

Transitions to Ecological Agriculture in
Nanjing, China:
Farm Types, Social-Political Networks,
and Rural Communities

by

Danshu Qi

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Examining Committee Membership

The following served on the Examining Committee for this thesis. The decision of the Examining Committee is by majority vote.

External Examiner	Silvia Sarapura-Escobar University of Guelph
Supervisor	Steffanie Scott University of Waterloo
Internal-external Member	Andrea Collins University of Waterloo
Other Member	Alex Latta Wilfrid University of Laurier
Other Member	Hannah Wittman University of British Columbia

AUTHOR'S DECLARATION

The thesis consists of material all of which I authored or co-authored: see Statement of Contributions included in the thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Statement of Contributions

I am the sole author of Chapter 1, Chapter 2, and Chapter 6 of this dissertation. I am the primary and lead author on the remaining Chapter 3-5. Chapter 4 was co-authored with Zhenzhong Si and Steffanie Scott and is in press. Chapter 3 and 5 are currently in preparation. Bibliographic citations for the chapters have been included below.

Chapter 3 A Typology of Ecological Agriculture in Nanjing, China: Farming Practices, Management Strategies, and New Attributes of Farmers

Qi, Danshu

Chapter 4 Can We be More Collaborative? Top-Down Policies and Urban-Rural Divide in the Ecological Agriculture Sector in Nanjing, China

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Chapter 5 Adding A Socio-Ecological Dimension to the Concept of Rural Restructuring: Insights from Two Modes of Ecological Agricultural Transition in Nanjing, China

Qi, Danshu

Abstract

China's rural and agricultural sector has been undergoing a dramatic transformation in the form of three major trends. First, the modernization and capitalization of agriculture has significantly modified traditional agriculture and exacerbated path-dependency towards an agro-industrial paradigm. Second, the Chinese government at various levels has been promoting an 'ecological civilization' that highlights science and technology to address environmental problems. Third, changes that have emerged in the agri-food sector vary from state certification scheme of organic agriculture to grassroots initiated alternative food networks. By delineating the structural changes, previous studies argue that these changes open up possibilities for innovative and sustainable food practices to challenge the mainstream agro-industrial paradigm, and that China stands a chance of witnessing a new post-productivist era in the agri-food sector. Yet, it is unclear how a transition to sustainable agriculture could be formed at the farm-level under the three trends and how the transition is interpreted and implemented by various farmers. This dissertation investigates the ecological agriculture sector in Nanjing, China. It sheds light on the various stakeholders who are the major proponents and leading forces of ecological agriculture, and their practices as shaped by the three interwoven trends. It answers the questions of what ecological agriculture is from the perspectives of Chinese farmers, and what barriers are facing this sector.

The notion of ecological agriculture covers a wide range of farming practices, including organic agriculture, natural farming, biodynamic farming, and other chemical-free farming styles. The first manuscript (Chapter 3) explores ecological agriculture at the farm level. It creates a typology of ecological farms and farmers in Nanjing. This analysis contributes to a conceptualization of ecological agriculture as a range of dynamic practices, evidenced in the evolving farming and management practices. It argues that understanding farmers' varied attributes is of central importance to elucidate the complexities of ecological agriculture. The second manuscript (Chapter 4) explores the institutional and socio-cultural reasons for the emergence of the ecological agriculture sector in Nanjing. It reveals the vertical relations between farmers and governmental and institutional actors, and the horizontal relations between various farmers. It documents the shifting focus on support for ecological agriculture from local governments and public institutes, and unveils the challenges for different farmers to develop ecological agriculture in the current political and socio-cultural settings. The first two papers suggest a significant urban-rural inequity in opportunities to participate in ecological agriculture, and point out the lack of perspectives from small-scale farmers who join (as

labourers), rather than initiate (as farm operators), ecological agriculture. Therefore, the third paper (Chapter 5) compares the transitions to ecological agriculture, through a case study in two villages. It highlights how these transitions are accompanied by varied spatial, economic, and social changes that significantly alter rural social patterns. The findings suggest that although both villages have seen land consolidation and income improvement, farmers' autonomy and relations to land are different. This research thus calls for recognition of the socio-economic values of ecological agriculture in addition to environmental improvement. In addition, this chapter also shows that the current conceptualization of rural restructuring in China overemphasizes the roles of the agro-industrial regime. More work should be added to the rural restructuring concept to uncover the implication of ecological agriculture.

The three papers explore pathways for developing ecological agriculture from different perspectives, i.e., the farm level, the network and relational level, and the village community level. The thesis as a whole argues that ecological agriculture should not be considered as merely governmental schemes to improve environments or initiatives by grassroots actors who seek for food system transitions. Instead, ecological agriculture represents the dynamic outcomes of how different stakeholders are driven by opportunities and confined by barriers. Enabling forces in the development of this sector are associated partly with the governments' ecological civilization framework that directly changed policy settings by attaching great importance to environmental protection, and partly with growing awareness in the production side that recognize the multiple benefits of ecological agriculture. However, this dissertation also identifies challenges for moving ecological agriculture towards a stronger version of sustainability. The tensions and disconnections between new farmers and rural established farmers should be noted as a structural barrier for ecological agriculture to reach a broader population of producers and consumers. Furthermore, the current business model of promoting ecological transition in the countryside suggests further commercialization of rural land and labour resources. Therefore, the associated processes of altering rural spatial and socio-economic patterns have reinforced the agro-industrial regime and have made it harder for agroecological initiatives to grow. As a result, this thesis from a sociological and human geographical stance illuminates the structural challenges of advancing ecological agriculture in the Chinese context. It calls for critical theorizations of individual-level experiences into studies of ecological agriculture and asserts and applauds key contributions made towards sustainability.

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Dedication

To my parents, Qun Huang and Jie Qi.

Table of Contents

Examining Committee Membership	ii
Author's Declaration	iii
Statement of Contributions	iv
Abstract	v
Acknowledgements	vii
Dedication	ix
List of Figures	xiii
List of Tables	xiv
Chapter 1 Introduction	1
1.1 Problem Context	1
1.2 Research Puzzle	5
1.3 Research Design	7
1.3.1 Rationale for Research Questions	7
1.3.2 Three Manuscripts	9
Chapter 2 Methodology	15
2.1 Actor-Based Qualitative Case Study	15
2.2 Study Setting	17
2.2.1 Context of Nanjing, China	17
2.3 Data Collection	19
2.3.1 Sampling Procedure	19
2.3.2 Data Collection Methods	22
2.4 Data Analysis	25
2.5 Research Rigor	27
Chapter 3 A Typology of Ecological Agriculture in Nanjing, China: Farming Practices, Management Strategies, and New Attributes of Farmers	31
3.1 Introduction	31
3.2 Conceptualizations of Ecological Agriculture	33
3.3 EA Farms in Nanjing	37
3.4 Research Findings: A Typology of Ecological Farms	41
3.4.1 Certified EA Companies	41
3.4.2 Ecological Farms by New Farmers	42

3.4.3 Farmers' Cooperatives.....	43
3.4.4 EA Farms by Established Farmers	45
3.5 Two Types of Ecological Farmers	48
3.5.1 New Farmers	48
3.5.2 Established Farmers.....	52
3.6 Discussion and Conclusion.....	54
Chapter 4 Can We be More Collaborative? Top-Down Policies and Urban-Rural Divide in the Ecological Agriculture Sector in Nanjing, China	59
4.1 Introduction	59
4.2 Theoretical Background: The Framework of Horizontal and Vertical Embeddedness	62
4.3 Research Methods	65
4.3.1 Case Contexts	65
4.3.2 Data Collection and Analysis	67
4.4 Results and Discussions	68
4.4.1 Vertical Embeddedness: Policy Designs and Political Patronage.....	68
<i>Financial supports</i>	69
<i>Technical sources</i>	71
<i>Political patronage</i>	72
4.4.2 Horizontal Relations: Bonds and Tensions	75
<i>Kinship</i>	75
<i>Neighborly relations of collaboration and conflict</i>	76
<i>Relations with like-minded people</i>	78
4.5 Conclusions	80
Chapter 5 Adding A Socio-Ecological Dimension to the Concept of Rural Restructuring: Insights from Two Modes of Ecological Agricultural Transition in Nanjing, China	84
5.1 Introduction	84
5.2 Conceptualizing and Contextualizing Rural Restructuring in China	86
5.2.1 Land Policies and Spatial Restructuring.....	87
5.2.2 Agricultural Modernization and Economic Restructuring	89
5.2.3 Social Restructuring	91
5.3 Case Studies of Ecological Agriculture in Two Villages.....	92
5.3.1 Barolo Eco-Valley in Jinci Village.....	92

5.3.2 Dai Farmers' Cooperative in Dai Village	93
5.4 Rural Restructuring in Jinci Village and Dai Village	94
5.4.1 Spatial Restructuring.....	95
5.4.2 Economic Restructuring.....	99
5.4.3 Social Restructuring.....	102
5.5 Conclusions and Discussions	101
Chapter 6 Conclusion	107
6.1 Summaries and Discussions of Research Findings in Nanjing.....	108
6.2 Linking Nanjing's Case with the Multi-Level Perspective Framework	118
Bibliography	124
Appendix: Instruments of Farm Survey, Interview Guides	140

List of Figures

Figure 1 Conceptualizing Three Major Trends of Agricultural and Rural Transformation.....	6
Figure 2 Fitting the Transition Study into the Multi-Level Perspective Framework.....	9
Figure 3 Top-Down and Bottom-Up Perspectives in the Research Framework.....	14
Figure 4 Timeline of the Fieldwork.....	24
Figure 5 Farmland and Residential Land in Jinci Village.....	96
Figure 6 Farmland and Residential Land in Dai Village.....	98
Figure 7 A Coordinate Axis of Different Farms and Farmers.....	120

List of Tables

Table 1.1 The Theoretical Framing of Multi-Level Perspective	8
Table 1.2 Research Design: Questions, Foci, and Objectives	11
Table 2.1 Different Explanations of Environmental Problems between Technological and Social Perspectives.....	16
Table 2.2 Interview Sample Summary.....	21
Table 2.3 Interviewees in Two Villages	25
Table 3.1 A Framework to Examine Weak to Strong Ecological Agriculture	36
Table 3.2 Categorizing Four Types of EA farms in Nanjing.....	40
Table 3.4 The Typology of Ecological Farms in Nanjing	46
Table 3.5 The Typology of Ecological Farmers and Farms in Nanjing	55
Table 4.1 Interviewees From Organizations in Nanjing Linked to Ecological Agriculture	66
Table 4.2 Supports Received in the Vertical Network.....	73
Table 4.3 Horizontal Relations between Farmers and Other Actors	79
Table 5.1 A Comparison of Rural Contexts between Jinci Village and Dai Village	94
Table 5.2 A Comparison of Spatial Changes between Jinci Village and Dai Village.....	98
Table 5.3 A Comparison of Economic Changes between Jinci Village and Dai Village.....	101
Table 5.4 A Comparison of Social Changes between Jinci Village and Dai Village	104
Table 6.1 Research Findings and Summary.....	109

Chapter 1

Introduction

1.1 Problem Context

Worsening environmental and climate challenges have led China to steer agricultural practices towards greater sustainability. Such agricultural changes started in the 1980s when the government promoted Chinese ecological agriculture, a widespread program guided by ecological-economic principles to improve the natural environment on a county level (Ye 2002, Shi 2002). Since the 2000s, with the central state's increasing emphasis on environmental protection and with a severe level of food anxiety among consumers, China has witnessed the mushrooming of certified organic agriculture, certified green food, farmers' markets, food buying clubs, community supported agriculture (CSA), and more (Sanders 2006; Sheng et al. 2009; Scott et al. 2014; Si et al. 2015). The notion of ecological agriculture (EA), which has often been used interchangeably alongside "agroecology" to denote agricultural practices guided by ecological principles (Brodt et al. 2006; Pretty 2009), mark the sustainability transitions in agriculture.

In spite of the development of EA, the agricultural landscape in rural China has been characterized by the decline of small-scale traditional agriculture and the strengthening of larger-scale modern agriculture. While traditional farming often involves crop rotation, on-farm recycling, and many other agroecological practices (King 1911, Luo and Gliessman 2017), modern agriculture relies largely on capital investments and fossil fuels. As many scientists would argue that these two paths are indeed compatible, it seems illogical to claim that China is on a road of transition to sustainable agriculture with such a strong focus on agricultural modernization.

The loss of traditional agriculture has happened prominently through urbanization and 'depeasantization'¹. According to United Nations (UNDP 2013), the urbanization rate (i.e. the percentage of people living in urban areas) in China reached 50% in 2011 and is estimated to surpass 70% by 2030. Rapid urbanization profoundly alters rural spatial arrangements for economic activities and social life (Lin et al. 2016), and gradually acclimatizes rural residents to modern lifestyles (e.g., from living with big families to small families) (Wang et al. 2016). Alongside the change of rural

¹ Depeasantization associates with global agricultural modernization and urbanization, in which the group of peasant farmers and the peasant economy gradually vanish (Berstein 2015).

lifestyles, the urbanization process ‘frees’ rural farmers from agrarian traditions. Meanwhile, millions of rural laborers migrate to wealthier provinces and cities, which results in the decline and aging of the farming population (Wu et al. 2016). Furthermore, the Chinese governments at various levels have also devalued traditional agriculture in favor of modern, industrial agriculture (Schneider 2014).

The strengthening of modern agriculture in rural areas has been reinforced in successive years through the series of Documents No.1 of the Chinese Central Government, which were released each January by the State Council outlining guiding principles for agriculture and rural development. In these documents, the requirements to modernize, scale up, specialize, and commercialize agriculture have opened the gate for restructuring the smallholding agrarian economy by agribusinesses (Zhang and Donaldson 2008). By 2017, more than 35% of farmland has been transferred to agribusinesses, farmers’ cooperatives, and other types of commercial farms, where individual farmers are hired as farm workers (Zhang 2013; Yan and Chen 2015). The larger-scale capital-intensive agriculture is, according to many political discourses (State Council 2015, 2016, 2017, 2018), better suited for the agenda of boosting agricultural production (especially grain yields) and applying modern scientific technologies.

Through changing rural demographics and the shifting agricultural patterns, the decline of small-scale farming and the strengthening of modern agriculture are mutually reinforcing, and are enhanced by other food system changes beyond the production stage. In addition to food consumption in China converting to a meat and dairy dominant pattern (Huang 2011), food retailing is experiencing a process of ‘supermarketization’ that severely changes wholesale and retail patterns (Zhang and Pan 2013; Si et al. 2019). Globally, the industrialization of the food and agricultural system has long been heavily reliant on agro-chemicals and fossil fuels for mechanization and transportation (Woodhouse 2010), and causing serious environmental pollution and resource degradation (Kremen et al. 2012). In China and rest of the world, these transformations are often conceived as economically positive by governments, media, and the general public.

In China, such a positive view of modern agriculture is never viable without the political propaganda that characterizes small-scale farmers and small-scale agriculture as backward and low quality by stressing the term “peasant” (Day 2013; Schneider 2014). Many agricultural economists and policy makers adopt the modernist language of “scattered” and “disorganized” to construe peasant farming as a crucial barrier to scaling up agriculture. Peasants are seen as either difficult to bring into

commercialized markets or financially too weak to have purchasing power (Day 2013). Moreover, peasants have been blamed in mainstream discourses for over-applying chemicals on their fields, especially to crops they will sell on the market, thereby posing a threat to food safety through pesticide residues on food crops. All of these factors contribute to the reputation of small-scale farmers as not trustworthy, which supports the state's view of the need to modernize and effectively do away with small-scale farmers.

Alongside an economic development based on industrialization, the Chinese state has also been searching for approaches to more sustainable development. Witnessing the global financial crisis and its associated broken of commodity supply from 2007 to 2009, the Chinese state has then proposed a notion of 'ecological civilization' in president Hu Jintao's tenure (Wen et al. 2012). In 2012 when president Xi Jinping was nominated at the 18th National Congress of the Communist Party of China, Xi officially endorsed ecological civilization as the critical guidance for the future development of China (Hansen et al. 2018). The program is a turning-point from the extensive growth model, which caused severe environmental problems, to a development model that considers environmental impacts. Hansen et al. (2018) criticize ecological civilization as a 'sociotechnical imaginary' that guides future laws, policies and regulations, and resorts to scientific innovations and technological solutions for environmental problems, while maintaining a deep commitment to economic growth. Nonetheless, the promotion of ecological civilization indeed results in growing attention paid to environmental protection by both Chinese citizens (Martindale 2019) and governments at various levels. In 2017 when president Xi started his second tenure, the state council published "A Guideline of Assessing and Examining the Construction of Ecological Civilization", which is applied on governments and Party councils of all the provinces, autonomous regions, and municipalities. In this guideline, a set of criteria related to agriculture are important for evaluating the performances of governments at multiple levels. These criteria include conservation rate of farmland, re-use rate of agricultural biomass (e.g., stalks or green manures), nitrogen emission, reduction of fertilizer and pesticide usages. The year 2016 witnessed the first time of fertilizer usage decrease in China, which is considered a big success of greening agriculture guided by ecological civilization.

