comprehensive study of nutrition ever conducted and the startling implications for diet, weight loss and long-term health*. Dallas, TX: BenBella Books.
- Casey, J. & Koleski, K. (2011). Backgrounder: China's 12th Five-Year Plan. U.S.-China Economic & Security Review Commission. Retrieved from www.uscc.gov/researchpapers/2011/12th-FiveYearPlan_062811.pdf.
- Chang, K., & Anderson, E. N. (1977). *Food in Chinese culture: Anthropological and historical perspectives*. New Haven: Yale University Press.
- Chao, Eveline. (2009). *Niubi!: The real Chinese you were never taught in school*. London: Plume.
- Chen, G. & Wu, C. (2006). *Will the boat sink the water? The life of China's peasants*. New York, NY: Public Affairs.
- Cheng, Y. (2010, February 12). Soybean imports squeeze market share. *China Daily*. Retrieved from http://www.chinadaily.com.cn/bizchina/2010-02/12/content_9467624.htm.
- China raises poverty line by 80 percent to benefit over 100 million. (2011, November 29). *Xinhua News*. Retrieved from http://news.xinhuanet.com/english2010/china/2011-11/29/c_131277041.htm.
- Chinese agriculture goes global. (2012, February 13). *Economic Observer*. Retrieved from <http://farmlandgrab.org/post/view/20030>.
- Chinese gov't 'has an open mind' on GM food. (2010, March 4). *Global Times*. Retrieved from <http://china.globaltimes.cn/chinanews/2010-03/509717.html>.

- Christiansen, F. (2009). Food security, urbanization and social stability in China. *Journal of Agrarian Change*, 9(4), 548–575.
- Christman, C.J., Sponenberg, D.P. & Bixby, D.E. (Eds.). (1997). *A rare breeds album of American livestock*. Pittsboro, NC: The American Livestock Breeds Conservancy.
- Clapp, J. & Fuchs, D. (Eds.). (2009). *Corporate power in global agrifood governance*. Cambridge, MA: MIT Press.
- Clausen, R. (2007). Healing the rift: Metabolic restoration in Cuban agriculture. *Monthly Review*, 51(1), 40-52.
- Cohen, M.L. (1993). Cultural and political inventions in modern China: The case of the Chinese “peasant.” *Daedalus*, 122(2), 151-170.
- Corn imports set to slow. (2010, September 2). *People’s Daily*. Retrieved from http://www.chinadaily.com.cn/imqq/bizchina/2010-09/02/content_11247902.htm
- Cotula, L. (2012). The international political economy of the global land rush: A critical appraisal of trends, scale, geography and drivers. *Journal of Peasant Studies*, 39(3-4), 649–680.
- Cronon, W. (1991). *Nature’s metropolis: Chicago and the great West*. New York, NY: W.W. Norton & Company.
- Cui, K. (2009). *Interview on development in the chicken meat industry in China* (in Chinese). Retrieved from <http://finance.ifeng.com/leadership/cygc/20090522/696380.shtml>.
- Cutler, C. (1999). Locating “authority” in the global political economy. *International Studies Quarterly*, 43(1), 59-81.
- Data Monitor. (2010). *Industry profile: Agricultural products in China*. New York, NY.
- Davison, N. (2013, January 1). China’s taste for pork serves up a pollution problem. *The Guardian*. Retrieved from <http://www.guardian.co.uk/world/2013/jan/01/china-taste-pork-pollution-problem>.

- Day, A.F. (2013). *The peasant in postsocialist China: History, politics, and capitalism*. Cambridge: Cambridge University Press.
- Day, A. & Hale, M.A. (2007). Guest editors' introduction. *Chinese Sociology and Anthropology*, 39(4), 3-9.
- Day, K. A. (2005). *China's environment and the challenge of sustainable development*. Armonk, NY: M.E. Sharpe.
- de Schutter, O. (2011). Agroecology: A path to realizing the right to food. *Food First Backgrounder*, 17(2), 1-5.
- Delgado, C. L., Rosegrant, M.W., Steinfeld, H., Ehui, S.K., & Courbois, L. (1999). *Livestock to 2020: The next food revolution*. Washington, D.C: International Food Policy Research Institute.
- Deng, X. (1984, June 30). Building a socialism with a specifically Chinese character. *People's Daily*. Retrieved from <http://english.peopledaily.com.cn/dengxp/vol3/text/c1220.html>.
- Diaz, R.J. & Rosenberg, R. (2008). Spreading dead zones and consequences for marine ecosystems. *Science*, 321, 926-929.
- Dixon, J. (2002). *The changing chicken: Chooks, cooks and culinary culture*. Sydney: UNSW Press.
- Drewnowski, A. & Popkin, B.M. (1997). The nutrition transition: New trends in the global diet. *Nutrition Reviews*, 55 (2), 31-43.
- Du, S. Lu, B., Zhai, F., & Popkin, B.M. (2002). The nutrition transition in China: A new state of the Chinese diet. In Caballero, B. & Popkin, B.M. (Eds.), *The nutrition transition: Diets and disease in the developing world* (pp. 205-221). London: Academic Press.
- ETC Group. (2009). *Who will feed us? Questions for the food and climate crises*. (Issue No. 102). Retrieved from <http://www.etcgroup.org/content/who-will-feed-us>.
- Fan, C.C. (2006). China's Eleventh Five-Year Plan (2006-2010): From "Getting Rich First" to "Common Prosperity." *Eurasian Geography and Economics*, 47(6), 708-723.