Under the ecological civilization program, the "ecologically civilized modern agriculture" (sheng tai wen ming xing de xian dai nong ye) becomes the primary agricultural development agenda. In the majority of Chinese policy and academic publications, the abbreviated term "ecological agriculture" (sheng tai nong ye) implies a reliance on modern technologies and new agricultural management

models to address the economic and environmental problems associated with chemical agriculture widely implemented by small farmers (Yi et al. 2015). By highlighting ecologically civilized modern agriculture, the state wishes to 1) ensure food security and stabilize crop production, 2) enhance the organization of farmers and improve the linkages between producers and the markets, 3) reduce chemical pollution to the environment and improve the efficiency of resource utilization, and 4) relieve social problems such as rural poverty and food quality concerns (summarized from Document No.1 of Central Government from 2012 to 2017).

Inquirers of ecological civilization project have commented on the challenging task facing president Xi of sustaining the enormous economy vehicle while having tremendous environmental problems (Hansen et al. 2018; Geall and Ely 2018; Lent 2018). China is the world's largest consumer of energy and lumber (Lent 2018). The country also faces severe problems like freshwater shortages and losses of farmland and biodiversity (Zhang et al. 2011). Under such a background, the proposal and promotion of ecological civilization are necessary and inevitable for sustainable development in the future. In effect, in the agricultural field efforts on restoring the environment have been implemented before ecological civilization. Since the late 1980s, the state has been promoting food certification schemes to normalize the consumption of ecologically produced agricultural products (Sander 2006). Labelled according to the strictness level of permitted synthetic inputs, there are three main agricultural certifications: hazard-free, green, and organic (Scott et al. 2014)². The sector of certified organic agriculture is developing fast: till now, China has the largest organic land area and the biggest organic market in Asia, and is respectively ranked third and fourth globally (CNCA and CAU 2019). It seems like ecological civilization is a catalyst of accelerating the growth of the organic sector in China, as many scholars and policymakers have been working on adding organic certification to the evaluation system of ecological civilization (Gu et al. 2014).

Despite the flourishing of the organic sector, consumers worry about the credibility of the organic labels due to the lack of trust of the organic inspections. One result is that increasing consumers have been initiating various alternative food practices driven by a strong concern for food safety (Shi et al. 2011; Scott et al. 2014). These practices, including alternative food networks (AFNs) (e.g., organic farmers' markets) (Si et al. 2015), the New Rural Reconstruction movement (e.g., transforming

² Hazard free produce allows a certain amount usage of synthetic inputs. Green food and organic certification abandon synthetic inputs more strictly.

urban-rural relations) (Si and Scott 2015; Day and Schneider 2017), and new channels of nested markets (e.g., group purchasing from villages) (van der Ploeg et al. 2012), mark transitions to environmental and quality food production in China. The severe food anxiety is not only related to food safety worries of excessive additives in and chemical residues on food products, but also characterized by the demand for freshness associated with local and seasonal production (Si et al. 2015), the desire for social connection and re-building of trust (Si et al. 2015; Schumilas and Scott 2016), the self-identified obligations related to environmental restoration and food provision (Cody 2014; Xie 2020). Therefore, there appears a “quality turn” in China’s agro-food sector that present possibilities for re-shaping rural and agricultural development. Despite that weak social justice and inclusiveness to peasant farmers are identified in Chinese AFNs (Si et al. 2015; Schumilas and Scott 2016) and the capacity of these AFNs to confront the capitalist logics are questioned (Day and Schneider 2017; Ding et al. 2018), some scholars witness the emergence of a new agricultural regime (i.e., postproductionism) in China (Xie 2020).

1.2 Research Puzzle

Combining the above transitions underway in China’s rural and agricultural sector, there are three clear yet interrelated trends that determine the overall transformation (Figure 1). First, both the countryside and agriculture have been undergoing dramatic modernization since 1978, characterized by fast urbanization, agricultural industrialization, and increasing agrarian transformation that subsume agriculture to capital (Yan and Chen 2015; Zhang et al. 2015). Second, the agro-food sector has witnessed transitions towards high-quality food and ecological farming, driven by both state food certification schemes since the late 1980s to address agricultural pollutions and grassroots food initiatives since the late 2000s based on strong food safety concerns (Sander 2006; Sheng et al. 2009; Scott et al. 2014; Willer and Lernoud 2017). Third, the state has launched the project of ecological civilization, which is gaining importance among the central leadership to influence various local provincial and municipal governments. This framework, rather than reversing the current trend of economic development, preserves the mainstream economic logic of marketization while highlighting science and technology to address environmental problems (Hansen et al. 2018).

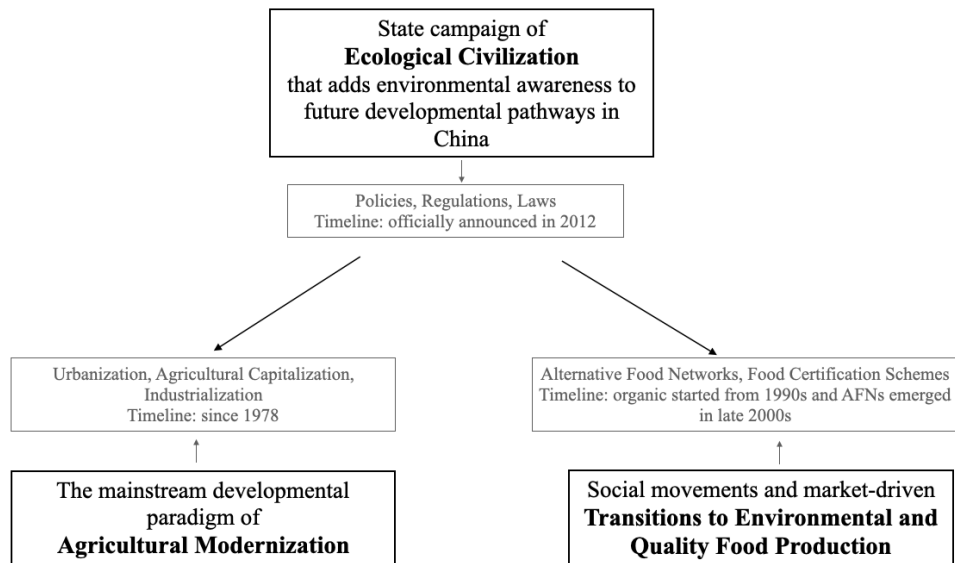


Figure 1 Conceptualizing Three Major Trends of Agricultural and Rural Transformation (author’s integration)

One of the unexplored questions regards the intersection between the three trends of ecological civilization, agricultural modernization, and the transitions to quality food production – how do they effect and co-shape agricultural transition? This question is important because the three trends point to different directions of agricultural transition. First, agricultural modernization and ecological or alternative agriculture appear to be contradictory. Moreover, the notion of ecological civilization seeks to reconcile these conflicts into a future development agenda. In the near future, the ecological civilization agenda and its compatibility with the other two trends will be pivotal determinants to the rural and agricultural transformation in China.

In this dissertation, my main research interest lies in understanding China’s transition towards sustainable agriculture. Recognizing the prominent trends of the broader rural and agricultural transformation, the key research question is understanding the interplay between the three trends of ecological civilization, agricultural modernization, and transition to quality food production, and

knowing how sustainable agricultural practices are shaped by the three trends. For this aim, I choose to focus on ecological agriculture (EA, *sheng tai nong ye* in Chinese) as my main research domain. Linguistically, compared to the term “sustainable agriculture”, “ecologically civilized modern agriculture” is often used in governmental papers in China, whereas the term “agroecology”, which implies both science, practices, and social movements that design and change food systems based on ecological principals, may be more familiar to some readers from other parts of the world. In contrast, EA has wider acceptance in Chinese society. Normatively, compared to organic agriculture that has strict certification requirements, EA encompasses broader ecological farm management approaches; and compared to civil society-driven food movements that often link to middle-class consumers, EA also encompasses governmental agricultural projects that mobilize more rural farmers. Generally, EA provides a reasonably broad study domain to include organic agriculture, natural farming, biodynamic farming, and other chemical-free farming styles. It thus fits the research aim of characterizing the development of sustainable agriculture in broader rural and agricultural transformations.

Investigating the development of EA will help with understanding this sustainability transition, especially in China’s socio-political context. The knowledge acquired helps to address the following gaps. How do the three trends shape the ecological agricultural sector, individually and collectively? What are the strategies taken by ecological agro-food initiatives and individuals to cope with or to buck the trends? What successful outcomes have been achieved and what efforts should be carried out hereafter? Are there experiences and suggestions to generate from China’s case? What are the reasons that account for either success or failure? How can we evaluate China’s transitional pathway towards sustainable agriculture? In the next part of the introduction section, I want to rationalize my research questions by synthesizing literature on sustainability transition. Based on this literature review, I then introduce my research design and unpack the research puzzle into three main sets of research questions.

1.3 Research Design

1.3.1 Rationale for research questions

Sustainability concerns the natural and social systems in a long run, and thus refers to both environmental, social, economic resilience of the systems (Campbell et al. 1997). Sustainability transition studies probe into “long-term, multi-dimensional and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and

consumption” (Markard et al. 2012, p.956). What is implied in this definition is that sustainability transitions entail the co-evolution of multiple areas, engage a large number of social groups and actors, and result in far-range changes (Geels and Schot 2007). To examine the complex co-evolutionary processes, transitional scholars widely adopt the multi-level perspective (MLP) approach proposed by Geels (2002). The MLP approach comprises two foundational viewpoints of transitions. First, it considers current, functional sociotechnical systems as configurations of a heterogeneous set of technical factors (e.g., sciences, technologies, industries) and social factors (e.g., social routines, culture, relations, institutions) (Geels 2002). Second, it argues that different degrees of coherences and alignments between factors will produce sociotechnical configurations at three levels (Geels 2011). While the middle regime-level refers to the current, functional (and less sustainable) systems where factors are configured into constant mechanisms and form stable structure, the lower niche-level accounts for the emerging, innovative (and more sustainable) novelties that are less stabilized and structured, and the higher landscape-level in opposite (See Table 1.1). On the basis of the two foundations, Geels (2011) recognizes that transitions are shifts from an existing regime to a new one.

Table 1.1 the Theoretical Framing of Multi-Level Perspective

	Niche	Regime	Landscape
Normative Contents in Each Level	Innovative practices deviate from existing regimes, and form stronger networks and visions to unlock a radical change.	The stable rules, routines, and regulations that coordinate multiple social groups and reinforce the deep structure.	The highly structured context that provides influential backdrop to both regimes and niches.

(synthesized from Smith et al. 2010)

By clearly positioning innovative niches in the complex of regimes and landscapes, the MLP approach unpacks transitional processes into developments within and interplay between levels—how niches grab the opportunity released by landscape evolvment, and how they confront, transform, and eventually take over the regimes (Smith et al. 2010; Geels 2011). In this vein, rather than identifying the linear and directional changes, sustainability transition studies should focus on the dynamic bounding and alignments between sociotechnical factors, and the constant interacting and coordination across levels.

Accordingly, my study of agricultural sustainability transition in China fits with the rationale of the MLP approach to understand transitional processes. Essentially, the three major trends related to agricultural and rural development correspond with the three levels in the MLP (see Figure 2): the ecological civilization project reflects a landscape-level modification that incorporates environmental awareness into the political ideology for future development; contemporary agricultural modernization is the regime-level configuration that aligns policies, agri-businesses, investors and other sociotechnical factors; and the emerging transition to quality food production involves niche-level innovations that progress with resistance while gaining influences in process. Therefore, I argue that, in terms of understanding the agricultural sustainability transition, it is important to scrutinize the entanglements of sustainable agriculture developments in the three trends of eco-civilization, agricultural modernization, and transition in agri-food sector.

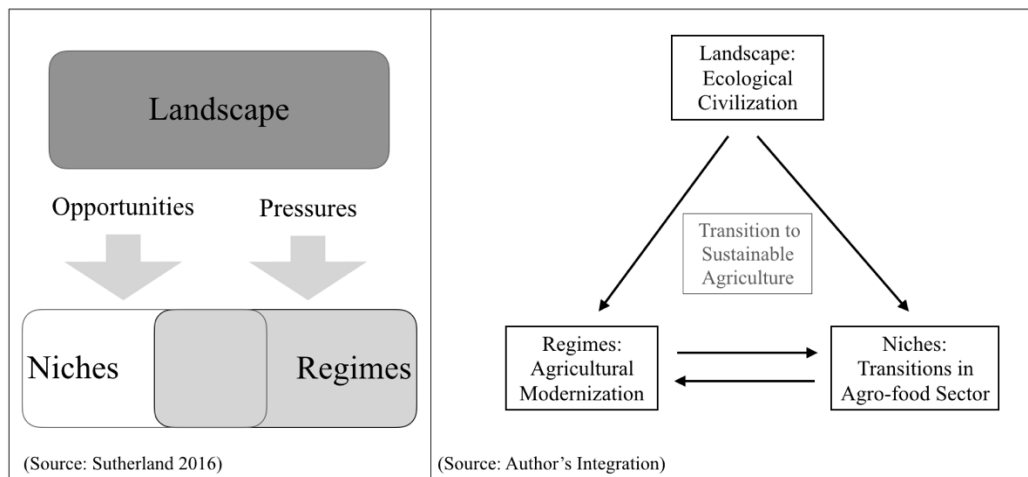


Figure 2 Fitting the Transition Study into the Multi-Level Perspective Framework

To further develop my study in response to the research puzzle, I draw on more discussions and critiques of the MLP approach, and of its associated sustainability transition studies. In doing so, I want to avoid the highlighted flaws of using this approach (described below), and to contribute to the sustainability transition literature from the lens of agri-food study.

1.3.2 Three Manuscripts: Research Questions, Foci, and Objectives

The major critique of using an MLP approach to characterize a sustainability transition is its overemphasis on structural, hierarchical explanations to transitional processes (Geels 2011; Ingram

2015). In the most classic case of using an MLP approach, Geels (2002) documents a long-term evolving process of technological inventions, shifting consumption patterns, shifts in items that are subsidized, building of infrastructure, and so on, during which the older sailing ships regime is replaced by steamships. The early focus on technological innovations often highlights elite groups whose possession of knowledge, power over distribution, and decision-making are more important for inducing structural changes (Lawhon and Murphy 2012). However, such a portrayal of transitions that focuses on structural indicators, risks “crowding out the importance of human agency and muting the inevitable contest and politics of sustainability transitions” (Hinrichs 2014, p.149). Shove and Walker (2007) caution the neglect of the broader stakeholders, whose winning or losing should not be negligible.

Transitional scholars have proposed many theoretical and empirical suggestions to revise the strong structural focus of MLP approach. In terms of “flattening” sustainability transitions and de-layering the MLP approach, engaging a broader range of stakeholders and considering their voices and knowledge are necessary (Lawhon and Murphy 2012). More empirically, within each level of the MLP approach, it is fundamental to clarify the analytical scope of specific research and draw boundaries of niche, regime, and landscape (Geels 2011; Smith and Raven 2012). By operationalizing the three levels, studies are able to identify heterogeneous stakeholders, and catch the agency-related features rather than getting lost in structural factors. In addition, between different MLP levels, it is important to examine the cross-level linkages and the dynamics of interactions (Ingram 2015; Sutherland et al. 2012). Not at all meaningless, interactions are indeed spaces for individuals to network or confront with each other, and to seek momentum (Lawhon and Murphy 2012). Hence, examining the linkages and interplays helps to gain insights into power relations and transition politics (Shove and Walker 2007).

Grounded in the above rationale and critiques, I conclude that while the MLP approach is appropriate for mapping out this study, the specific research design should balance the structural foci and attention on individual agency. Hence, I chose to stay with the research questions of exploring the sustainability transition amid broad trends, rather than identifying structural indicators such as numbers and percentages of eco-farms or agri-businesses in the whole industry. In this dissertation I explore how the transition to ecological agriculture is formed at the farm-level under the three trends and how the transition is interpreted and implemented by various farmers. This study adopts the “insider ontology”, which opposites to the “outsider ontology” that consider “niches as an object to be

developed” (Smith and Raven 2012, p.1034). The insider ontology emphasizes agency embedded in actors, and their expectations of and involvements in the transition processes (Smith and Raven 2012). Therefore, the research design is laid out as follows:

Table 1.2 Research Design: Questions, Foci, and Objectives

Overarching Research Question	How is the transition to ecological agriculture in Nanjing implemented at the farm-level and interpreted by farmers? How does the transition reflect the three interwoven trends of eco-civilization, agricultural modernization, and the transition to quality food production?		
	Research Questions	Research Foci	Research Objectives
Manuscript 1	<ul style="list-style-type: none"> • What farming practices and organizational forms constitute the ecological agricultural sector? • Who are the farmers or practitioners? • How do they initiate ecological farming and how are they affected by the three trends (above)? 	Ecological farming practices that serve as “seeds for systematic change” (Geels 2011).	<ul style="list-style-type: none"> • To create a typology of ecological agriculture in China; • To understand the reasons why different social groups become ecological farmers.
Manuscript 2	<ul style="list-style-type: none"> • Who are the key non-farming stakeholders and who are the pillars of the transition? • How do they reach out to the agricultural sector? • How do they represent the trends of modernization or transitions to quality food production? 	Organizations or individuals who direct form or indirectly affect the ecological agricultural practices, and their relations.	<ul style="list-style-type: none"> • To identify the support networks of key organizations and stakeholders; • To analyze the embeddedness of ecological farming in the networks; • To evaluate the effect of ecological civilization by examining policy supports to ecological agriculture.