Flannery, R. (2011). It's China's year on the 2011 Billionaires List. *Forbes*, March 10. Retrieved from <http://www.forbes.com/sites/russellflannery/2011/03/10/its-chinas-year-on-the-2011-forbes-billionaires-list/>.

Fiddes, N. (1991). *Meat, a natural symbol*. London: Routledge.

Food and Agriculture Organization of the United Nations. (2012). FAOSTAT. Retrieved from <http://faostat3.fao.org/home/index.html>.

----- (2006). *Livestock's long shadow: Environmental issues and options*. Rome: FAO.

----- (1970). *Income effect on the structure of diet: Provisional indicative world plan for agricultural development*. Rome: FAO.

Forbes. (2011). China's 400 richest. *Forbes*. Retrieved from http://www.forbes.com/lists/2011/74/china-billionaires-11_rank.html.

Foster, J.B. (1999). Marx's theory of the metabolic rift: Classical foundations for environmental sociology. *American Journal of Sociology*, 105(2), 366-405.

----- 2000. *Marx's ecology: Materialism and nature*. New York: Monthly Review Press.

Foster, J.B. and F. Magdoff. (2000). Liebig, Marx, and the depletion of soil fertility: Relevance for today's agriculture. In F. Magdoff, J.B. Foster, and F.H. Buttel, eds, *Hungry for profit: The agribusiness threat to farmers, food, and the environment* (pp. 43-60). New York: Monthly Review Press.

Francis, C., Lieblein, G., Gliessman, S., Breland, T.A., Creamer, N., Harwood, R., Salomonsson, L., Helenius, J., Rickerl, D., Salvador, R., Wiedenhoef, M., Simmons, S., Allen, P., Altieri, M., Flora, C. & Poincelot, R. (2003). Agroecology: The ecology of food systems. *Journal of Sustainable Agriculture*, 22(3), 99-118.

French, P. & Crabbe, M. (2010). *Fat China: How expanding waistlines are changing a nation*. London: Anthem Press.

Friedmann, H. (2000). What on earth is the modern world-system? Foodgetting and territory in the modern era and beyond. *Journal of World-Systems Research*, 1(2), 480-515.

- Friedmann, H. & McMichael, P. (1987). Agriculture and the state system: The rise and fall of national agricultures, 1870 to the present. *Sociologia Ruralis*, 29(2), 93–117.
- Gale, F. (2010, March). China's corn surplus persists, despite industrial-processing boom. *Amber Waves*. Retrieved from <http://www.ers.usda.gov/AmberWaves/March10/Findings/ChinasCornSurplus.htm>.
- (2002, December). *China Corn Exports: Business as Usual, Despite WTO Entry*. Economic Research Service, United States Department of Agriculture.
- Gale, F. & Hansen, J. (2003, August). *China's Exports Outpaced Imports During WTO Year One*, Electronic Outlook Report from the Economic Research Service, United States Department of Agriculture, August 2003.
- Gale, F., Tuan, F., Wang, X., & Cao, Z. (2009, December). *China is Using More Corn for Industrial Products*. United States Department of Agriculture Foreign Agricultural Service.
- Gallagher, K. (2010, October 2). The fragile bit of BRIC: Brazil's powerhouse reputation, Latin America needs to learn from China to secure future economic growth. *The Guardian*. Retrieved from <http://www.guardian.co.uk/commentisfree/cifamerica/2010/oct/01/brazil-argentina>.
- Gao, X. (2008). Women and development in China: An analysis of reappraisal of practice. *Chinese Sociology and Anthropology*, 40(4), 13-26.
- Göbel, C. (2010). *The politics of rural reform in China: State policy and village predicament in the early 2000s*. New York, NY: Routledge.
- Goldman plans to sell Shineway stake to a Chinese fund. (2009, November 4). *China Daily*. Retrieved from http://www.chinadaily.com.cn/bizchina/2009-11/04/content_8914246.htm.
- GRAIN. (2012, August 4). Who will feed China?: Agribusiness or its own farmers? *Against the Grain*. Retrieved from <http://www.grain.org/article/entries/4546-who-will-feed-china-agribusiness-or-its-own-farmers-decisions-in-beijing-echo-around-the-world>.
- (2010, October). Big meat is growing in the global South. *Seedling*. Retrieved from <http://www.grain.org/article/entries/4044-big-meat-is-growing-in-the-south>.