Manuscript 3	<ul style="list-style-type: none"> • How is ecological agriculture promoted and implemented in rural areas? • How does the countryside serve as battleground for agricultural modernization and ecological and alternative food production? 	Rural villages that develop ecological farming and various rural changes along with the promotion of ecological agriculture.	<ul style="list-style-type: none"> • To evaluate the ecological agricultural developments from the eyes of farmers; • To embody the influences of agricultural modernization in rural farmers' daily life and farming practices.
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The first manuscript looks at the emerging farming practices at the farm level that seed a transition. Namely, what does the ecological agricultural sector look like from the perspectives of farmers? What are the farming practices that constitute the sector in China, and how do farmers (and farm operators) manage to conduct these forms of ecological farming? Does this sector contain highly diversified or unified types of practices? In this sector, have modern agricultural practices been altered to pursue a more ecological direction, or have eco-agricultural practices been modernized, or both? Overall, how can we understand the formation of the ecological agricultural sector? These questions are examined in Manuscript 1 (Chapter 3) through a study of ecological farms in Nanjing, China. Manuscript 1 provides a rough portrayal of the sustainable agriculture transition on the practical level, and reveals a variety of attributes of farm operators including entrepreneurship, craftsmanship, nostalgia for rural past, and so on. It provides explanations of why different social groups of farmers construct different types of ecological farms.

The second manuscript examines the niche-regime linkages on the individual relational level. That is, what are the broader networks that provide the institutional and social-cultural context for the ecological agriculture practices? This question involves a larger group of stakeholders beyond ecological farms, such as public institutes, private businesses, NGOs, governments, and media, who are often invisible agents behind the trends. This manuscript addresses who are these key stakeholders that serve as pillars of the development of the ecological agriculture sector? In what ways do they support this sector? How do they represent the trends and how do they reach out to the agricultural sector? Are there any synergies or conflicts? These questions are addressed in Manuscript 2 (Chapter

3) by characterizing the vertical and horizontal embeddedness of Nanjing's ecological agricultural sector. The main aim of this part is to identify the support networks that are entailed by the broad trends and enable ecological agricultural development. It also helps to visualize the agricultural transition on the level of relations and networks.

The first two manuscripts take a "bottom-up" perspective to examine individual and organizational practices in the overwhelming trends. In the "bottom-up" perspective, major farm operators are identified with a strong focus on their agency in innovation and making change. In other words, the research focuses on niche practices of ecological farming that challenge the regime rules related to agricultural modernization. It thus emphasizes the will of stakeholders in finding new solutions alternative to conventional food systems. While international literature has been drawing attention to such autonomy-related themes (e.g., participation and empowerment), my fieldwork reveals weak interests of some farmers in gaining influences in a "top-down" system (e.g., agribusiness). Instead of looking for alternativeness, many smallholders would rather conform to the majority. Hence, a focus on "bottom-up" practices may lead to overlooking the reluctance and adaptation of smallholders in processes of transition. The third manuscript shifts perspective to examine farmers in "top-down" systems, which leads to questions such as how rural farmers adapt to changes, and what their perceptions of changes are (see Figure 3). More specifically, it focuses particularly on the agricultural transitions in rural villages. How is the development of ecological agriculture in rural areas affected by the trends? How does the countryside serve as the spaces for both modernization and ecological agriculture? More importantly, how is the development of ecological agriculture initiated by non-local actors (e.g., the higher-level government) influence local farmers? These questions help to more comprehensively understand the sustainability transition from the perspective of farmers. These questions are explored in Manuscript 3 (Chapter 4) by examining the rural restructuring and processes of shifting to ecological agriculture in two rural villages on the outskirts of Nanjing.

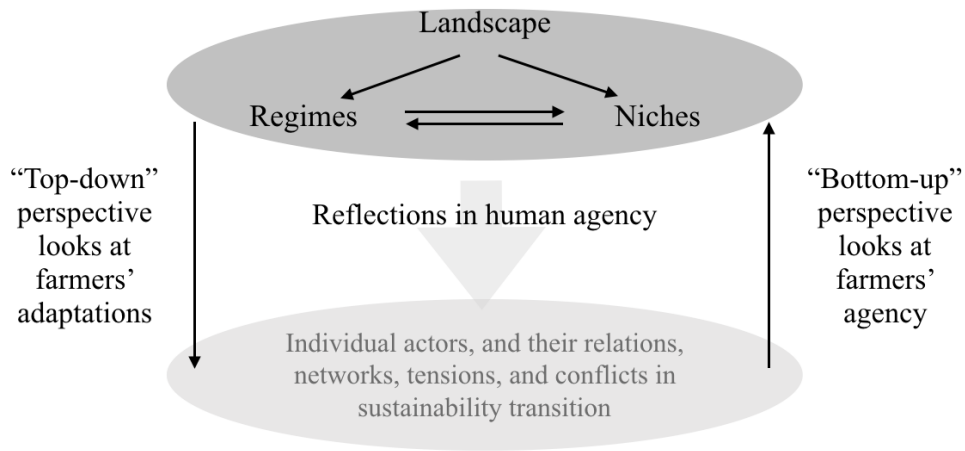


Figure 3 Top-down and Bottom-up Perspectives in the Research Framework

Chapter 2

Methodology

2.1 Actor-based qualitative case study

The basic research focus of this study is to explore the transition to ecological agriculture in China, in light of the sustainability transition theories. In this field, socio-technical transition theorists, especially the work of Frank W. Geels (2002, 2004) who proposes the multi-level perspective (MLP) approach, contribute to unpacking transitional processes into hierarchical developments and interplay, within which technological innovations serve as important seeds for breeding structural and institutional changes. While MLP gains great impact in terms of understanding the evolutionary nature and structural impetus of transitions, other transitional scholars such as Shove and Walker (2007), Smith et al. (2010), Coenen et al. (2012), Lawhon and Murphy (2012), and Ingram (2015) have pointed out several critiques of MLP: 1) overemphasizing technological innovations for constructing transitions; 2) lacking considerations of human agency (i.e., willingness and capacity for changes) and inevitable contest and conflicts; and 3) leaning over structural, hierarchical explanations to transitions.

Lawhon and Murphy (2012) present epistemological differences and advantages to explain transitional processes from a broader social perspective (see Table 2.1). A pure technocentric perspective and a social perspective provide different guidelines for change. From a technological stance, environmental problems can be attributed to the immature technologies that are not able to reduce excessive emissions. Therefore, knowledge from experts is needed for updating technologies, and criteria should be selected to evaluate the applications of new techniques. Hence, the technical explanation of environmental problems leads to expert-led innovations and the corresponding power concentration. However, from a social perspective, problems are interpreted within broader contexts and governing systems. A broader involvement of actors and knowledge could offer multiple lenses to understand the problems and offer solutions. For example, if applying indigenous knowledge helps to enhance environmental conditions, social changes such as empowerment of bottom-up initiatives are needed to address the problem. Lawhon and Murphy (2012) argue that incorporating these social lenses into transitional theories will expand our imaginations of sustainable forms of development.

Table 2.1 Different Explanations of Environmental Problems between Technological and Social Perspectives

	Causes of Environmental Problems	Understanding of knowledge	Understanding of power	Measuring transition outcomes
Technological Explanations	Immature technologies	“Rule of experts”	“Inscribed capacity” to control or dominate	Material changes of technique applications
Social Explanations	Broader contexts and governing rules	Local/ indigenous knowledge of broader actors	“Use of language or the building of networks” to mobilize	Social changes in wealth redistribution, empowerment, etc.

(author’s synthesis based on Lawhon and Murphy 2012)

Therefore, this study builds on the refined ideology of sustainability transition theories (Shove and Walker 2007, Lawhon and Murphy 2012) ---- adopting social lenses into examining sustainable agricultural transitions in China. In fact, such a theoretical modification is imperative for studying agricultural transitions in China. In a highly cited paper, Xue et al. (2016) review 30 empirical studies on ecological agriculture in China since the start of the 21st century, and identify a high weight on quantitative, top-down indexes to evaluate both environmental and socio-economic outcomes of ecological agriculture (e.g., use the amount of fertilizer usage to reflect environmental outcomes, use the Engel coefficient to measure economic outcomes). Meanwhile, they point out a lack of “humanist color” in selecting indicators that cover benefits of individual stakeholders (e.g., food quality, farm management). Xue et al.’s paper reflects how quantitative, index-centered research forms a solid base for governmental schemes on agricultural development: as the research papers stress the numeric changes of index to assess ecological agriculture, the governmental papers are proposing similar index systems as their development goals (e.g., reduce 5% of the usage of fertilizers by next year, increase by 10% the recycling rate of plastic mulch). Consequently, there has been less focus on how ecological agriculture brings social changes to farmers, the countryside, and the rural culture. Hence, more case-oriented research and heterogeneous social factors are important for improving understanding about sustainability transition in China.

Built on the actor-based methodology (Smith et al. 2010, Lawhon and Murphy 2012), I further unpack my research question about the interplay between the three trends of eco-civilization,

agricultural modernization, and the transition to quality food into examining the development of ecological agriculture sector at the farm-level. Thus, my study has a strong focus on the complexity of varied ecological practices, various farmers and other stakeholders, and their relations shaped within a “real life” context of the three trends. The expressions of human agency in social systems (e.g., becoming an ecological farmer due to food safety concerns) (Burton and Wilson 2006) are of essential importance to answer my questions of how are individual stakeholders involved in the three levels of niche, regime, and landscape. What are the stories of the stakeholders who have been taking initiatives in ecological agriculture, how have they bonded or disagreed with each other, and what do these stories tell in terms of a broader sustainability transition under the three trends of eco-civilization, agricultural modernization, and agri-food movements. In this vein, a case study is the most appropriate method since a holistic and in-depth investigation is demanded in my research (Zaidah 2007). In general, guided by my research questions and the refined transition theoretical framework, this study adopts the actor-based qualitative case study.

2.2 Study Setting

This study is conducted in the city of Nanjing. Thomas (2011, p513) defines case study as “*analysis of persons, events, decisions, periods, projects, policies, institutions, or other systems that are studied holistically by one or more methods. The case that is the subject of the inquiry will be an instance of a class of phenomena that provides an analytical frame—an object—within which the study is conducted and which the case illuminates and explicates.*” Corresponds to the definition, the subject (the case) of my research is the development of ecological agriculture in Nanjing. The phenomena (the context) are the rural and agricultural transformations under the three trends of eco-civilization, agricultural modernization, and agri-food movements. The object (the associated analytical frame) of my research is the shaping of ecological farming practices at the farm-level by the three interwoven trends. The following section explains the reasons for selecting Nanjing as the case study place.

2.2.1 Context of Nanjing, China

The context of Nanjing’s ecological agricultural developments provides a great case for examining the agricultural sustainability transition. First of all, China is a very large country, with 9.63 million square kilometers of national land area spanning 5 time zones and 32 provincial administrative regions. Moreover, the historical legacy and cultural background, geographical environments, social-

economic situations, major industries and agricultural developments are highly diverse among regions and cities. Thus concentrating on one area to research the variety within its ecological agricultural sector is more feasible for this research than trying to select appropriate samples from across China.

First, Nanjing is an important place for agricultural production. Nanjing is the provincial capital of Jiangsu province, a south-east province with the highest economic level and strongest comprehensive governance capacity among all the provinces in China. Located in the Yangtze-river delta, Jiangsu covers multiple river systems, lakes, flatlands and low hills. The geographical landscape of arable soil and water source, and the historical tradition of farming led to Jiangsu being one of the 13 main food producing regions of in China (Jiangsu Agricultural and Rural Department 2019). These conditions favor Jiangsu as the leading province in terms of carrying out state schemes of ecological civilization. In the developmental plans published by the Jiangsu provincial office and Nanjing municipal government in 2018, the overall key guiding principle is to formulate strategies according to the state eco-civilization scheme, in which the development of green agriculture is the top priority.

Second, as one of the main national development focuses, agricultural modernization is also prevalent in Jiangsu. According to the Modernization Plan of the National Agricultural and Rural Department, the central state (and president Xi Jinping) expects Jiangsu to be the first province to accomplish agricultural modernization, such as building industrial systems and constructing modern style residential houses (Tang and Zhang 2018). As important indicators for measuring modernization levels, the percentage of machine utilization among all the farms in Jiangsu is 84%³, and the percentage of highly standardized farmlands is 61%⁴, and the percentage of farmland area with high-tech facilities (e.g., macromolecule greenhouses) is 19.6%. This high modernization level in Jiangsu significantly shapes rural landscapes, including fast urbanization and changing rural lifestyle (Wu et al. 2016). Therefore, Jiangsu serves a useful context for this study to examine agricultural transition and farmers' experiences under the modernization trend.

The third reason that Nanjing serves a suitable context for this study is because Nanjing has seen transitions to quality food production as well. Nanjing witnessed the earliest presence of an organic

³ The percentage of machine utilization is a general rate reflecting the areas of farmland that are tilled, sowed, and harvested by machines.

⁴ The indicators of distinguishing highly standardized farmland include land consolidation, land assembling, equipped with irrigation system and other agricultural machines, soil fertility, and resilience. In general, highly standardized farmland should prove stable productivity.

certification body in China, attributed to the efforts of Nanjing's environmental bureau in the early 1990s (Sanders 2006). Since then, organic agriculture has been well developed in Nanjing. In 2015 the annual Nanjing statistic bulletin (NSB 2016) identified 89 certified organic farms. Meanwhile, the civil society-driven food sector is also evident in Nanjing. Though it cannot compare with super metropolises such as Beijing and Shanghai where AFNs are thriving, Nanjing has at least 3 CSA farms listed by the national CSA Alliance (CSA Alliance 2019). This is probably because of the strong economic conditions in Nanjing where people have a relatively high purchasing power to purchase quality food. Furthermore, Nanjing has the traditional culture of appreciating fresh food and dietary diversity (Veeck and Veeck 2000), which complies with the quality-concerned 'good food' movement in China (Zhang 2016).

Based on these agricultural contexts, Nanjing is an appropriate setting to study the agricultural sustainability transition under the three trends: the provincial and municipal governments are following eco-civilization scheme; the farmland has gone through remarkable consolidation and transfer to commercial farms; and the public sector and society are breeding a nascent food movement. Nanjing mirrors what has been happening in the rural and agricultural sector in China more broadly. Moreover, sustainability transition studies also call for "localized" place-based, case studies, to add a spatial dimension into transition theories because a local territory is the primary site for visualizing the interactions between landscape forces, regime structures, and niche practices (Coenen et al. 2012). This study thus takes Nanjing as the research site and examines stakeholders involved in the ecological agricultural sector there.

2.3 Data Collection

2.3.1 Sampling procedure

This study started with a purposeful sampling strategy to select "information-rich cases...from which one can learn a great deal about issues of central importance to the purpose of the research" (Patton 1990, p.169). This study chooses to focus on stakeholders involved in the ecological agricultural sector in Nanjing. The informants thus include individual farmers who started their own ecological farms and hired farmers who work for ecological farms, local governmental actors whose jobs are related to regulating the development of ecological agriculture, officers from the organic certificate bodies who shared their stories with certified organic farms and shared contacts of more farmers,

NGOs and social enterprises whose work is related to supporting ecological farming, and professors whose research interests are focused on ecological agriculture.

After meeting with the initial interviewees, I conducted snowball sampling to identify more stakeholders. Representatives from Organic Food Development Centre (OFDC, Nanjing's organic certification body), Nanjing Rural and Agricultural Bureau, and Nanjing Agricultural University suggested seven cases of certified organic farms. However, there was a lack of inclusion of non-certified cases. And it was difficult to connect with more ecological farms, or even to find out about these farms, especially ecological farms run by existing farm households. This was because there were no official statistics on ecological farms, and hardly any online posts (either websites or microblogs) that could guide me to more farms. Therefore, another round of purposeful sampling was started by online searching of keywords of “domestic/Jiangsu/Nanjing; organic/green/ecological/low-carbon/environmental; agriculture/farms/farmers/new farmers/CSA/farmers’ markets/AFNs” in Chinese. I then identified two CSA farms without certification and one magazine called “Organic Slow Life” that was based in Nanjing. Following the snowball sampling again, the two female CSA farmers and the magazine editor linked me to other types of ecological farms. With their sharing of ongoing events in Nanjing, I was able to attend one lecture and one workshop to meet more people. The sampling process was also supported by my colleague Ning Dai, who joined the fieldwork and shared with me his contacts with ecological farms to find more participants.

At the end of my fieldwork in 2016, I had a rough database of ecological farms in Nanjing. And that was when I realized an important missing actor in terms of forming the ecological agricultural sector and understanding agricultural transition in China ---- existing farmers. With a deeper understanding of rural China, I gradually sensed a mismatch between western-based sustainability transition theories and Chinese socio-political rural settings. While much existing research on global food movements examines how initiators form networks and movements to articulate visions, many rural farmers in China are not expressing interest in making their voices heard, at least not proactively. The western-based research philosophy such as identifying niches and focusing on individuals' agency, may lead to the “bottom-up” perspective of “how do rural farmers approach transitional processes” (Lawhon and Murphy 2012, p). However, the “bottom-up” perspective may lead to the misreading of rural farmers under the top-down social-political structure prevalent in China, and their reluctance in and adaptations to transitions. This changing of perspective to examine rural farmers under transition (see figure 3 in p.11), rather than to solely identify ecological farmers who are typically from an urban

background and enthusiastic in starting initiatives, encouraged me to modify my sampling strategy later. In order to look at questions like “how do rural farmers perceive and adapt to changes”, I used a second round of purposeful sampling and decided to select two villages to conduct fieldwork in 2017.