- (2010, July). Global agribusiness: Two decades of plunder. *Seedling*, 14-20.
- . (2008). *Seized! The 2008 land grab for food and financial security*. Retrieved from <http://www.grain.org/article/entries/93-seized-the-2008-landgrab-for-food-and-financial-security>.
- Guo, H., & Jolly, R. W. (2009) *Contract farming in China: Perspectives of smallholders*. International Association of Agricultural Economists Conference, Beijing, August 16-22.
- Guo, H., Jolly, R. W., & Zhu, J. (2007). Contract farming in China: Perspectives of farm households and agribusiness firms. *Comparative Economic Studies*, 49(2), 285-312.
- Gura, S. (2008, January). Livestock breeding in the hands of corporations. *Seedling* (GRAIN). Retrieved from <http://www.grain.org/article/entries/651-livestock-breeding-in-the-hands-of-corporations>.
- Gürel, B. (2012). Changing relations of Chinese agriculture from decollectivization to agrarian capitalism. Paper presented at the *21st Annual Graduate Student Conference on East Asia*, Columbia University, February 11.
- Hale, M.A. (2013). Tilling sand: Contradictions of “social economy” in a Chinese movement for alternative rural development. *Dialectical Anthropology*.
- Han, J. (Ed.). (2007). *Survey on farmers' cooperatives in China*. Shanghai: Shanghai Far East Publishers. (in Chinese).
- Han, X. (2005). *Chinese discourses on the Peasant, 1900-1949*. Albany, NY: State University of New York Press.
- Harbaugh, R. (1998). *Chinese characters: A genealogy and dictionary*. New Haven, CT: Yale University Press.
- Hart-Landsberg, M. & Burkett, P. (2005). *China and socialism: Market reforms and class struggle*. New York: Monthly Review Press.
- Harvey, D. (2003). *The new imperialism*. Oxford: Oxford University Press.

- Hayford, C.W. (1998). The storm over the peasant: Orientalism and rhetoric in constructing China. In Cox, J. & Stromquist, S. (Eds.), *Contesting the master narrative: Essays in social history* (pp. 150-172). Iowa City, IA: University of Iowa Press.
- (1990). *To the people: James Yen and village China*. New York: Columbia University Press.
- Heffernan, W.D. (2000). Concentration of ownership and control in agriculture. In Magdoff, F., Foster, J.B., & Buttel, F.H. (Eds.). *Hungry for profit: The agribusiness threat to farmers, food, and the environment* (pp. 61-76). New York: Monthly Review Press.
- Ho, P. (1955). The introduction of American food plants into China. *American Anthropologist*, 57(2), 191-201.
- Ho, P., Eyferth, J. & Vermeer, E.B. (2004). *Rural development in transitional China: The new agriculture*. Portland, OR: Frank Cass.
- Hofman, I. & Ho, P. (2012). China's 'developmental outsourcing': A critical examination of Chinese global 'land grabs' discourse. *Journal of Peasant Studies*, 39(1), 1-48.
- Holden, P.J. & Ensminger, M.E. (2005). *Swine science* (7th ed.). Upper Saddle River, NJ: Prentice Hall.
- Holt-Giménez, E. (2002). Measuring farmers agroecological resistance after Hurricane Mitch in Nicaragua: A case study in participatory, sustainable land management impact monitoring. *Agriculture, Ecosystems and the Environment*, 93(1-2), 87-105.
- Hooker, J. (2008, May 26). Toll rises in China quake. *The New York Times*. Retrieved from <http://www.nytimes.com/2008/05/26/world/asia/26quake.html>.
- Hsu, H. (2001, November). Policy changes continue to affect China's oilseeds trade mix. *China: Agriculture in transition*. Economic Research Service, United States Department of Agriculture.
- Hsu, V.Y.N. & Hsu, F.L.K. (1977). Modern China: North. In Chang, K.C. (Ed.). *Food in Chinese culture: Anthropological and historical perspectives* (pp. 295-316). New Haven, CT: Yale University Press.

- Hu, D., Reardon, T., Rozelle, S., Timmer, P. and Wang, H. (2004). The emergence of supermarkets with Chinese characteristics: Challenges and opportunities for China's agricultural development. *Development Policy Review*, 22: 557–586.
- Hu, Y. & Hendrikse, G. (2009). Allocation of decision rights in fruit and vegetable contracts in China. *International Studies of Management and Organization*, 39, 4, 8-30.
- Huang, P.C.C. (2011). China's new-age small farms and their vertical integration: Agribusiness or co-ops? *Modern China*, 37(2), 107-134.
- Imhoff, D. (2010). Introduction. In Imhoff, D. (Ed.). *The CAFO reader: The tragedy of industrial animal factories* (pp. xiii-xviii). Berkeley, CA: University of California Press.
- INFORMA Economics and National Grain and Oil Information Center (NGOIC). (2009). *China's pork industry: Recent trends and Implications for world meat trade and grains trade*. Beijing: INFORMA Economics and National Grain and Oil Information Center.
- International Trade Center. (2011). *Organic food products in China: market overview*. Geneva, Switzerland.
- Jacka, T. (2012). 'Left behind' and 'vulnerable'? Agency, cooperative conflicts, and well-being among women in rural China. Paper presented at the annual *Association for Asian Studies* Conference, Toronto, Canada, March 15-18
- (2009). Cultivating citizens: *Suzhi* (quality) discourse in the PRC. *Positions*, 17(3), 523-535.
- (2006). Approaches to women and development in rural China. *Journal of Contemporary China*, 15(49), 585-602.
- Javier, L.A. (2010a, June 17). China corn buys may exceed 1 million tons, U.S. says (Update 1). *Bloomberg Businessweek*. Retrieved from <http://www.businessweek.com/news/2010-06-17/china-corn-buys-may-exceed-1-million-tons-u-s-says-update1-.html>.
- Javier, L.A. (2010b, July 26). China to buy 15 Million tons of corn in 'new era,' council says, citing Li. *Bloomberg*. Retrieved from <http://www.bloomberg.com/news/print/2010-07-26/china-to-buy-15-million-tons-of-corn-in-new-era-council-says-citing-li.html>.