In 2017 I found out about two villages in rural Nanjing that had almost fully transitioned to ecological agriculture, one through building up farmers’ cooperatives (Dai Village) and one by attracting investments from agri-business companies (Jinci Village). The two villages are very popular among citizens in Nanjing. For Dai Village, many of my interviewees referred to it as “a very successful but exceptional case of doing organic farming, and also improves the livelihoods for farmers”, or “worth visiting”. I had visited Dai Village in 2016 and agreed with the above observation. The most impressive thing was the villagers’ own recognition of the value of organic farming, rather than them merely working as hired laborers. But my interviews in 2016 were mainly with two leading farmers in the co-op. I then decided to visit Dai again in 2017, and to spend more time with villagers and the village leader. For Jinci Village, I got the recommendation from an officer in the Nanjing Agriculture Bureau who referred to Jinci as “one of the major projects of promoting ecological agriculture, credited by both municipal and provincial government”. Additionally, my friends in Nanjing talked about the Barolo Eco-Valley in Jinci Village as the most popular agri-tourism site in Nanjing. I was surprised by how Jinci looked like a town/city with the decorated streets, apartment buildings, and public shuttles and vehicles. I then decided to compare the two cases of Dai and Jinci. The interviewees included leaders (who have power in terms of making agricultural plans) of both villages, major actors in the farming sector in the cooperative/ company, farmers and villagers I met during my visits.

In total, I ended up sampling 31 ecological farm owners, 15 organizational actors, and 9 local villagers (either employed as farm workers or not) (see Table 2.2). In the next section, I will explain different data collection methods I used during different stages of fieldwork.

Table 2.2 Summary of Interviewees

Type of Interviewees	Number
Certified Ecological Agribusinesses	11
Non-certified Ecological Farms	16
Farmers’ Cooperatives with Eco-Farming	4

Governmental staff	5
Research Institute and University	2
Private Business Actors	2
Other Organizational Actors	6
Local Villagers	9

2.3.2 Data collection methods

This study mainly relied on interviews and site visits to collect information from participants. However, it also used observation of food selling venues, daily life in rural villages, conversations between farmers, and lectures and workshops on eco-farming. Secondary information was collected through published governmental regulations online, We-Chat posts from farmers, and articles published in the “Organic Slow Life” magazine. These observations included notes and photographs.

For qualitative research that probes into meaning and interpretation of specific perceptions held by participants, interviews are the most commonly used data collection method (Shazia 2014). Just as no sampling is purposeless in qualitative research, it is also recognized that no interview is without structure (Coyne 1997). According to the different preparations of questions and room left for interviewees to express their narratives, interviews can be loosely sorted into structured interviews, semi-structured interviews, and unstructured interviews (Dunn 2010). Different types of interviews provide different ways for researchers to gain information. While structured interviews are mostly used in quantitative research to obtain statistical data, semi- and lightly structured interviews are often adopted in qualitative research for researchers to better get to know interviewees and their ideas, to dig out more unknown and unprepared information, and to organize conversation directions within certain freedom levels (DiCicco-Bloom and Crabtree 2006).

The adoption of unstructured interviews or semi-structured interviews is also discussed by scholars. DiCicco-Bloom and Crabtree (2006, p315) find that “whereas the unstructured interview is conducted in conjunction with the collection of observational data, semi-structured interviews are often the sole data source for a qualitative research project”. This observation complies with the tradition of combining observations and unstructured interviews by early ethnographers. This kind of in-depth

research often relies on the adoption of observations by researchers to generate questions over time and to identify key informants, and then on the adoption of unstructured interviews by researchers to gain knowledge for the studied fields (DiCicco-Bloom and Crabtree 2006). Because unstructured interviews often comprise unplanned questions, another advantage of unstructured interviews is that it “allows respondents to let them express in their own ways and pace, with minimal hold on respondents’ responses” (Shazia 2014, p87). In contrast, semi-structured interviews often include predetermined open-ended question sets, and allow other questions to emerge from the conversation between interviewer and interviewees. The semi-structured interviews are “usually scheduled at a designated time” (DiCicco-Bloom and Crabtree 2006, p315) and conducted only once. Hence, it relies on the interview guide to achieve efficiency in a limited time.

Therefore, unstructured interviews and semi-structured interviews may be chosen by researchers, according to their own understandings of the research fields, their acquaintance and social relations with interviewees, and the time schedule in the field. For this study of ecological agricultural stakeholders in Nanjing, I divided my research into two parts and utilized different interview methods for each part (see Figure 4).

The first stage was from late May to early October 2016, and then from late July to early October 2017. In this stage I mainly conducted semi-structured interviews with 44 key stakeholders in the ecological agricultural sector in urban and sub-urban Nanjing, including 30 interviews with ecological farm owners (both certified organic farms and uncertified small-scale farms), and 14 interviews with multiple organization sectors such as governmental departments, retail stores, research institutes, and media companies (5 interviews were with different representatives in the same organizations). In this part of my research, I developed two semi-structured interview guides for farmers and organizational actors. For farmers, the questions focused on their impetuses to start or transit to eco-farming, the main types of plants or animals they were farming, the adopted farming techniques they were using, how they learned about this information and knowledge, what kinds of supports or challenges they were facing, and how they understood ecological agriculture. For organizational actors, my questions

focused on their job relations, organizational relations, and personal relations to eco-farms.

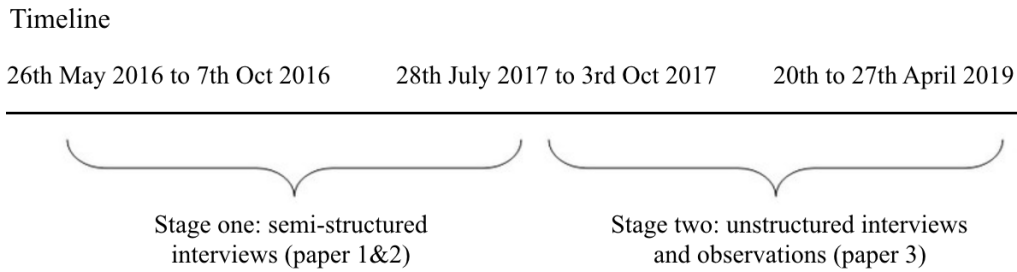


Figure 4 Timeline of the Fieldwork

The second stage overlapped with part of the first stage from late July to early October 2017, and a week in late April 2019. In this stage I used on-site observations and lightly structured interviews in two villages: Dai Village and Jinci Village. As explained above, after the 2016 fieldwork I found a lack of representation of rural farmers in my case studies, and decided to change my view from finding farmers from urban backgrounds who started ecological farming to examining farmers from rural backgrounds who were involved in transition to ecological agriculture. As stated earlier, I came to learn about two villages in rural Nanjing that had almost fully transitioned to ecological agriculture, one through building up farmers' cooperatives (Dai Village) and one by attracting investments from agri-business companies (Jinci Village). Although I am native Chinese, I lacked understanding of the social rules and conditions in rural villages as I grew up in urban areas. At the beginning, my naïve and unskilled communication methods failed to build rapport with rural farmers. As a result, I made the decision to use observations and unstructured interviews to familiarize myself with the rural context. In the two villages I conducted in-depth interviews with 13 key actors (i.e., the leader and council members of the farmers' cooperative in Dai Village, the governmental representative of agricultural development in Jinci Village, the production manager and production team members, rural farmers and villagers. See Table 2.3). I also collected 32 secondary sources including policy papers, news reports and published journal articles regarding agricultural development in the two villages.

Table 2.3 Interviewees in Two Villages

	Governmental Representative	Coop/Enterprise Representative	Coop/Enterprise Farmers	Local Villagers
Dai village	1 (interviewed twice)	2	2	1
Jinci village	1	1	2	3

2.4 Data Analysis

This research is a case study to investigate the sustainability transitions to ecological agriculture using Nanjing as the case context. It is argued that when a large variety of factors and relationships can be observed, but there is no clear direction to decide the importance of them, case study is an appropriate strategy to discover the connections (Fidel 1984). In depth-oriented case studies researchers can see conditions, interactions, events, and other factors that might be ignored by other breadth-oriented investigations. Hence, it facilitates a deep comprehension of specific events and phenomenon, while developing general theoretical understandings related to the cases (Becker 1970). In general, case study is an inductive research that generates new or builds on existing theoretical explanations to the identified problems in the fields (Zainal 2007). One key method that supports the case study is to continuously conceptualize findings alongside data collection until no new categories or themes emerge (DiCicco-Bloom and Crabtree 2006). Similarly, Fidel (1984, p274) specifies “during the process of data analysis (of case study), the investigator identifies the problems that appear to be of major importance. The selection of research questions and concepts is guided by the concrete findings and the attempts of the investigator to identify possible theoretical implications” (Fidel 1984, p274). After that analysis should include procedures for “seeing” data, making sense of it, and thinking of theories constantly (Berbary and Boles 2014).

During the fieldwork, I used constant comparison of cases to guide my interview procedure and to obtain a general categorization. For example, after the first interview with an ecological farm owner,

the interesting topics that emerged to me were 1) the relatively weak economic concerns compared to the strong desire for healthy and delicious food; 2) the gradually increasing care for environment; and 3) the complex relations with other farms. I then built on these understandings to interview more farmers, and to compare the similarities (e.g., topic 2 and 3) and differences (e.g., topic 1) between them. This iterative process helped me to dig deeper into why there were these similarities and differences, and to distinguish important indicators that shape different categories of eco-farms. The basic categorization of farms then serves as an initial empirical base for my first manuscript. In the same way, constant comparison helped me through the entire data collection procedure, especially in terms of gaining practical knowledge about eco-farming (which helped me to conduct better interviews with farmers) and identifying key clues for theoretical works later.

Since a general categorization of farms and related organizations emerged after the fieldwork, I then organized fieldnotes and recordings under titles of large-scale agri-businesses, farmers' cooperatives, household farms, public organizations, private organizations, social organizations, and individuals. I used the naturalized style to transcribe the fieldnotes and recordings into Chinese. This is because "a naturalized version contains many details, (which) the research could turn to if in-depth analysis of conversation (i.e., accents, communication style and speech idiosyncrasies) needed to be examined" (Oliver et al 2008, p13). For the interview questions such as "what's your impression of one particular experience" and "can you tell me the challenges so far", how interviewees choose terms and organize language are important analysis factors to suggest their feelings or to imply the significance level of a certain topic. Another part of the fieldnotes came from my observations from on-site visits at the two villages. These fieldnotes were also transcribed into contextual documents with pictures added. Although these descriptions alone cannot provide explanations, they serve as important contexts to rationalize specific situations (Mays and Pope 1995).

With learning from the field work and the transcriptions, this research unpacked the transitional processes to sustainable agriculture through interpretations of data and linking them to multiple theories for explanations. In the first manuscript, I firstly focused on farming practices and management practices that categorize different EA farms. The framework is built on both empirical findings and literature reviews of weak to strong ecological modernization and multifunctional agriculture. I then resorted to two elements of certification and the main operators (new farmers or established farmers) to conceptualize the different categories. The analysis reveals that the farmers themselves, their understandings of ecological agriculture and their reasons to start this style of

farming, were the crucial reasons that caused the differences. Hence, after a general assessment of different types of ecological farms, I then examined how different categories of farmers made their choices of starting and practicing ecological farming.

In the second manuscript, I looked into the notes for relations between organizations and farms. I then mapped out the relationships on paper, such as links between certification body and certified farms. The finding was that there was a strong institutional support for the large-scale certified organic farms through multiple organizations. However, the links between organizations to small-scale farms are fewer and thinner. To understand with whom and how small-scale farms establish relations, I went back to the transcriptions to look for interactions mentioned and described by small farms. This led me to discover the implicit relations between farmers themselves and allowed me to prepare interview questions for fieldwork in the second year. This interesting comparison between vertical, explicit relations entailed by policies and horizontal, implicit relations penetrated in everyday interactions, directed me to the theoretical discussions of embeddedness of EA sector in vertical context of policies and horizontal context of territorial and social relations.

In the third manuscript, I started with reading transcripts from interviews with local governmental actors. These conversations provided rich details about how the whole villages moved to ecological farming, and the timeline of the transitions. I also paid particular attention to how governmental actors perceive such shifts, for the purposes of comparison with villagers' perceptions. This first analysis helped me to discover different key turning points in the two villages. I further looked at the interviews with rural villagers, focusing on the tensions and conflicts implied in words and sentences by farmers. What emerged from these comparisons between governmental perspective and farmers' words, were actually a departure of conversational topic from agricultural transition to more life-related topics such as revenues, living environment, community relationships and so on. These findings were actually close to discussions of rural restructuring in China. Hence, I referred to this field of research to conceptualize the transitions to ecological agriculture in China.

2.5 Research Rigor

Case studies often receive critiques for lacking credibility, a question of how researchers' subjective observations and understandings can reflect the "truth", and how findings generated from this research can be transferred elsewhere. Therefore, I want to explain my position as a native Chinese,

urban-based female researcher, and how does it shape my research. First of all, my Chinese nationality and Asian face closed the distance between the researcher and participants most of the times. As many foreign researchers would find themselves to be outsiders doing fieldworks in China, I was easily considered as insiders via communicating in Chinese, understanding social codes (e.g., dressing codes, greeting notes), building rapport by casual talks, and others. More importantly, the Chinese identity improved my investigation in two ways: I can sense the mood and feelings of participants by distinguishing the words they adopted and probe other questions (e.g., an interviewed farmer used “peasant” instead of “villager” when he talked about neighbors); I can read implicit information from farm decorations with Chinese characters (e.g., poetic creations, see Section 3.5.2, Chapter 3).

My fieldworks in villages led to the feeling of being an outsider. As a person grows up in urban cities in China, I have a limited understanding of the social rules (e.g., in some villages, women have less speaking power than men do) and colloquial language. The first three conversations with rural farmers generalized little information because we cannot understand each other from time to time. For example, they referred “small vegetable” (*xiao cai* in Chinese) to “leafy vegetable” (*shu cai* or *ye zi cai* in Chinese). Frequently, my speaking appeared to be too formal for them. The other problem was that I jumped into the interviews too soon before establishing rapport with local farmers. My feeling was that more casual talks of daily life routines (in order to demonstrate my familiarity of the general village context and to well communicate my research plan) are needed for fieldworks in villages.

As a young female researcher, I felt that I took advantage of many participants as they would offer rides and caring about my accommodation in Nanjing. Since some of my interviewees are older than me, after knowing my trip purpose and research plan, they sometimes developed sympathy on me as a junior sister. Foreign female researchers sometimes encounter sexual harassment and other situations of which they were taking advantage in exchange for more information (Schneider et al. 2020). My fieldwork was more friendly unfolded: most of the participants facilitated my research by providing information, connections, and resources. However, there was gendered relationships throughout my fieldwork. As many senior male participants considered me as a young and unsophisticated student, they sometimes avoided in-depth talks with me. The situation was better when another male researcher joined this fieldwork. Therefore, most of my interviews with female participants were longer than interviews with male participants.

This study used multiple strategies to cross-check the validity of data collection and the reliability of data analysis. First, I conducted three days of pilot fieldwork in Shanghai, which helps to verify and enhance the questions listed on the interview guidance. I chose Shanghai for the pilot fieldwork because this is where the annual organic trade show called Biofach happens, and many organic farmers would be attending the trade show. It provided a good opportunity for me to meet people, and to revise my interview questions by talking to them. For example, one tea farmer I met at the exhibition found that some of my language was too academic, and suggested I simplify my questions with more common language. In addition, I also brought 10 questionnaires to the exhibition covering questions such as, what agricultural products do you farm and to whom do you turn for farming knowledge. It turned out that these questions were great for general statistic of ecological farms, but did not bring about the knowledge to explain the behavior behind the answers. Such learning from the pilot fieldwork led me to adjust my interview form: I used these easy questions to open conversations with farmers, and went deeper into their stories and experiences after building rapport.

Second, since this research used snowball sampling and purposeful sampling for reaching out to the ecological agricultural sector in Nanjing, it may lead to a biased observation of stories told by “insiders”. For example, customers in Nanjing may hold totally different views about going organic. As I stayed in Nanjing for a couple of months, I spent some time talking with “outsiders”. In 2016 I went to various supermarkets and wet markets. It allowed me to talk with several food customers and sellers. From them, I verified the reputation of several large agri-businesses, and even the short history of setting up retail stores inside supermarkets by these enterprises. In 2017 I spent three days in another village called Changle. I talked to a local government officer to learn about recent regulations promoting EA. The conversations with Changle villagers also provided a standard for me to compare my selected cases of Dai Village and Jinci Village. These strategies allowed me to shift my identity from a researcher to a Nanjing resident, and improved the reliability of my data interpretation.