- King, F.H. (1911). *Farmers of forty centuries, or permanent agriculture in China, Korea and Japan*. Madison, WI: Mrs. F.H. King.
- Kipnis, A.B. (2006). *Suzhi*: A keyword approach. *China Quarterly*, 186, 295-313.
- Lan, L. (2010, August 23). Battle of the beans. *China Daily*. Retrieved from http://www.chinadaily.com.cn/business/2010-08/23/content_11189082.htm.
- Lang, T. & Heasman, M. (2004). *Food wars: The global battle for mouths, minds and markets*. London: Earthscan.
- Lappé, F. M. (1971). *Diet for a small planet*. New York: Ballantine Books.
- Lawrence, G. & McMichael, P. (2012). The question of food security. *International Journal of Sociology of Agriculture and Food*, 19(2), 135-142.
- Li, J. (2010). The decline of household pig farming in rural Southwest China: Socioeconomic obstacles and policy implications. *Culture & Agriculture*, 32(2), 61-77.
- Li, X., Dong, Q., Liu, X., & Wu, J. (2008). Gender inequality and poverty in asset ownership. *Chinese Sociology and Anthropology*, 40(4), 49-63.
- Li, X.J. (2006). Organic agriculture development background, status and expectation in China. *Farm and Produce Market Weekly*, 42, 26-29.
- Lin, B.B., Chappell, M.J., Vandermeer, J., Smith, G., Quintero, E., Bezner-Kerr, R., Griffith, D.M., Ketcham, S., Latta, S.C., McMichael, P., McGuire, K.L., Nigh, R., Rocheleau, D., Soluri, J., & Perfecto, I. (2011). Effects of industrial agriculture on climate change and the mitigation potential of small-scale agro-ecological farms. *CAB Reviews: Perspectives in Agriculture, Veterinary Science, Nutrition and Natural Resources*, 6(20), 1-18.
- Lin, Z. (2008). Chinese women and poverty alleviation. *Chinese Sociology and Anthropology*, 40(4), 27-37.
- Lingohr, S. (2011). *Industrialization and rural livelihoods in China: Agricultural processing in Sichuan*. New York: Routledge.

- (2007). Rural households, Dragon Heads and associations: A case study of sweet potato processing in Sichuan Province. *The China Quarterly*, 192, 898-914.
- Liu, Q., & Lu, F. (2008). Conflict and innovation practice of China agricultural chain. *International Conference on Risk Management and Engineering Management*, 70-75.
- Liu, Y., Chen, Y., & Long, H. (2011). Regional diversity of peasant household response to new countryside construction based on field survey in eastern coastal China. *Journal of Geographical Sciences*, 21(5), 869-881.
- Lohmar, B., Gale, F., Tuan, F. & Hansen, J. (2009). *China's ongoing agricultural modernization: Challenges remain after 30 years of reform*. Economic Information Bulletin No. 51, United States Department of Agriculture, Economic Research Service, April.
- Looney, K. (2011). *The New Socialist Countryside, rural modernization in the Hu Jintao Era*. Paper prepared for the *Association for Asian Studies Conference*, April 1.
- Lu, H., Trienekens, J.H., Omta, S.W.F., & Feng, S. (2010). Guanxi networks, buyer-seller relationships, and farmers' participation in modern vegetable markets in China. *Journal of International Food & Agribusiness Marketing*, 22, 70-93.
- Ma, X. (Ed.). (2008). *China's New Rural Construction and the New Village Movement in Korea: 2006 Korea Economic Cooperation Seminar Proceedings*. Beijing: Zhina Planning Press. (in Chinese).
- Ma, M & An, Y. (2010). *Concept note: Sustainable soybean initiative in China*. Beijing: Solidaridad.
- MacDonald, M. & Simon, J. (2011). *Cattle, soyanization, and climate change: Brazil's agricultural revolution*. New York: Brighter Green.
- Magdoff, F., Foster, J.B., & Buttel, F.H. (Eds.). (2000). *Hungry for profit: The agribusiness threat to farmers, food, and the environment*. New York: Monthly Review Press.
- Martin, S. (2012, April 30). China to up pork production. *Agweek*. Retrieved from <http://www.agweek.com/event/article/id/19782/>.

- Marx, K. (1967). *Capital*. Volume III. New York: International Publishers.
- McMichael, P. (2012). *Development and social change: A global perspective* (5th ed.). Thousand Oaks, CA: Sage.
- (2009). A food regime genealogy. *Journal of Peasant Studies*, 36(1), 139-169.
- (2006). Peasant prospects in the neoliberal age. *New Political Economy*, 11(3), 407-418.
- (2005). Global development and the corporate food regime. In Buttel, F. & McMichael, P. (Eds.). *New directions in the sociology of global development* (pp. 265-299). Amsterdam: Elsevier.
- McOrist, S., Khampee, K. & Guo, A. (2011). Modern pig farming in the People's Republic of China: Growth and veterinary challenges. *Revue Scientifique et Technique*, 30(3), 961-968.
- McOrist, S. & Walters, R. (2009, May 1). Native pig breeds of China. *Pig Progress*, 25(3).
- Mickelson, G. (2008, September 2008). Tyson enters third poultry joint venture in China: Venture involves vertically-integrated operations in Eastern China. *Globe Newswire*. Retrieved from <http://globenewswire.com/news-release/2008/09/10/384521/150109/en/Tyson-Enters-Third-Poultry-Joint-Venture-in-China.html>.
- Ministry of Agriculture of the People's Republic of China. (2009). *China Agricultural Development Report*. Beijing: China Agricultural Press.
- Mitchell, T. (1991). America's Egypt: Discourse of the development industry. *Middle East Report* 21 (March/April).
- Miyata, S., Minot, N., & Hu, D. (2009). Impact of contract farming on income: Linking small farmers, packers, and supermarkets in China. *World Development*, 37(11), 1781-1790.
- Murphy, R. (2004). Turning peasants into modern Chinese citizens: 'Population quality' discourse, demographic transition and primary education. *China Quarterly*, 177, 1-20.

- Murphy, S. Lilliston, B. & Lake, M.B. (2005). *WTO Agreement on Agriculture: A Decade of Dumping*. Minneapolis, MN: Institute of Agriculture and Trade Policy.
- Netting, R. M. C. (1993). *Smallholders, householders: Farm families and the ecology of intensive, sustainable agriculture*. Stanford, CA: Stanford University Press.
- Nierenberg, D. (2005). *Happier meals: Rethinking the global meat industry*. (Worldwatch Paper 171). Washington, D.C.: Worldwatch Institute.
- Niu, S. & Miles, T. (2010, September 21). China turns into a regular corn importer. *Reuters*. Retrieved from <http://uk.reuters.com/article/idUKLNE68K00C20100921>.
- O'Brien, K. J. & Li, L. (2006). *Rightful resistance in rural China*. Cambridge: Cambridge University Press.
- Olson, R.K. & Francis, C.A. (Eds.). (1995). *Exploring the role of diversity in sustainable agriculture*. Madison, WI: American Society of Agronomy.
- Ong, A. & Zhang, L. (2008). Introduction: Privatizing China: Powers of the self, socialism from afar. In Zhang, L. & Ong, A. (Eds.), *Privatizing China: Socialism from afar* (pp. 1-20). Ithaca, NY: Cornell University Press.
- Orlik, T. (2011, July 8). Why pork prices are such a big deal in China. *The Wall Street Journal*. Retrieved from <http://blogs.wsj.com/chinarealtime/2011/07/08/why-pork-prices-are-such-a-big-deal-in-china/>.
- Pai, H.-H. (2012). *Scattered sand: The story of China's rural migrants*. London: Verso.
- Pearce, F. (2012). *The land grabbers: The new fight over who owns the earth*. Boston, MA: Beacon Press.
- People's Government of Jilin Province. (2012, December 14). *China-Singapore Jilin food zone speeds up construction*. [Press Release.] Retrieved from <http://www.noodles.com/view/1EA92B5F1EE4665A00BB7DFC2E7DFEA3DF0C0585>.
- Philpott, T. (2010, July 28). With the global climate pact dead, China gets hungry for U.S. factory pork. *Grist*. Retrieved from <http://www.grist.org/article/food-with-the-global-climate-pact-dead-China-gets-hungry-for-corn-fed-fact/>.

- Ping, L. (2008, July 3). Hopes and strains in China's oversea farming plan. *Economic Observer Online*. Retrieved from <http://www.eeo.com.cn/ens/Industry/2008/07/03/105213.html>.
- Popkin, B.M. (1994). The nutrition transition in low-income countries: An emerging crisis. *Nutrition Reviews*, 52(9), 285-298.
- PRL.org, (2009, May 27). The saga of China's rising soy imports and prices. *Commodity Online*. Retrieved from <http://www.commodityonline.com/news/The-saga-of-China%E2%80%99s-rising-soy-imports-and-prices-18155-3-1.html>.
- Pretty, J. (2007). Agricultural sustainability: Concepts, principles and evidence. *Philosophical Transactions of the Royal Society*, 363, 447-465.
- Provance, P. (2003, March 31). *China: Soy producers face shifting internal policies and world markets*. United States Department of Agriculture.
- Rabobank. (2013, March 8). *Rabobank report: Can China's poultry move out of pork's shadow?* Retrieved from <https://www.rabobank.com/en/press/search/2013/RabobankReportCanChinaspoultrymoveoutofporksshadow.html?pt=PressReleasepage>.
- Research Center of Rural Economy (RCRE), Ministry of Agriculture. (2010). *Survey of social responsibility in leading agricultural enterprises in China*. Report Sponsored by Oxfam Hong Kong.
- Rifkin, J. (1992). *Beyond beef: The rise and fall of the cattle culture*. New York: Dutton.
- Rosset, P.M., Sosa, B.M., Jaime, A.M.R., & Lozano, D.R.A. (2011). The *Campesino-to-Campesino* agroecology movement of ANAP in Cuba: Social process methodology in the construction of sustainable peasant agriculture and food sovereignty. *Journal of Peasant Studies*, 38(1), 161-191.
- Rostow, W.W. (1960). *The stages of economic growth: A non-communist manifesto*. Cambridge, UK: Cambridge University Press.
- Sanderson, S.E. (1986). The emergence of the "world steer": Internationalization and foreign domination in Latin American cattle production. In Tullis, F.L. & Hollist, W.L. (Eds.), *Food, the state and international political economy* (pp. 123-148). Lincoln, NE: University of Nebraska Press.