Third, I adopted the important strategy of triangulation to enhance the credibility of data analysis. I was fortunate to have a colleague to conduct fieldwork with me for almost half of the time. After each interview we had conversations to recall most of the interview contents, and to communicate reflections. This collaborative process helped me to avoid a one-person perspective, and enhanced the accuracy of transcripts. In addition, my other team colleagues also joined my fieldwork each time for one to two weeks. We then had group meetings to discuss fieldwork findings and further interview

directions. We continued group meetings after we returned from the field, with each of us reporting our progress. This process allowed me to present my three papers to them and to get their comments and feedback. During the process, I also applied different theoretical lenses to examine the results. The triangulation strategies improved the trustworthiness of my measurements and my investigation of specific cases.

This research of a case study of ecological agriculture sector in Nanjing is not without limitations. Since the development of this specific sector in Nanjing is unique, the generalization of theories and transferability of the case to the Chinese context should not be taken for granted. As most of the scholars focusing on case studies suggest, the disadvantage of the generalizing power of a case study is as apparent as its advantage of the explaining power of understanding very complex phenomena under a “real life” context (Zainal 2007, Thomas 2011). The following chapters of research findings and theoretical discussion related to ecological agriculture illustrate the uniqueness of the case of Nanjing. Hence, the research provides empirical and theoretical basis to compare Nanjing with entire China and other social-political settings.

Chapter 3

A Typology of Ecological Agriculture in Nanjing, China: Farming Practices, Management Strategies, and New Attributes of Farmers

Abstract:

China has been witnessing a significant shift towards ecological agriculture (EA) since the 1980s after decades of practicing chemical agriculture. While existing studies on Chinese EA provide a clear structural contextualization (e.g., a state-led yet market-oriented environment) that portrays EA relatively accurately, we argue that there is a lack of more nuanced interpretations of EA that is evidenced in micro-level practices and perspectives of diverse types of ecological farmers. Such a study is necessary for understanding farmers' attitudes to and motivations for conducting EA. Our study, undertaken in Nanjing, sought to capture the diversity of EA in China at the farm-level and from farmers' perspectives. It addresses two questions: to what extent and in what aspects do EA farms differ from each other, and why have farmers undertaken these different approaches to EA. Our findings reveal four types of EA farms, identified based on farming practices, marketing strategies, and relations between farm operators and hired farmers. Moreover, we further explore entrepreneurship, artisanship, gendered roles of food provision, nostalgia for rural pasts, inherited knowledge, and re-building of confidence, as factors shaping decisions for both new farmers and established farmers for initiating EA operations. This study sheds light on the dynamic situation of the EA sector, within which farmers are constantly modifying farming and management practices subjected to both the broad policy settings (e.g., land system) and their distinct backgrounds. We argue that farmers' specific attributes are important for understanding the complexity of EA and formulating EA-related policies.

Keywords: ecological agriculture, farmers' perspectives, new farmers, established farmers.

3.1 Introduction

Worsening environmental and climate challenges have led some current and new farmers to steer agricultural practices towards greater sustainability. In China, such agricultural changes started in the

1980s when the government promoted Chinese ecological agriculture (CEA), a widespread program guided by ecological-economic principles to improve the natural environment on a county level (Ye 2002, Shi 2002). Since the 2000s, with the central state's increasing emphasis on environmental protection and with a severe level of food anxiety among consumers, China has witnessed the mushrooming of certified organic agriculture, certified green food, farmers' markets, food buying clubs, community supported agriculture (CSA), and more (Sanders 2006; Sheng et al. 2009; Scott et al. 2014; Si et al. 2015). Examinations of these initiatives reveal dual developments of an ecological agriculture sector characterized by strong state participation in certified food production and the rising influence of middle-class consumers on changing practices at the farm level (Shi et al. 2011; Scott et al. 2014).

While existing studies on Chinese EA contribute to a broad structural contextualization based on state incentive programs and public food anxiety that portrays the dualism of EA, we argue that there is a lack of more nuanced interpretations of EA that is evidenced in micro-level practices and perspectives of diverse types of ecological farmers. For farmers whose perceptions of and specific needs to realize EA are highly diverse, their perspectives are essential to portray the more massive diversity of EA that goes beyond state and non-state dualism (Burton and Wilson 2006; Wilson 2009). More specifically, research revealing farmers' perspectives is necessary in order to identify various elements: the complexities within the existing agri-food system configurations, innovative behaviors and particular visions of EA, and possibilities for achieving them (Hinrichs 2014). Furthermore, such research helps to identify farmers' attitudes to and motivations for conducting EA, and the costs for farmers to modify their farming types (Shove 2010). To carry out such research, "on-the-ground" and farm-level investigations are needed to comparatively discern how various farmers have developed different thoughts on EA and have implemented various practices (Wilson 2008).

In order to capture the diversity of EA in China at the farm-level and from farmers' perspectives, we undertook the study in Nanjing, the provincial capital of Jiangsu in China, to investigate and categorize a variety of EA farms, from state-led agriculture schemes to civil society-developed alternative food initiatives (Scott et al. 2014). The province was the frontier for promoting CEA and organic agriculture announced by the state in the 1990s and 2000s and has seen various CSA farms develop since 2010. By 2013, Jiangsu witnessed more than 500 certified organic companies (ranked 6th among 6051 certified companies in China) (CNCA 2014), and Nanjing had 89 certified companies (Nanjing Statistic Bureau 2015). According to the China CSA alliance, by 2015, there

were 10 CSA farms in Jiangsu (ranked 5th among 123 CSA farms in China). The case study in Nanjing includes various farmers engaged in different EA styles. The study addresses two questions: to what extent and in what aspects do EA farms in Nanjing differ from each other, and why have farmers undertaken these different approaches to EA? Addressing the first question depicts a typology of EA that suggests different transitional pathways to sustainable agriculture. Researching the second question helps to understand the specific situations and needs facing farmers when conducting EA today.

This paper is structured as follows: first, we provide a theoretical discussion of EA, based on which we develop an analytical framework comprised of two aspects to examine EA farms. Second, we introduce the empirical cases of EA farms in Nanjing, and present the qualitative research methods involved in this study for data collection and analysis. In particular, we draw on both previous studies on CEA, organic agriculture, and alternative food networks (AFNs) in China, and empirical findings to categorize our cases. Third, based on the categorization of four types of EA farms in Nanjing, we apply the analytical framework to each type of EA farms to reveal their features and differences. Fourth, we further probe into farmers' individual experience of operating EA farms, and illustrate two groups of new farmers and established farmers. Finally, we link the analysis of farmers to explain why they initiate different types of farms and offer a conclusion.

3.2 Conceptualizations of Ecological Agriculture

The notion of EA has been widely debated. Some scholars have argued that EA involves a normative confusion because the term “ecological” is too broad and lacks a universally accepted definition and standards (Lockeretz 1989). EA has often been used interchangeably alongside “sustainable agriculture” and “agroecology”, the latter denoting agricultural practices that are guided by ecological principles (Brodt et al. 2006; Pretty 2009). One possible way to address the confusion is to specify the criteria that distinguish EA practices from conventional agricultural practices, such as adopting integrated pest management. Both in China and in a global context, assessments of EA have overwhelmingly concentrated on the creation of index systems to evaluate the physical, environmental and economic outcomes of various agricultural activities (Wilson 2008b; Xue, Hu, and Chen 2016). EA is praised within the index systems if negative impacts on the environment have been reduced, and resource-use efficiency has been increased (Duru and Therond 2015). Such an interpretation of EA leads to what Kitchen and Marsden (2011) call a bio-economy paradigm, in

which technological innovations penetrate food productions. New technologies such as precision agriculture, molecular techniques, and even genetically modified organisms are considered viable pathways to EA⁵.

Recognizing the deficiency of using efficiency and environmental improvement as the only assessments of EA, scholars have examined a range of concepts, such as “ecological modernization” (Horlings and Marsden 2011) and “biodiversity-based agriculture” (Duru et al. 2015), to broaden thoughts on potential dimensions that characterize a stronger version of EA. These conceptualizations breed a heterogeneous and interrelated set of ecological, social, economic, political, and cultural dimensions to unpack food productions and distributions. For example, Horlings and Marsden (2011) distinguish weak and strong forms of ecological modernization. The weak forms continue with productivity orientations, standard business models, and capitalist economic logic in agriculture. The strong forms call for a place-based economy comprised of increased farmers' autonomy, rejuvenation of local knowledge, enabling policies, and re-embedded economic activities in local communities. Duru et al. (2015) similarly propose the contrasting concepts of efficiency-based agriculture and biodiversity-based agriculture. The former corresponds to technological solutions to agricultural pollution, and the latter entails systemic rethinking of the on-farm ecosystem, in which gaining biodiversity serves to reduce input utilization.

Wilson's (2008, 2009) conceptualization of strong multifunctional agriculture also breaks the narrowness of equating unidimensional and straightforward agricultural changes (e.g., a shift in agricultural policy, a decline in input utilization) with achieving multifunctionality. The strongest multifunctional agriculture should demonstrate high environmental sustainability, enhanced food quality, new value-adding avenues, shorter food chains, low integration into the global capitalist market, as well as local and regional embeddedness (Wilson 2009). Furthermore, instead of pursuing the fulfillment of the ideal model of strong multifunctional agriculture, Wilson (2008) asks for understanding of the reasons that hinder farmers from reaching the ideal model. In this respect, his works suggest a critical farm-level lens and farmers' perspectives to conceptualize agriculture.

⁵ GM crops (e.g., corns, soybeans, cottons) with insect-resistant gene requires less pesticides in production. Many scientists thus consider GM crops as environmental solutions to agricultural pollution attributed to severe synthetic inputs. However, in many countries including China, GM species are strictly forbidden in organic production.

Previous discussions on ecological modernization, biodiversity-based agriculture, and multifunctional agriculture generate two points for this study to examine EA. First, the conceptualization of EA should involve multiple social, economic, cultural, and political dimensions in addition to the primary environmental dimension. Second, applying these dimensions to examine EA should be operationalized at the farm level, focusing on farmers' practices and strategies that demonstrate these dimensions in operating their farms. More specifically, methodologies that rely on static indicators (e.g., waste recycling rate) can be refined by introducing “more qualitative and ethnographic methods...to engage more closely with [the] farmers’ individual [and] multifunctional life histories, transitions and development pathways” (Wilson 2008b, p.380). Based on previous literature, this study heeds the call by generating two aspects of farm operations to formulate a framework for examining EA. The first aspect regards farming practices, by which farmers build relations with soil, water, organisms, and the natural ecosystems. This aspect reveals partly the environmental, technological, cultural, economic dimensions (e.g., selection of seeds, uses of farming techniques, yield orientation) of farm operations. The second aspect links to management practices, through which farmers establish relations with consumers, hired farmers, and other stakeholders. This aspect further exhibits the economic, social, and political dimensions (e.g., uses of food chains, empowerment of local actors) of farm operations.

In both aspects, farmers could adopt operational strategies that vary from a strong (e.g., technology-centered) EA to a weak (e.g., biodiversity-based) EA. The empirical study builds on this framework to investigate operational strategies and explore farmers' attitudes, opinions, and decisions about EA. In the aspect of farming practices, EA is at its weakest when interpreted as a “one-size-fits-all” solution to the environmental impacts that “do not fundamentally question the [homogeneously] associated landscapes and standardized agricultural practice” (Duru et al. 2015, p.1261). The technological approaches to cope with agricultural pollution include replacing the chemical formula of fertilizers, pesticides and herbicides with organic ones and optimizing inputs through precision agriculture (Francis et al. 2003; Duru and Therond 2015). The strongest EA operations should “demonstrate [the] characteristics of strong ecosystems – efficiency, diversity, self-sufficiency, self-regulation and resilience” (Magdoff, 2007, p.111). Farming practices emphasize building an enabling environment that promotes a healthy and balanced symbiosis between multiple crops and the other inhabiting plants, animals and organisms. The specific practices involve boosting biodiversity, multiple cropping or mix cropping, preparing organic fertilizers, building soil strength, and laying out

diverse varieties according to specific spatial and temporal guidelines – in order to maximize the use of on-farm resources while minimizing off-farm inputs (Liu et al. 2013; Magdoff 2007; Duru et al. 2015; Hedberg 2015).

In the aspect of management practices, weak EA follows the logic of capitalism to manage food production and distribution, which resembles the market rules to expand production and reproduction, and therefore relies on mass markets for distribution and consumption. This farm management pattern entails loosening social ties, lacking locally embedded sociocultural capital (Wilson 2009; Horlings and Marsden 2011). In other words, management practices include conventional marketing strategies and employment contracts that exclude or marginalize hired farmers. In contrast, the typically strong EA initiatives include short food chains, AFNs, local food movements, amongst others (Kitchen and Marsden 2011). These marketing strategies recognize the deficiency of “business as usual” models, and they thus seek to promote socioeconomic changes to transform – if not wholly overthrow – the capitalist economy (Horlings and Marsden 2011). Meanwhile, strong EA often witnesses higher inclusiveness to hired farmers, in which farmers exhibit greater autonomy and power in making decisions. By enacting alternative marketing strategies and inclusiveness to hired farmers, strong EA enables novel social networks and economic relations and even influences economic rules, policy regulations, and social consensus involving food (Kitchen and Marsden 2011; Gliessman 2016).

Table 3.1 A Framework to Examine Weak to Strong Ecological Agriculture

Criteria of Farm Operations		Practices that Reflect Weak to Strong EA
Farming Practices		e.g., from biofertilizers to place-based ecosystems
Management Practices	Marketing Strategies	e.g., from long-distance food chains to alternative marketing channels
	Employment Relations	e.g., from marginalizing hired farmers to empowerment of local farmers

Generally, based on the above theoretical discussions of EA, we formulate a framework comprised of two aspects to examine various farm operational strategies, including farming practices and management practices. The latter is further unfolded into marketing strategies and employment relations (see Table 3.1). Moreover, these farm operational strategies are exemplified in weak forms such as utilizing precision agriculture and biofertilizers (Duru and Therond 2015), long-distance food chains (Wilson 2008), and marginalizing hired farmers, and in strong forms such as building place-based ecosystems, alternative marketing channels, and empowerment of local farmers (Horlings and Marsden 2011). This study explores the cases of EA farms in Nanjing according to the outlined framework.

3.3 EA Farms in Nanjing

Nanjing is the capital city of China's Jiangsu province. Located in eastern China with Yangtze river traverses the province, Jiangsu has a geographical landscape that fits for productions of rice, aquatic products, cotton and silk, tea, and vegetables. Historically, Jiangsu maintains rich farming traditions such as rice-fish farming and crop rotation from across the annals of its history. In the past decades, the GDP per capita and development and life index (reflecting factors such as employment rate, social insurance level) in Jiangsu have ranked the first among the 23 provinces in China, suggesting a relatively strong economic level. Due to Jiangsu's leading capacity in coordinating economic development, the state has always selected Jiangsu as the first place for carrying out new agricultural developmental schemes, such as promoting agricultural machinery and EA. For instance, both the policy agenda for developing CEA and the organic certification scheme were first implemented on trial in Jiangsu (Sanders 2006). It is not surprising that Nanjing gave birth to the first organic certification body – the organic food development center (OFDC) – in China. Meanwhile, the consumption abilities for spending on EA produced food, which is usually more expensive than regular food, have been high. By 2015, there were 10 CSA farms in Jiangsu and 89 certified organic companies in Nanjing. Therefore, the city is at the frontier of China's EA development, and is thus a suitable region to investigate the various EA farms.

Data collection was conducted in Nanjing through semi-structured interviews with 31 EA farm operators over seven months in 2016 and 2017. In the first stage, purposeful sampling was utilized to select "information-rich cases from which one can learn a great deal about issues of central importance to the purpose of the research" (Patton 1990, p.169). Fifteen certified organic and green

food enterprises were selected through recommendations from Nanjing Agricultural Bureau and OFDC. Additionally, three uncertified EA farms were reached through searching online platforms (e.g., Baidu, Weibo). In the second stage, snowball sampling was used to reach another thirteen uncertified EA farms. Semi-structured interviews were conducted with the 31 farm operators to learn about their farm operations, their personal stories in terms of initiating EA farms, and their understanding of EA. Other data collection mechanisms included site visits to farms, on-farm observations, and participation in pertinent lectures and workshops. This variety of methods enabled us to know the details about field management practices and to validate the interviewees' accounts of their farm operations.

The field notes and audio recordings during the interviews were transcribed into Chinese. An analysis of the identified farm operations classified the 31 farms into four categories. Each category comprises farms that employ similar farming practices, marketing strategies, and relations between farm operators and hired farmers. Two factors – certification (i.e., certified or not) and leading operators of farms (i.e., new farmers or established farmers) – are used to elucidate the classification of four categories. Before presenting a qualitative analysis of four categories, we draw from empirical findings and previous research on organic agriculture, AFNs, and agrarian studies in China to explain why the two factors affect farm operational strategies.

First, whether governments and markets play the dominant roles in shaping EA initiatives is the crucial difference between EA farms with and without organic or green food certifications (Thiers 2002). In the Chinese context, the development of organic and green food certification schemes has been highly state-oriented (Scott et al. 2014), driven by the state's desire for exportation and promote agricultural modernization (Sanders 2006). The national standard of organic products in China was introduced in 2005 based on the IFOAM Basic Standard, Codex Alimentarius, EU regulation, US National Organic Program and Japanese Agricultural Standard (Xie et al. 2009). According to a policy brief published by the Certification and Accreditation Administration of China (CNCA 2014), the national organic standard has significant implications for organic exports and imports.

Additionally, organic-related policies in China emphasize the role of large-scale companies and farmers' cooperatives in standardizing organic agriculture. Organic-related research strongly focuses on technological innovations (e.g., precision fertilization, plant-based pesticide, automation greenhouse). Furthermore, stakeholders from the public sector (e.g., research institutions, CNCA-

accredited certification bodies) facilitate the implementation of a state-oriented blueprint into organic farm operations (Qi et al. 2020).

In contrast to certified EA farms that are strongly shaped by government schemes of developing organic markets, uncertified EA farms, mostly CSA farms in the Chinese context, are non-governmental and community-based practices rooted in public food anxiety (Scott et al. 2014; Krul & Ho 2017). Although CSA farms entail direct relations with consumers, the foundation of such relations is to provide chemical-free, local and seasonal food to consumers (Si et al. 2015). Unlike certified organic movement that endows EA with strong scientific and modernization implications, the uncertified alternative food movement associates EA with the implications of quality food production. In our cases, certified and uncertified EA farms differ remarkably in terms of the farm scales and marketing channels.

Second, studies on CSA farms in China have pointed to the emerging new farmers (i.e., middle-class people primarily from urban regions, with higher educational levels, following successful urban careers, who turn to farming and differentiate themselves from traditional farmers prominently) (Shi et al. 2011; Cody 2014; Si et al. 2015; Xie 2020). In our cases, 22 EA farms (both uncertified CSA farms and certified farms) out of the 31 cases are operated by new farmers. The other remaining nine cases are operated by established farmers who have been living in rural areas for decades and have extensive farming experience.

Land access and farming experience are the major elements that distinguish EA farms operated by new farmers and by established farmers. In terms of land access, while established farmers with rural identities have farmland use rights authorized by the household registration system (*hukou*)⁶, new farmers who are often associated with urban identities have no access to farmland except for contracting farmland use rights from rural residents (i.e., land transfer). In terms of farming experiences, established farmers who have been based in rural villages are used to the scenario of “one family conducts two farming practices for different food delivery systems” (Zhou 2014). For example, one study shows that more than 60% of rural households conduct conventional farming for market sales while ecological farming for self-consumption (Si et al. 2019). Such experiences not

⁶The *hukou* system divides citizens between a rural agricultural identity and an urban non-agricultural identity based on one’s permanent place of residence. It was abandoned in 2014. However, interviewees in this study were all above 20 years old and thus had been influenced by the *hukou* system.

only endow established farmers with strong conventional farming knowledge, such as the usage of synthetic inputs, but also sustain a diverse set of knowledge more consistent with EA for them, such as intercropping of leguminous crops with tall cereal crops. Urban farmers, as newcomers to the countryside, are less knowledgeable in terms of both conventional and ecological farming methods. The different backgrounds of new and established farmers undoubtedly shape diverse farm operational strategies, which is explored in section 3.5.

Table 3.2 Categorizing Four Types of EA farms in Nanjing

EA Farms	Number of cases	Farm Operators	Certification	Land Scale (mu)	Land Access
1.Certified EA Companies	11	New Farmers	Yes	>1000	Leased from village councils
2.EA Farms by New Farmers	11	New Farmers	No	<300	Leased from rural residents or village councils
3. Farmers Cooperatives	4	Established Farmers	Yes	200-500	The pooling of land or leased from coop members
4.EA Farms by Established Farmers	5	Established Farmers	No	40-120	Land authorized to them & leased from neighbors

An initial analysis of the general information (e.g., operators, certification, scale, access to farmland) immediately classified the 31 farms into four categories (see Table 3.2). First, 11 certified EA companies were operated by new farmers. They leased farmland larger than 1,000 mu (67 ha) from rural village councils. Second, 11 uncertified EA farms were all operated by new farmers who leased farmland pieces smaller than 300 mu (20 ha) from rural residents. Third, four farmers' cooperatives are operated by established farmers. One of them witnessed the pooling of land from members, and the other three all leased land from members. Village councils played important roles in terms of facilitating both pooling of land and land leases. The scales of these farms ranged from 200 mu to 500 mu (13.2 to 33 ha). Fourth, five uncertified EA farms were operated by established farmers based on

their authorized land. These farms were small and ranged from 40 to 120 mu (2.6 to 7.9 ha). The four categories of farms demonstrated the different ways they approach EA. In section 3.4, we delineate these different approaches based on farming practices, marketing strategies and employment relations.

3.4 Research Findings: A Typology of Ecological Farms

3.4.1 Certified EA Companies

Farming practices of certified EA companies are based first on organic principles prescribed by certification bodies (Xie et al. 2009) and market demands, and on increasing considerations of the natural ecosystems afterward. CNCA-accredited certification bodies offer these companies instructions, including advice on site selection, soil standards, conversion period, selection of plant species, and rotations. Certification bodies develop stricter prohibition lists and conduct examinations of contaminations based on the national standard of organic products (Dendler and Dewick 2016). These companies each entered the organic field by selecting a featured product different from others (e.g., organic tea company, egg company, and rice company). By focusing on specialized production, these companies avoided local competition among themselves. The process was facilitated by advice from certification bodies and assessment of local organic markets. According to the certification bodies, these certified EA companies were the most successful and prevailing enterprises in terms of profitability and adherence to organic standards. They developed stronger connections with on-farm ecosystems as they continuously adopt new and various ecological approaches such as raising free-range chicken and pigs, introducing pollinator insects and removing anti-bird nets.

Certified EA companies mainly chose high-end supermarkets located in the downtown centers or in Nanjing's wealthy residential communities to sell products and for gaining price premiums. Furthermore, These EA companies used high-end supermarkets to distribute products and advertise their brands to local customers. One of the certified farms has even opened a sales counter in three collaborating supermarkets and has assigned a saleswoman for each, whose job is to maintain good relations with the consumers by introducing the farm, explaining the price premiums and suggesting featured products. Despite discounted price premiums, some EA companies specializing in fruit also sold products to wholesalers or processors for bulk orders. In Nanjing, seasonal fruits such as blueberries, peaches and pears are produced and highly sought only during summer to early autumn.

Hence, ecological fruit farms need mass markets for bulk orders. Meanwhile, two blueberry farms have developed on-farm u-picks and process blueberries into value-added products.

These companies participated in the governmental scheme of leasing farmland and hiring local farmers. Starting from the late 1990s, the state has been supporting and promoting large-scale agribusinesses authorized as “dragon-head companies” to take over farmland. The scheme is facilitated through (1) a land transfer scheme that assembles small dispersed plots and leases the land use rights to the companies (Ye, 2015; Day and Schneider, 2017), and 2) a provision of waged jobs (i.e., hired farmers) by companies to the local villagers whose land-use rights have been transferred away (Zhang and Donaldson, 2010). As implied above, the EA companies have all shared a similar large-scale mode of leasing land from rural villages. They have hired local villagers to meet their intensive labor demands. By doing so, five of the certified companies were designated by the government as “dragon-head companies” due to their large land scales and their capacity to provide hundreds of job opportunities to local villagers. Hired local villagers acquire stable and relatively higher incomes (80-120 CNY per day, 11-14 USD) than they earned as peasant farmers.

3.4.2 Ecological Farms by New Farmers

The second category of EA farms by new farmers are uncertified and exhibit strong farm designs. These designs mainly include two aspects: first is the high plant diversity. The 11 farms all initiated highly diversified crop arrangements to produce seasonal leafy greens, fruits, grains, and nuts. They also adopted multiple practices such as cover crops, mixed cropping, agroforestry, rotations to manage the diversified crops. Furthermore, five of the 11 farms were mixed farms, raising chickens and pigs to produce manure for plants and thus have nutrient cycling on the farm. The second feature of their farm designs is clear field layouts of land utilization associated with crop and livestock farming. For instance, a pig and vegetable farm designed a pigpen-orchard-vegetable field layout to allow the pigs to roam inside the orchard. Another farm started with a rice-fish system, in which fish help to decompose nutrition in soil and enhance soil conditions for rice (Liu et al. 2013).

EA farms by new farmers all adopted online marketing channels based on acquaintance networks. None of them have established retail stores or have attained any certification that can potentially modify their practices according to the demands of governments (e.g., increase farm size, join the mainstream markets). With the fast-emerging mobile payment and online marketing schemes such as Alipay and WeChat Pay, these ecological farms have relied on these virtual platforms to maintain

their bases of customer-friends (Xie 2020). Customers place orders through online platforms, and the farms arrange for a third-party to do delivery every day or two. Similar to CSA farms, they have established and developed direct connections with those who have purchased from them over several years. However, rather than emphasizing risk-sharing between producers and consumers through pre-payments (as happens with some CSA models), most of these farms have allowed ‘a la carte’, flexible ordering. The existing relations of trust between new farmers and customers helps to set up market relations. Meanwhile, on-farm tours and u-picks are only occasionally arranged by a few farms to enhance connections.

Although these EA farms by new farmers deviate from the “business as usual” models of food production and consumption, it should be noted that the new solutions and social networks they enabled are limited to new farmers and their acquaintances. On these farms, one to three local farmers were hired as work force based on their farming expertise, fame among other local farmers, and trustworthiness. These hired farmers were the agencies of new farmers to deal with local businesses: hiring labor forces (tens of seasonal workers) during peak times and sometimes negotiating with village councils. Except for that, few connections and social ties were being built between new farmers and hired workers.

3.4.3 Farmers’ Cooperatives

Farmers’ cooperatives constitute a category that is similar to certified EA companies. They also followed the standard of organic productions like going through the conversion period, manure composting, rotation schemes. Farmers’ cooperatives also focus singularly on one or a few product types, including rice, tea, grapes and leafy greens. The monocropping model was attributed to the “one village, one product” state policy in the 2000s, through which scientific programs (e.g., formula fertilization by soil testing) and public funding though upholding agricultural production based on geographical conditions, with a particular focus on creating competitive advantage by mass producing one product. Exporting the geographically based products to global markets has been a key theme of the policy. It corresponds to what Hinrichs (2003, p37) defined as “defensive localization”, through which “rigid boundaries around the spatial ‘local’” are used to define quality. It thus minimizes differences beyond the spatial scale and exacerbates homogeneity of food products as commercial goods. Our site visits revealed that farmers’ cooperatives pay attention to nurturing the biodiversity of the environment beyond crops. For instance, a tea cooperative planted small shrubs around tea trees to

stabilize the soil, protect plants from dust and attract birds for pest control. Meanwhile, a rice cooperative abandoned the hunting of frogs and snakes appearing in paddies so that these wild animals could help build soil fertility. These field practices are not prescribed in the organic standard but developed by established farmers seeking to naturalize the ecological processes on their farm.

In terms of marketing channels, farmers' cooperatives experienced a change from public procurement programs to more diversified channels. Sales were heavily reliant upon the green public procurement programs initiated by local government departments, which was promoted in the 2000s because of legislation such as the Clean Production Promotion Law in 2002 (Qiao and Wang 2007). It was canceled in 2012 since the state forbade expenses on food and drinks. According to interviewed farmers, the price that government agencies were willing to pay was higher than the regular market price; for some products such as tea and grapes, the price was almost ten times higher. Such a large price premium was the primary incentive for these farmers' cooperatives to obtain the green labels (e.g., green food certificate, organic certificate) and adopted ecological farming in the first place; thus, they suffered from a sharp income reduction after the termination of the public procurement programs. Nonetheless, this previous marketing experience had strengthened the farmers' ability to value product quality in terms of local varieties, tastes, and freshness, helping them gain confidence in terms of finding other market opportunities. Consequently, after the cancellation of public procurement, all four cooperatives had adopted diverse alternative channels for value-added products and services, including agri-tourism, community grocery stores, direct delivery to loyal consumers, and online outlets.

These farmers' cooperatives have contributed to biodiversity and an enabling environment that balances crops and other living beings. However, except for one cooperative that allocated profits with members fairly, the other three failed to deliver impartial benefits to members or enhance social embeddedness as found in other parts of the world (Hu et al. 2017, Day and Schneider 2017). The former rice cooperative led by a village committee redistributed 85% of its revenues to all participating villagers by land shares. The latter three cooperatives were all managed by stronger members who initiated the cooperatives and whose families thus became the main beneficiaries. If considering the stronger members as managers of the cooperatives, other members outside the core leading team (formed by strong members and their families) were like hired hands who provided labor and received wages. In this way, farmers' cooperatives follow the standard business model for management. The only difference between cooperative members and hired farmers in companies was

that the former maintains land use rights and long-term interpersonal relations with stronger members to bargain for higher income and more flexible involvement in farming and other jobs. Hired farmers in the latter case have less bargaining power (Chen Aijuan 2014).

3.4.4 EA Farms by Established Farmers

The last category of EA farms, operated by established farmers, exhibited the strongest crop diversity and circular economy practices regarding maximizing the use of on-farm resources. This can be attributed to their inherited farming knowledge. For instance, all the five farms I visited adopted a mix of crop and livestock production. Chickens and geese on-farm help not only to loosen and oxygenate the soil but also to control pests and boost soil fertility. According to interviews with these farmers, such a practice is the best way to save costs rather than purchasing chemical inputs. Meanwhile, they used the vegetable leaf waste and worms to feed to the animals, saving on animal feed costs. These farms were also creative at utilizing vertical spaces. Three of the farms planted beans and peanuts under orchards, which enhances the soil fertility through nitrogen fixation. Three of the farms that had low-lying areas constructed small ponds to collect rainwater for the farm. Their practices demonstrate strong EA thinking by minimizing unnecessary costs for artificial inputs while maximizing nutrient cycling on farm (Magdoff 2007).

Products of these farms, except for self-consumption, were mostly sold through connections with urban consumers. Among the five farms, two whose owners were also members of a rice cooperative mentioned above, accumulated consumer contacts by participating in the cooperative and selling fruits to these consumers individually. Similarly, one farm whose owner used to work for a large-scale peach farm also accumulated his consumer base and then adopted a u-pick marketing strategy to invite consumers to his peach farm. Owners of the other two farms were invited to a one-day farmers' market in an urban residential community, through which they met several consumers offered to "rent" some of the fruit trees for as long as the farmer would continue ecological farming; in return, they would come each year to harvest for all the fruits from these trees. Furthermore, it should be emphasized that the adopted "alternative marketing channels" are negotiated decisions oriented by urban consumers. The price premium offered by the consumers had built confidence for the farmers in EA and shaped their EA practices. Two farmers from the cooperative were more than satisfied with earning over 10,000 CNY (1,400USD) net profit annually due to a change of consumer base. The price of ecologically produced peaches sold to urban consumers directly was almost ten times higher

than the price of conventionally produced peaches sold through wholesaling. Some established farmers also drive vehicles or ask friends who have vehicles to help with arranging direct delivery to consumers.

These farms had the least expenditure on hiring laborers because they were mostly self-reliant. During peak times, they asked for help from relatives and neighbors for activities such as harvesting. However, they were most vulnerable in terms of marketing products. The viability of these EA farms by established farmers is actually sustained by the increasing demand for new solutions to the mainstream agri-food systems by urban consumers. Through learning market demands from urban consumers, established farmers are restored with confidence in traditional family farming that relies its yields on eco-system balance. Their operations of EA farms also gain capacity for them to initiate and maintain customer relations. For instance, two farmers reported that they had recognized the social values (e.g., equity, respect) in maintaining socially embedded relations with their loyal customers. One peach farmer said that urban customers would not pay for large quantities of peaches but would be willing to pay extra for the experience of being in a beautiful rural environment and for the perceived safety of the peaches. Such perceived values exhibit the re-thinking of relations between producers and consumers. It is hard to tell, however, whether and to what extent established farmers want and are able to persist with EA practices, if without the support from consumers. The five cases in this study at least portrayed a promising start of established farmers initiating EA farms.

Table 3.4 Typology of Ecological Farms in Nanjing

Farm Types	Certified EA Companies	EA farms by New Farmers	Farmers' Cooperatives	EA farms by Established Farmers
Farming Practices	Strictly follow organic principles based on national organic standard; & develop various practices like free-range chicken and pigs, introducing pollinator insects	Organic farming, biodiversity farming, permaculture; & high plant diversity; & clear field layouts of land utilization (e.g., pigpen-orchard-vegetable)	Follow organic principles based on national organic standard; & monocropping but pay attention to landscape biodiversity as natural habitats	Natural farming based on inherited farming knowledge and culture; & strongest crop diversity (e.g., crop and livestock farming) & circular economy practices for saving costs

Marketing Strategies	High-end supermarkets; & wholesalers, processors, u-picks	Online platforms to customer-friends; & on-farm tours, u-picks	Public procurement (abandoned); & agri-tourism, grocery store, direct delivery	Farm visits & direct sales to urban customers
Relations between Farm Operators and Hired Farmers	Hire dozens to hundreds of local farmers; Recruit bee farmers (who are always travelling across the province) for pollination	Hire one to three local farmers; During the peak time recruit dozens of local farmers	Weak members act as hired hands but with stronger bargaining power	Mainly relied on themselves; & seek for help from neighbors sometimes

Table 3.4 summarizes the four categories of farms based on farming practices, marketing strategies, and employment relations. First, certified EA companies and farmers' cooperatives followed the organic standard but focused less on the diversity of food products. In contrast, both uncertified EA farms by urban residents and EA farms by rural residents exhibited strong biodiversity, but seldom went through the three-year conversion required in certified organic production. Second, both uncertified EA farms operated by new farmers and by established farmers innovated by finding multiple alternative marketing channels instead of using the conventional channels of selling to traders or supermarkets. However, such innovations were rooted in the demands and interests of middle-class consumers. The other two categories—certified EA companies and farmers' cooperatives—also rejected the conventional marketing channels for exports in favor of more local ones, including exhibiting their products in collaboration with local high-end supermarkets. Such assessment and categorization of EA farms reveal the complexity of EA. It suggests that EA should be theorized as a range of dynamic practices, within which farmers are constantly changing their farming practices and management practices. However, even various practices that reflect a stronger version of EA (e.g., rich biodiversity, social embedded relations, value-adding to farmers) are difficult to achieve simultaneously (Wilson 2008). The four types suggest possible combinations of EA practices in the Chinese social-political context. In the next section, we probe into farmers' perspectives of operating these farms.