- Schmalzer, S. (2002). Breeding a better China: Pigs, practices, and place in a Chinese county, 1929-1937. *The Geographical Review* 92(1), 1-22.
- Schneider, M. (2013). Chinese agribusiness profiles. [Blog post]. Retrieved from <http://pigpenning.wordpress.com/agbiz-profiles/>.
- . (2012). *Poor rural and agricultural livelihoods: Discourses, policies, Dragon Head Enterprises, vertical integration, and contract farming in China*. Beijing: Oxfam, Hong Kong.
- (2011a). *China living wage study*. Beijing: Solidaridad.
- (2011b). *Feeding China's pigs: Implications for the environment, China's smallholder farmers and food security*. Institute for Agriculture and Trade Policy. Retrieved from <http://www.iatp.org/documents/feeding-china%E2%80%99s-pigs-implications-for-the-environment-china%E2%80%99s-smallholder-farmers-and-food>.
- (2010, July 19). China's pollution census, manure and biogas [Blog post]. Retrieved from <http://www.iatp.org/blog/2010/07/chinas-pollution-census-manure-and-biogas>.
- Schneider, M., & McMichael, P. (2010). Deepening, and repairing, the metabolic rift. *The Journal of Peasant Studies*, 37(3), 461-84.
- Schroeder, R., St. Martin, K., Wilson, B., & Sen, Debarati. (2008). Third world environmental justice. *Society & Natural Resources*, 21, 547-555.
- Shen, H. (2012, December 10). China's gini index at 0.61, University report says. *Caixin Online*. Retrieved from <http://english.caixin.com/2012-12-10/100470648.html>.
- Sheng, J., Shen, L., Qiao, Y., Yu, M. & Fan, B. (2009). Market trends and accreditation systems for organic food in China. *Trends in Food Science & Technology*, 20(9), 396-401.
- Shi, L. (2010). The economic situation of rural migrant workers in China. *China Perspectives*, 4, 4-15.
- Single year's corn import quantity exceeds past decade's. (2010, July 23). *Global Times*. Retrieved from <http://business.globaltimes.cn/china-economy/2010-07/555463.html>.

- Sklair, L. (2002). The transnational capitalist class and global politics: Deconstructing the corporate-state connection. *International Political Science Review*, 16(1), 5-13.
- Smaller, C., Qiu, W., & Liu, Y. (2012). *Farmland and water: China invests abroad*. International Institute for Sustainable Development (IISD) Report. Winnipeg, Manitoba, Canada.
- Smith, J.N. (2006). Maintaining margins: The politics of ethnographic fieldwork in Chinese Central Asia. *The China Journal*, 56, 131-147.
- So, A.Y. (2007). Peasant conflict and the local predatory state in the Chinese countryside. *Journal of Peasant Studies*, 34(3-4), 560-581.
- Solot, I.B. (2006) The Chinese Agricultural Policy Trilemma. *Perspectives*, 7(1), 36-46.
- Song, B., Marchant, M.A., Reed, M.R., & Xu, S. (2009). Competitive analysis and market power of China's soybean import market. *International Food and Agribusiness Management Review*, 12(1).
- Stringer, R., Sang, N., & Croppenstedt, A. (2008). Producers, processors, and procurement decisions: The case of vegetable supply chains in China. *World Development*, 37, 11, 1773-1780.
- Su, M. (2009). *China's rural development policy: Exploring the "New Socialist Countryside."* Boulder, CO: First Forum Press.
- Sun, W. (2009). *Suzhi on the move: Body, place, and power*. *Positions*, 17, 3, 617-641.
- Sun, Z. (Ed.) (2009). *Three decades of rural reform and agricultural development*. Beijing: China Agricultural Press. (in Chinese).
- Takada, A. & Song, Y. (2010, September 30). China's corn imports may grow 10-fold, Marubeni says. *Bloomberg Businessweek*. Retrieved from <http://www.businessweek.com/news/2010-07-07/china-s-corn-imports-may-grow-10-fold-marubeni-says.html>.