3.5 Two Types of Ecological Farmers

We explore two categories of new farmers and established farmers in EA. The following analysis highlights their different demographic, individual and historical backgrounds in developing different understandings and practices of EA. Farmers are not one unified, consistent group but are different groups who entered this field due to various reasons and with diverse enabling resources and conditions (Hinrichs 2014). Our analysis suggests individual memory of farmers (e.g., shifting from various careers to farming, converting to organic farming) and the developed “attributes” of farmers (e.g., entrepreneurship, building confidence in farming) as factors influencing farm-level transitions to EA.

3.5.1 New Farmers

New farmers are the primary operators of certified EA companies and newly developed EA farms on leased land. They share some similarities. The first common feature is the higher levels of formal education and previous work experiences in various employment types—in news media, real estate, computer science, fashion markets, chain stores, academia, and other job fields. The 22 new farmers all had bachelors degrees or higher, and three of them had doctoral degrees. Their previous work experience helped them to accrue substantial social capital or *guanxi* (e.g., in the form of developing a consumer base) to shift their careers to farming. The second feature is the shared discontent with conventional agriculture and its food safety problems. When answering the question of “why do you want to start an ecological farm”, almost every new farmer mentioned defects of chemical farming, including chemical residues on food, water pollution, loss of soil fertility, and many health problems caused by eating chicken or pork raised with excessive clenbuterol. This motivation to provide one's own food coincides with previous findings on Chinese AFNs centered on food safety anxiety among the middle-class (Si et al. 2015; Shi et al., 2011). New farmers interviewed for this study also hoped to produce quality food and address food problems through EA. Such features shape the behavior of farmers into adopting strict ecological farming practices.

A closer examination further distinguishes these new EA farmers into four groups, each with specific attributes. First is the entrepreneurship. The 11 male operators of certified EA companies exhibit strong business operational capacity, such as managing large-scale organic farms, coordinating multiple production lines, managing technical and marketing departments, and adapting to the

changes particularly related to shifting market demands. These capacities reflect the high level of entrepreneurship of these farmers (Vesala and Vesala 2010). For example, a rice company assigned sales assistants to supermarkets to build more direct connections with customers. The perceived consumer desire for more vegetables and fruits shape the rice farm's plan of diversifying production. A blueberry farm also adopted field management methods that ensure a safe and clean environment for the customers to visit and pick blueberries. It has employed natural farming principles while abandoning artificial inputs as much as possible, allowing the blueberry trees to grow "wild".

The strong entrepreneurship of these farmers is also reflected in their consistent marketing strategy of selling to supermarkets. Seven interviewed organic companies were established in the 2000s when multiple governments promoted supermarketization (Zhang and Pan 2013), thus introducing market opportunities for organic enterprises to sell in supermarkets. "It is just too difficult to survive economically in the organic sector." This sentiment was raised repeatedly throughout the interviews with the operators of certified organic enterprises, suggesting that being economically viable is a significant challenge. The primary reason is that the price premiums obtained from selling organic products can hardly cover the high price to rent land, certification fees, organic inputs, costs to hire labor, and sunk costs during the conversion period. Based on the interviews, the two earliest certified organic enterprises in Nanjing went bankrupt in the 1990s due to limited sales. Afterward, the supermarkets brought the chance to gain a price premium. The seven farm operators reported that they only felt less stressed economically after the first three to four years when the on-farm ecosystems had been constructed, and thus the productivity has been improved to meet the mass markets.

The entrepreneurship of these farmers is related to their successful business experience in various fields. Arguably, such experience has shaped their initial selection of the business model to run EA farms and focus on commercialized food production. These farmers all referred to their previous success in terms of shaping their ambition to run EA companies effortlessly. After that, whilst insisting on the business model, they have gradually recognized the natural attributes of food products beyond commodities. Thus, they have made efforts to learn ecological farming knowledge and build harmonious relations with nature, rather than merely pressing for productivity. They recognized the stark contrast of allowing limited profits with their previous value-settings as businessmen. Therefore, over time, they have further distanced themselves from being businessmen, and are more strongly self-identified as new farmers.

“I perceive myself as a farmer now. My daily life starts with walking around my farm. I pay attention to the growing up of all living beings here. The best thing about being a farmer is the beautiful environment.” – (an interview with an organic farm owner on 20th July 2016)

The second attribute that portrays some new farmers is craftsmanship, which is exhibited in farmers' interests in farming techniques and their desire to put their knowledge into practice on the ground (Mooney 1983). There are six new farmers who received education in agriculture-related fields, including agronomy, biology, botany, cell science and molecular organisms; four of these worked in agricultural companies and research institutes before starting their ecological farms. These six farmers referred to their educational backgrounds and job experiences as the major determinants for starting EA farms. Indeed, these experiences have not only assured them a sense of confidence in mastering agricultural rationales and farming crafts but have also encouraged them to practice what they had learned:

“I was a researcher in a rice-fish agricultural system. This experience gave me access to good varieties of seeds and an understanding of the nature of their growth and the preferred conditions of rice crops. In this way, there is no reason for me not to farm them right.” – (interview with a rice farmer on 16th Aug 2016)

“I have been working for the Jiangsu Academy of Agricultural Science for more than 20 years. During these years, I have set up multiple experimental fields, intending to compare varieties and repeatedly testing different crop rotation patterns.” – (interview with a soon to be retired new farmer on 26th July 2016)

“From my understanding, agriculture shares similar principles with biology, as we all try to understand the rationales of living bodies. So, whenever I want to apply specific farming techniques to my plants, I distinguish the useful ones by ascertaining the biological rationale of each technique.” – (interview with a grape farmer on 5th Aug 2017)

Throughout the interviews, these farmers spoke more enthusiastically about field management methods than about marketing aspects. For example, they explained the relatively small-scale farm sizes ranging from 80 to 300 mu (5.28 to 20 ha): they have been able to achieve enough yields for their customer base (around 100-200 people), and to rely on themselves and a few hired employees as laborers. They adopted multiple farming techniques. For instance, one farmer utilized the fermenting

bed technique to realize vegetable waste and pig manure recycling. One farmer was practicing worm farming learned from friends in New Zealand. She used worm castings and composted mushroom waste for fertilizer. Another farmer invented small robotic machines for weeding.

The third feature of new farmers relates to food anxiety experienced when providing food to their families. This feature is strongly gendered. Four female new farmers started small EA farms because of their family's food safety and nutritional intake. Such a concern had directly determined the varieties of food products on their farms: two of them initiated highly diversified small farms to produce seasonal vegetables, two to three types of fruits, chickens and pigs; one had a specific concern about rice; and one focused on fruits for additional vitamins and better taste. Moreover, with much less emphasis on markets and yields, their farm scales were less than 100 mu (6.7 ha).

That women farmers taking the lead in initiating food movements is not uncommon in global studies on AFNs (Kondoh 2014). Comparably in this study, the female farmers demonstrate a strong vocational spirit in managing EA farms in addition to being full-time moms or housewives. They were marketing managers, chief editors and researchers before shifting to farming. Although family food concern is their primary motive for such a shift, the desire for demonstrating their working capacity by operating EA farms is also a strong driver. Despite having little background or experience in farming, they have demonstrated a robust learning-by-doing capacity. The rich farming knowledge obtained in field management ranges from crop rotation and inter-planting to composting and vertical farming.

The fourth attribute that characterizes new farmers is the romanticism of rural lifestyles: “a keen nostalgia for China’s agrarian past and the oriental wisdom of traditional farming techniques” (Cody 2014, p23). The nostalgia is strongly triggered by the boredom with modernity and the desire for freely controlling one's own work modes and lifestyles. Two new farmers exhibited such nostalgia. They share a similar small-scale and diversified farming style with the other new farmers. The disparity is that they have largely considered recreational needs in their field arrangements. Apart from crop fields, their farm designs also include private libraries, rural open kitchens, trails for horse riding, amongst others. The farmer who built a private library strongly wishes for sustaining rural traditional culture documented in poems that are centuries-old. For instance, at the reception room there was a plaque with four Chinese characters of fisherman, woodcutter, farmer, and scholar (*yu*,

qiao, geng, du)⁷. The term of the four characters is a classic reflection of four major occupations in the old rural China, implying a person's romantic wish for regression to the old time. This farm also serves the space for many art exhibitions, workshops and other activities, which generates some additional profits. The farmer also worked for a magazine company as his main occupation. Interestingly, of the 11 new farmers, five have off-farm income to subsidize the establishment of EA farms. For them, EA has much to do with the original and traditional rural subsistence lifestyle, a retreat away from a relatively busy modern world.

3.5.2 Established Farmers

Compared to new farmers characterized by high educational backgrounds, sufficient capital and *guanxi*⁸ accumulation before initiating EA farms, and holding strong critiques of chemical farming, established farmers exhibit many distinguishing features. First of all, the interviewed established farmers in this study were mostly over 50 years old and had lower educational backgrounds. The countryside's aging population is because most adult rural residents migrate to large cities for better-paid jobs (Afridi 2015). Secondly, these rural farmers had been relying on chemical fertilizers since 1960s and made a living (although very poor) through conventional farming. They largely believed that they would end up with little yield without synthetic fertilizers, and would be unable to make a profit. They seldom develop critiques on chemical farming because the increase of yields gains them profit distribution during the planned economy era (before 1978) and market access during the new market economy era (1978 till now). The reliance on wholesalers who prefer mass production for conventional markets further exacerbates rural farmers' fear of conducting EA. Although the market demand for ecological products is growing, the mainstream outlets (e.g., supermarkets) require certified products, which are hardly afforded by established farmers.

The decisions of established farmers to engage in EA are linked to various economic rationale. Many established farmers in farmers' cooperatives mentioned the economic incentives when describing the shifting to EA. *"Initially, most villagers were reluctant to join due to skepticism on the productivity of*

⁷ The term of the four characters are commonly adopted by many Chinese poets, novelists, and artists to inspire their art creations. It writes as “渔樵耕读” in Chinese.

⁸ A Chinese term means social relations and networks. A person with many *guanxi* with others typically has greater social status and is able to facilitate deals more easily.

chemical-free farming; later on, as we validated the yield and profitability of EA, more villagers decided to join afterward.” – (interview with a farmer from a rice coop on 13th Sep 2016)

“The coop [a vegetable-and-fruit cooperative] has had good earnings for years. As far as I know, they (the coop founders) have reliable market connections. Therefore, I have agreed to lease my farmland to them and join the farm, so that I need not worry about selling my products.” – (interview with a participating farmer in the cooperative on 2nd Aug 2016)

“Our tea leaves are of excellent quality. The great earnings from selling tea enable me to provide higher income for our farmers than conventional cooperatives do. I also pay extra compensation to our farmers for certain works such as processing tea leaves.” – (interview with a tea cooperative starter on 18th Aug 2016)

Compared to established farmers in the coops, it takes even more effort and courage for individual established farmers to break the stereotype of the non-chemical farming model. Mr. Du and Mr. Zhang, two members of the aforementioned rice farmers’ cooperative who started their own EA farms, changed their minds about ecological farming thanks to the retired experts in the coop. To break their fears of being unable to sell the products, the expert promised to purchase their products if they would ecologically grow peach trees. Afterward, he contacted several former colleagues and friends to promote the forthcoming peaches. Over time, he gradually retreated from selling and directly connected Mr. Du and Mr. Zhang to the urban consumers. Later on, through word-of-mouth, the farmers have accumulated a firm customer base and eventually changed their minds about EA.

Similarly, Mr. Xu, a peach farm operator, changed his mind after working in an agro-tourism peach company. Instead of selling peaches, the company’s revenue was mainly derived from peach blossom tours, including tickets to the mountain farm and other on-farm recreational activities for tourists. After working for the company for over five years, Xu had built connections with many urban consumers. He then initiated his peach farm and adopted a u-pick marketing strategy because “it saves the cost of hiring laborers to do the harvesting, while also creating experiences for the consumers.”

Unlike farmers who converted to EA, another two female established farmers practicing EA for years. For them, EA is an effective way of saving costs on inputs, producing for self-consumption, and generating income by selling the rest to brokers. Specifically, Mrs. Sun noted that instead of

purchasing fertilizers, she and her husband collected the wasted corn stalks in exchange for cow manure from another livestock farm. In this way, they avoided having to pay for chemical inputs and animal feed. Mrs. Wu raised chickens and geese and planted peanuts for developing soil fertility. It demonstrates the sociocultural value of the traditions of EA as carried by farming knowledge, inherited by farmers, and reflected through an efficiency-oriented interpretation of EA, particularly by minimizing unnecessary costs for artificial inputs while maximizing resources relying on farms (Magdoff 2007). Compared to new farmers, they exhibited a more substantial concern over profitability. Also, firm market bases further strengthened the confidence of the two farmers over the economic prospects of EA. They became more determined to continue with ecological farming after they made connections with urban customers.

In general, established farmers were convinced of the economic viability of EA, which re-built their confidence in operating EA farms. On this note, having a firm customer base is vital for them to gain critical revenues and mitigate their skepticisms and concerns in conducting EA. The market incentive sharply contrasts with multiple motivations (e.g., entrepreneurship, craftsmanship) that drive new farmers to start EA operations. The other difference between established farmers and new farmers is that the former exhibited an inheritance of traditional farming knowledge. On the contrary, new farmers stick closer to rules (e.g., organic standards, normal patterns or routines) as knowledge sources. Furthermore, while new farmers rely more or less on hired laborers, established farmers rely on themselves or members of the same coop. The analysis reveals how individual memories of farmers (e.g., being a successful businessman, learning farming knowledge, nostalgia for the past, hesitation on the profitability of EA, inherited knowledge) result in different attributes of farmers (e.g., entrepreneurship, vocational spirit, monetary pursuits), and thus to different approaches to EA.

3.6 Discussion and Conclusion

This study advances several contributions: first, we unpack the spectrum of weak to strong versions of EA into an analytical framework of two aspects (farming practices and management practices). This framework is used for examining empirical cases in this study. Second, we elucidate 1) how the factor of certification or not distinguishes EA farms dominated by governments and markets and those shaped by grassroots initiatives, and 2) how the factor of farm operators (new farmers or established farmers) affects land access and farming knowledge under China's social-political settings. Based on the two factors, we classify four types of EA farms. Third, categorizing certified

companies, farmers’ cooperatives, and farms operated by new farmers and by established farmers, we examine their diverse farming practices, marketing methods, and relations between farm operators and hired farmers. Last but not least, we explore the two groups of new farmers and established farmers, and investigate why they initiate different types of EA farms. The results are reviewed in Table 3.5. The typology of ecological farming reflects the complexity of transitions to sustainable farming in the Chinese context, which should not be considered a uniform or uncontested pathway (Shove and Walker 2007), nor even dual pathways of either governmental schemes or grassroots innovations. Instead, transitional pathways to sustainable agriculture are embodied in farmers’ perceptions of agri-food systems, access to knowledge and resources, and specific farming practices.

Table 3.5 The Typology of Ecological Farmers and Farms in Nanjing

Farm Types	Certified EA Companies	Farms by New Farmers	Farmers’ Cooperatives	Farms by Established Farmers
Farmers	New farmers with entrepreneurship	New farmers with craftsmanship, roles of family food provision (gendered), and nostalgia for rural lifestyles	Established farmers (Strong members and hired labour)	Established individual farmers
Demographic Features	11 male farmers around 30 years old with bachelor’s degrees	Seven male farmers and four female farmers around 30 years old with bachelor’s degrees or above	Seven male farmers and two female farmers around 50 years old with limited formal educational	
Incentives for Ecological Farming	To provide quality food to the market; & To demonstrate entrepreneurship and making profits through EA businesses	To practice EA knowledge and experiences; & To ensure food safety for their families; & To experience a rural lifestyle	To achieve better incomes; & To save the cost of synthetic inputs	

Firstly, certified EA companies are run by entrepreneur farmers. The market opportunities for gaining price premiums, ambitions to demonstrate entrepreneurship, and other mixed motives, have incentivized these new farmers to run their businesses. The entrepreneurship, though locks them into

agri-business models to run EA companies in the beginning, helps them to convert food-related market demands into ecological farming practices. With growing recognition of the natural ecosystem, they are also shifting identity from entrepreneurs to farmers who can accept a certain discount of profit and localize supermarkets as stations for linking local but middle-class consumers.