- Tang, Z., Peng, Z., Liu, B., Fan, B., Zhao, S., Li, X., Xu, S., & Li, K. (2008). Effect of breed, sex and birth parity on growth, carcass and meat quality in pigs. *Frontiers of Agriculture in China*, 2(3), 331-337.
- ThØgersen, S. & Heimer, M. (2006). Introduction. In Heimer, M. & ThØgersen, S. (Eds.), *Doing fieldwork in China* (pp. 1-26). Honolulu: University of Hawai'i Press.
- Towne, C.W. & Wentworth, E.N. (1950). *Pigs: From cave to corn belt*. Norman, OK: University of Oklahoma Press.
- United Nations Development Program. (2011). *China: Country profile: Human development indicators*. Retrieved from <http://hdrstats.undp.org/en/countries/profiles/CHN.html>.
- United States Department of Agriculture, Foreign Agricultural Service. (2012, December). *Oilseeds: World markets and trade*. Retrieved from <http://usda01.library.cornell.edu/usda/fas/oilseed-trade//2010s/2012/oilseed-trade-12-11-2012.pdf>.
- (2012, October). *Livestock and poultry: World markets and trade*. Retrieved from http://www.fas.usda.gov/psdonline/circulars/livestock_poultry.pdf.
- . (2011, February). *Oilseeds: World markets and trade*. Retrieved from <http://usda01.library.cornell.edu/usda/fas/oilseed-trade//2010s/2011/oilseed-trade-02-09-2011.pdf>.
- (2001, December). *Oilseeds: World Markets and Trade*. Retrieved from <http://usda01.library.cornell.edu/usda/fas/oilseed-trade//2000s/2001/oilseed-trade-12-01-2001.pdf>.
- United States Grains Council. (2010, May 18). China purchase of U.S. corn: Beginning of future trade Opportunities. *USGC Newsletter*. Retrieved from [http://www.feedandgrain.com/web/online/Industry-News/USGC--China-Purchase-of-US-Corn-Beginning-of-Future-Trade-Opportunities/1\\$2135](http://www.feedandgrain.com/web/online/Industry-News/USGC--China-Purchase-of-US-Corn-Beginning-of-Future-Trade-Opportunities/1$2135).
- Van Dijk, T. A. (2003). Critical discourse analysis. In Schiffrin, D., Tannen, D., and Hamilton, H.E. (Eds.). *The handbook of discourse analysis* (pp. 352-371). Malden, MA: Blackwell Publishing.

- Vandermeer, J.H. (2011). *The ecology of agroecosystems*. Sudbury, MA: Jones and Bartlett Publishers.
- Waldron, S.A., Brown, C.G., Longworth, J.W., & Zhang, C.G. (2007). *China's livestock revolution: Agribusiness and policy developments in the sheep meat industry*. Wallingford, UK: CABI.
- Walker, K. L. M. (2008). From covert to overt: Everyday peasant politics in China and the implications for transnational agrarian movements. *Journal of Agrarian Change*, 8(2-3), 462–488.
- (2006). 'Gangster capitalism' and peasant protest in China: The last twenty years. *Journal of Peasant Studies*, 33(1), 1-33.
- (1999). *Chinese modernity and the peasant path: Semicolonialism in the Northern Yangzi Delta*. Stanford, CA: Stanford University Press.
- Walker, R. & Buck, D. (2007). The Chinese road: Cities in the transition to capitalism. *New Left Review*, 46, 39-66.
- Wang, X. (2010, March 10). Farmers: Support soy production with policy. *Global Times*. Retrieved from <http://business.globaltimes.cn/industries/2010-03/511346.html>.
- Wang, J., & Watanabe, M. (2007). *Pork Production in China: A Survey and Analysis of the Industry at a Lewis Turning Point*. Chiba, Japan. Retrieved from <http://www.ide.go.jp/English/Publish/Download/Asedp/077.html>.
- Watts, J. (2010, February 9). Chinese farms cause more pollution than factories, says official survey. *The Guardian*. Retrieved from <http://www.guardian.co.uk/environment/2010/feb/09/china-farms-pollution>.
- Weis. T. (2013). The meat of the global food crisis. *Journal of Peasant Studies*, 40(1), 65-85.
- (2007). *The global food economy. The battle for the future of farming*. London: Zed Books.
- Wen, D.J. (2008). How to feed China: A tale of two paradigms. *Third World Resurgence*, 212.

- White, S. (2011). From globalized pig breeds to capitalist pigs: A study in animal cultures and evolutionary history. *Environmental History* 16, 94-120.
- Wieger, L. (1927). *Chinese characters: Their origin, etymology, history, classification and signification* (2nd ed.). Catholic Mission Press.
- Wilkinson, J. (2010). The globalization of agribusiness and developing world food systems. In Magdoff, F. & Tokar, B. (Eds.) *Agriculture and food in crisis: Conflict, resistance, and renewal* (pp. 155-172). New York: Monthly Review Press.
- Wines, M. (2011, July 15). China plans to release some of its pork stockpile to hold down prices. *The New York Times*. Retrieved from <http://www.nytimes.com/2011/07/16/world/asia/16china.html>.
- Wittman, H. (2009). Reworking the metabolic rift: La Vía Campesina, agrarian citizenship and food sovereignty. *The Journal of Peasant Studies*, 36(4), 805-826.
- Wittwer, S., Yu, Y., Sun, H., & Wang, L. (1987). *Feeding a billion: Frontiers of Chinese agriculture*. East Lansing, MI: Michigan State University Press.
- Wong, L. (2011). Chinese migrant workers: Rights attainment deficits, rights consciousness and personal strategies. *The China Quarterly*, 208, 870-892.
- Wong, J., & Huang, Y. (2012). China's food security and its global implications, *China: An International Journal*, 10(1), 113-124.
- Wong, Y.K. (1990). *Unlocking the Chinese heritage*. Singapore: Pagesetters Services Pte Ltd.
- Woo, E. (2007, November 13). Baidu's censored answer to Wikipedia. *Bloomberg Businessweek*. Retrieved from http://www.businessweek.com/globalbiz/content/nov2007/gb20071113_725400.htm.
- Woosley, M. & Zhang, J. (2010). *China, People's Republic of: Livestock and products semi-annual report 2010*. (United States Agricultural Service, Foreign Agriculture Service, GAIN Report No. CH10009). Beijing, China.
- World Bank (2007). *World development report 2008: Agriculture for development*. Washington, DC: World Bank.

- Wu, C. (2012, September 4). Why complex food chains are to blame for China's food safety scares. *China Dialogue*. Retrieved from <http://www.chinadialogue.net/article/show/single/en/5144-Why-complex-food-chains-are-to-blame-for-China-s-food-safety-scares>.
- Yang, Y. (2007). *Pesticides and environmental health trends in China*. Western Kentucky University: China Environment Forum. Retrieved from <http://www.wilsoncenter.org/publication/pesticides-and-environmental-health-trends-china>.
- Yu, Y. (1987). Three hundred million pigs. In Wittwer, S., Yu, Y., Sun, H., & Wang, L. *Feeding a billion: Frontiers of Chinese agriculture* (pp. 309-323). East Lansing, MI: Michigan State University Press.
- Xie, J. (2009). *Addressing China's water scarcity: Recommendations for selected water resource management issues*. World Bank Practitioner Note, Issues 37. Retrieved from <http://water.worldbank.org/publications/addressing-chinas-water-scarcity-recommendations-selected-water-resource-management-is-0>.
- Xinhua News. (2010, August 20). China's corn supply adequate, price up on speculation. *Beijing Review*. Retrieved from http://www.bjreview.com.cn/headline/txt/2010-08/20/content_292791.htm.
- Yan, H. (2008). *New masters, new servants: Migration, development, and women workers in China*. Durham: Duke University Press.
- Ye, X. (2009). China's urban-rural integration policies. *Journal of Current Chinese Affairs*, 38(4), 117-143.
- Yin, S.J., Wu, L.M. & Chen, M. (2008). Demand analysis for organic food based on the consuming willingness. *Agricultural Technology and Economy*, 5, 81-88.
- Young, L.D. (1998). Survival, body weights, feed efficiency, and carcass traits of 7/8 White Composition and 1/8 Duroc, 1/8 Meishan, 1/8 Fengjing, or 1/8 Minzhu. *Journal of Animal Science*, 76 (6), 1550-1558.
- Yuan, J. & Niefhof, A. (2011). Agricultural technology extension and adoption in China: A case from Kaizuo Township, Guizhou Province. *The China Quarterly*, 206, 412-425.

- Yu, X., Abler, D., & Peng, C. (2008). *Dancing with the Dragon Heads: Enforcement, innovations and efficiency of contracts between agricultural processors and farmers in China*. American Agricultural Economics Association Annual Meeting, Orlando, Florida, July 27-29.
- Zader, A. (2011). Understanding quality food through cultural economy: The “politics of quality” in China’s northeast japonica rice. *Agriculture and Human Values* 29(1), 53-63.
- Zeuthen, J.W. & Griffiths, M.B. (2011). The end of urban-rural differentiation in China?: *Hukou* and resettlement in Chengdu’s urban-rural integration. In Alpermann, B. (Ed.), *Politics and Markets in Rural China* (pp. 218-232). New York, NY: Routledge.
- Zhang, H., Fan, S., & Qian, K. (2005). The role of agribusiness firms in agricultural research: The case of China. *Annual Meeting of the American Agricultural Economics Association*, Providence, RI: July 24-27.
- Zhang, Q. F., & Donaldson, J. A. (2010). From peasants to farmers: Peasant differentiation, labour regimes, and land-rights institutions in China’s agrarian transition. *Politics & Society*, 38(4), 458-489.
- (2008). The rise of agrarian capitalism with Chinese characteristics: Agricultural modernization, agribusiness and collective land rights. *China Journal*, 60(60), 25-47.
- Zheng, P. (1984). *Livestock breeds of China*. (Report No. 46). Rome, Italy: FAO Animal Production and Health Series and China Academic Publishers.
- Zhong, S. (2011). Towards China’s urban-rural integration: Issues and options. *International Journal of China Studies*, 2(2), 345-367.
- Zhou, K. X. (1996). *How the farmers changed China: Power of the people*. Boulder, CO: Westview Press.
- Zhou, Z. (2010). Achieving food security in China: past three decades and beyond. *China Agricultural Economic Review*, 2(3), 251–275.
- Zhu, J. (2007). *Three essays on contract farming in China* (Doctoral dissertation). Retrieved from ProQuest Dissertation and Theses database. (3289392).

Zhu, J. (2010, July 15). Animal waste a threat to clean water supply. *China Daily*. Retrieved from http://www.chinadaily.com.cn/china/2010-07/15/content_10108361.htm.

Zhu, L. (2011). Food security and agricultural changes in the course of China's urbanization. *China & World Economy*, 19(2), 40-59.

Zuo, W., Lu, R., & Ou, X. (2008). Strategizing corporate social responsibility: evidence from Guangdong Wen's Foodstuffs Group Co. *International Journal of Business and Management*, August.