Secondly, technician farmers, female farmers, and recreational farmers initiate the second type of EA farms by new farmers. They exhibit multiple incentives to initiate EA, including practicing learned farming-related knowledge, addressing serious food concerns for their families, and relieving the nostalgia for a countryside lifestyle. They endow EA with a strong meaning of fulfilling individual and personal values. The rapid growth of this type of EA farms is not only due to increasing food concerns but also alongside the critical technological breakthroughs such as mobile payments. If high-end supermarkets locating in wealthy regions geographically exclude customers with limited affordability, the frequently adopted online platforms by these farmers for acquaintances to make orders preclude unknown customers in the virtual space.

Thirdly, established farmers are the operators of the last two types of farmers' cooperatives and EA farms by established farmers. It takes greater efforts to demonstrate economic profitability and building confidence in independent operations to persuade established farmers to transfer to an EA operation. These efforts include public procurement programs, working in other farm enterprises, learning from cooperatives and experts, and connecting with urban customers. Meanwhile, because of their stronger established knowledge and experiences in farming, established farmers exhibit greater flexibility in farming practices and demonstrate a highly efficient and self-resilient crop and field management that "designs the strengths of the natural ecosystem into agroecosystems" (Magdoff 2007, p.110). Although these two types of EA operations show robust features of building the ecosystem and developing alternative market channels, they should be understood within specific socio-historical contexts. Established farmers are less equipped with formal educational backgrounds, accumulated capital and *guanxi* compared to new farmers. Their ecological practices (e.g., on-farm recycling) and adoption of alternative marketing channels (e.g., farm visits for selling products) are sometimes the only choice of farm operation strategies, due to the limited capacity to scale-up or join the market chains. A firm customer base is vital for them, especially small-scale farmers, to gain critical revenues and recognize the value of EA.

Based on Wilson's (2008) appeal to understand transitions at a farm level, this study depicts various transitioning pathways towards EA. It sheds light on the extreme complexity of EA operations beyond state schemes of certified agriculture and grassroots-oriented AFNs. We argue that EA should be theorized as a range of dynamic practices, evidenced in the ever-changing farming practices and management practices. For instance, within certified companies and farmers' cooperatives we have witnessed farmers adding to organic principles their understandings of building eco-system (e.g., relying less and less on purchased organic fertilizers, protecting landscape biodiversity beyond the farm). We have also witnessed farmers turning to direct producer-consumer relations by reinforcing existing customer bases and building online market platforms. However, various practices are diversely combined into different sets. The ideal sets of practices (e.g., rich biodiversity, social embedded relations, value-adding to farmers) are hard to be achieved simultaneously due partly to the varied attributes of farmers.

Farmers' attributes shaped by their specific experiences are of central significance to elucidate the underlying complexities further. Different social groups have entered this field of EA due to various reasons and with diverse enabling resources and conditions (Hinrichs, 2014). While new farmers have accumulated *guanxi* resources and capacity (and business experiences, especially for entrepreneur farmers) to support their new venture in the EA sector, established farmers are less confident in the economic viability of EA. In the opposite, while established farmers have inherited knowledge and farming experiences that facilitate greater flexibility in field design and crop selection, new farmers are short of such knowledge. The latter largely seek information from various certification bodies, related education and jobs, books and other second-hand materials, and experiential learning. Attributed to the specific growing backgrounds and mastered capacity-sets, new farmers develop multiple attributes such as entrepreneurship, craftsmanship, and nostalgia that shape their EA operations, and established farmers rejuvenate farming knowledge and rebuild confidence in EA. Previous studies on new farmers have revealed how they re-conceptualize ecological farming as a moral and collective obligation (Cody 2014) and re-define new farmers who are different from the conventional farmers (Xie 2020). Our study corresponds to their findings and adds that new farmers have re-conceptualized EA by strongly linking farm operations to their individual pursuits, and that both new farmers and established farmers are renovating the connotation of farmers.

Finally, we observe a trend that small farms are more likely to practice stronger EA, such as building diversity-based ecosystems and innovating value-adding ways. In contrast, large farms tend to

specialize in one or a few agricultural products rather than create a highly diverse farming system. Various management challenges – including formulating cropping plans, recruiting reliable farmers, providing training courses, selling the boosting seasonal harvests – have forced large-scale farms to simplify their production arrangements and marketing processes through bulk sales. The finding between farm size and agricultural sustainability contrasts sharply with the argument that increasing farm size benefits environmental improvements, often characterized by reducing chemical usage (Wu et al 2018; Ren et al 2019). Our finding suggests that when a higher level of sustainability (e.g., a holistic and strong version of EA) is sought, and chemical usage is already low (i.e., all farms abandon synthetic fertilizers and pesticides in this study), increasing farm size might be unwanted for achieving sustainability. Hence, the policy implication that land policy should be modified to encourage farm size expansion (Ju et al 2016; Ren et al 2019) needs rethinking, especially when China has seen growing organic sector (Qiao et al. 2018).

Chapter 4

Can We be More Collaborative? Top-Down Policies and the Urban-Rural Divide in the Ecological Agriculture Sector in Nanjing, China

Abstract:

Embeddedness has long been used to study collaborations and tensions between food initiatives, but less attention has been paid to this topic in both the vertical and formal contexts of governmental systems and the horizontal and vernacular contexts of local culture. Such interrogations are essential for understanding challenges for advancing food initiatives. This study uses the case of ecological agriculture in Nanjing, China to investigate the vertical embeddedness shaped by policy networks and the horizontal embeddedness carved in local social configurations. We conclude that strong government supports facilitated large-scale modern ecological agriculture, at the expense of small-scale ecological farms. Furthermore, the tensions between new farmers and local farmers attributed to the broad urban-rural divide are also an important factor behind the challenges facing emerging ecological farm operations. Strategies are needed to address these separations between ecological farms for them to be collaborative in China and in other similar social-political settings.

Keywords:

Ecological agriculture, horizontal embeddedness, vertical embeddedness, new farmers, urban-rural divide

4.1 Introduction

“For a long time I’ve been troubled with the question: Nanjing has a wonderful governmental platform for developing organic agriculture and has seen so many successful ecological farms, but why don’t we see them team up with each other? As far as I know, there is seldom mutual visiting,

communication, or learning. Why can't we be more collaborative?" (interview with Zhou Zejiang, IFOAM-Asia president on 12th July 2016).

"I always see interactions between ecological farms around China -- attending national conferences, sharing ideas and techniques with each other. I'm curious why ecological farms in Nanjing lack this spirit of being collaborative." (interview with an organic food retailer on 16th Sep 2016)

The national conference mentioned by the retailer in the above quote is the annual conference of Chinese community supported agriculture (CSA), which has taken place more than ten times. Such opportunities for farmers to meet with each other mainly occurred in metropolises like Beijing and Shanghai. In other cities such as, and perhaps especially, Nanjing, the lack of collaboration, particularly institutionalized collaboration, among ecological farmers has been a puzzle and a hinderance to the scaling out of ecological agriculture. As the country with the largest population and the second biggest economy in the world, China has attracted considerable attention in its moves towards sustainable development. The national program of "Ecological Civilization" has been guiding environmental policies and solutions to ecological challenges since the early 2000s (Hansen et al. 2018). Within this development agenda, the concept of Ecological Agriculture (EA) has been formally—and informally—adopted into a wide range of governmental papers, media coverage, research projects, and even daily conversations to broadly refer to environmentally sustainable modes of agricultural production. EA thus comprises certified organic agriculture, certified green agriculture, biodynamic farming, natural farming, community supported agriculture (CSA), and other chemical-free farming styles (Sanders 2006; Scott et al. 2014; Yi et al. 2015).

Amidst this broad context, the forming of collaborations among ecological farmers are dependent on both farmer-to-farmer networks and government-farmer networks. Various institutional arrangements (McKitterick et al. 2016), power structures (Chiffolleau 2009), social relations (Sage 2003), territorial specifications (Sonnino 2007, Bowen 2011), collective know-how (Tregear and Cooper 2016) are all critical factors that affect collaborations. What are the particular forming mechanisms for different networks? To what extent is there a symbiosis or competition between the various networks? Researching these questions is crucial for understanding developments in the EA sector, and identifying opportunities and challenges facing practitioners of diverse farming styles and other associated actors. In particular in China, the development of the EA sector is subordinated to the strong governmental push for agricultural modernization and 'scientification'

approaches to environmental issues. Developments in this sector are also a product of growing public awareness of and demand for an alternative food agenda that runs counter to the predominant agricultural modernization (Scott et al. 2014; Si et al. 2015; Krul and Ho 2017). These governmental and social forces could potentially provide critical resources for the EA sector. Hence, it is valuable to study network-building dynamics among various actors - from public institutions to various EA farms - in order to reveal the formation and distribution of critical resources. It can also help to identify strategies to achieve collaborations between various EA farms and even organizations that engage in the EA sector.

To answer the question of how different kinds of ecological farmers develop networks within distinct institutional and social-cultural contexts, this study applies the framework of vertical and horizontal embeddedness from Sonnino and Marsden (2006). The concept of embeddedness, implying an inextricable interface between economic behaviors and social relations (Granovetter 1985), has often been employed to examine alternative food movements in agri-food studies (Hinrichs 2000; Sage 2003; Winter 2003; Sonnino 2007). Although embeddedness theory offers a useful conceptual tool to reveal the socially entrenched character of food initiatives (e.g., farms), various scholars warn against the simplistic assumption of embeddedness as present or absent, and argue for more nuanced and systematic investigations of embeddedness in broader agri-food systems (Hinrichs 2003; Sonnino and Marsden 2006). Hence, Sonnino and Marsden (2006) point out that food initiatives are embedded in the broad settings of institutional and governance systems vertically, and regional contexts with distinct locality, ecology, and culture horizontally.

By differentiating the vertical from the horizontal, scholars highlight different linkages that local-level actors have to build with wider contexts and agencies. These linkages include vertical relations between food producers and a wide range of governmental bureaus, companies and organizations, and horizontal relations between diverse producers (Sage 2003; Winter 2003; Chiffolleau 2009; Bowen 2011). Applying the vertical/horizontal framework, in this study we examine the building of vertical and horizontal relations in the EA sector in Nanjing, China. The city of Nanjing is located in Jiangsu province, where the rich soil and water resources and high economic development have made it a leading region for EA over the past few decades. This makes it a good setting to study how the socio-cultural, institutional and policy contexts facilitate or impede the embeddedness of the EA sector.

This paper explores relations between producers and related organizations, and especially the processes of building such relations in both the vertical context of policies and horizontal context of social culture. Moreover, it analyzes how policy could help to enhance embeddedness and boost the vibrancy of the EA sector. It also offers insights into the multiple contexts that shape embeddedness, and thus contributes to a growing body of work that questions more narrow interpretations of embeddedness.

We start by introducing the analytical framework of horizontal and vertical embeddedness. In section two, we use this framework to address the empirical gap of integrating heterogeneous actors and producers in the embeddedness discussions. We then illustrate the case context of various ecological farmers and related organizations in Nanjing, and present the case study methods in section three. In section four, we analyze the policy-centered vertical relations, and horizontal relations and tensions. Using the empirical findings, section five discusses the top-down institutional context and the rural-urban divide in Chinese society.

4.2 Theoretical background: The framework of horizontal and vertical embeddedness

Amid the overwhelming “individualistic analyses of neoclassical economics” in the 1980s built on the institutional economy, social scientists of economic sociology have been adopting the notion of embeddedness to study the importance of social relations in facilitating economic systems (Sonnino 2007, p.62). Even though embeddedness allows social structures to penetrate into economic behavior analyses, scholars critique the weightless utilization of the notion – adopting vague theoretical expressions rather than attaching concrete, normative contents (Uzzi 1997). More specifically, scholars caution “an overly benign view of economic relations and processes” (Sayer 2001, p.698), through which many power structures, opportunistic collaborations, cultural variations, spatial relations are easily conflated with social relations (Hinrich 2000, Sayer 2000, Sonnino 2007).

The original conceptualization of embeddedness “increases interpersonal dimension of market exchanges and obscures the diversity and dynamics of relations” (Chiffolleau 2009, p219). More and more food scholars focusing on alternative food networks (AFNs) have responded to and strengthened the vague theoretical framing of embeddedness by applying it in diverse contexts (Sage 2003; Sonnino and Marsden 2006; Bowen 2011; Tregear and Cooper 2016). One of the critical conceptualizations that have emerged from these studies is a vertical/horizontal framework

to understand and distinguish vertical/horizontal embeddedness based on examining the various contexts in which diverse relations are rooted (Sonnino and Marsden 2006). The vertical embeddedness concerns “the political, institutional, and regulatory context in which alternative food networks operate,” while the horizontal embeddedness concerns the local/territorial/ecological context in which they take shape (Sonnino and Marsden 2006, 189; Sonnino 2007). In other words, food initiatives are vertically embedded in formal contexts of governmental systems and horizontally embedded in vernacular contexts of local culture.

By differentiating the vertical from the horizontal, the framework highlights different linkages with broader contexts and agencies that producers, and in this study EA farmers, have to build. In this way, embeddedness as a concept that describes economic behavior is embedded in interpersonal relations has been renovated twofold. First, economic behavior is adjusted by relations shaped by various political, institutional, social, cultural, spatial, ecological contexts. Second, future studies should explore these embedding processes in which different relations are established to portray an alternative interpretation of the economy. Therefore, this study investigates such an embeddedness process: how economic practices (i.e., EA farms) are adjusted by various relations (i.e., between farmers and other related stakeholders such as public institutes, neighbor farmers), and what contexts (i.e., vertical contexts of governmental systems and horizontal contexts of local culture) shape the embedding process.

A great body of food studies has shed light on the vertical and horizontal contexts of embeddedness. In the vertical facet, many studies have examined policies and institutional contexts that embed specific food initiatives. For instance, scholars have found that institutional arrangements, such as certification systems, geographical indication schemes, and specific food programs, strengthen the public recognition and coordination of food production within local-level actor networks (Higgins et al. 2008, Bowen 2011, McKitterick et al. 2016). Others have highlighted the changing nature of relationships. Their works suggest that, as producers gain greater economic autonomy and capacity in AFNs, they rely less on vertical relations and decouple themselves from the vertical contexts (Sonnino 2007; Chiffolleau 2009). In the horizontal facet, scholars have investigated food initiatives with particular attention to local socio-cultural and territorial contexts. These studies reveal a substantial social fabric of trust, a historical culture of collaborations, territorial influences on social bonding and value-adding, and public consciousness

of food quality that facilitate more embedded food systems (Sage 2003; Sonnino 2007; McKitterick et al. 2016; Tregear and Cooper 2016).

In both vertical and horizontal contexts, the formed relationships between various stakeholders are not only characterized by proximity and friendliness. However, the conflicts and tensions generated through the embedding process have been overlooked to some extent. It is probably due to the focus of existing research on particular place- or product-specific AFNs in which collaborations and cohesion based on shared visions played the leading role in the viability of the networks. Nevertheless, tensions, disparities in goals, and competing interests are foundational to understand problems that impede collaborations (Tregear and Cooper 2016). Thus, there is a need to incorporate heterogeneous actors into embeddedness studies to understand the conflicting relations. It could lead to a deeper understanding of a vertical/horizontal embedded process, which is a pivotal challenge to understand the development of agroecological farming practices (Horlings and Marsden 2011).

To explore the various relations among actors formed under governmental systems and local culture, this study chose to examine the relations within the EA sector. EA in China is a broad term that covers organic agriculture, alternative farming initiatives, and other ecological farming approaches. Furthermore, the EA sector encompasses the state-led food schemes and civil society endeavors for sustainable agricultural development (Scott et al. 2014). Therefore, the intertwined relations between different ecological farmers, and organizational actors such as governmental agencies, public institutes, private or social enterprises in the EA sector have the potential to reflect, at least partly, the wider structural context that breeds China's sustainable food transition.

Applying the above framework, this study explores the vertical relations between producers and the regulatory system, such as formal rules and policies that promote organic agriculture, and the horizontal relations between producers from diverse farming styles and local conditions, such as social ties and tensions (Sonnino and Marsden 2006). More specifically, this study identifies heterogeneous actors, examines their interrelations, and explores the situated contexts in which vertical and horizontal relations interact. By researching vertical and horizontal embeddedness, we seek to answer the following questions: What are the interactions and relations between producers and organizational actors? How are they embedded in the institutional and regulatory context and social-cultural context for developing EA practices? Are the contexts attributed to weak

collaborations between farms, or are farms managing to change the contexts? The next section explains the case context of Nanjing, China, and the research methods.

4.3 Research Methods

4.3.1 Case Context

We conducted case studies in Nanjing, in Jiangsu province, to investigate the embedding processes of EA initiatives. Jiangsu province's geographical and socio-economic landscape has enabled it to be a key food production region in China (JARD 2019) as well as a critical component of the Yangtze River Economic Belt. As Jiangsu's provincial capital, Nanjing has attached great importance to developing 'green' agriculture. Our previous research identified four types of ecological farms in Nanjing: certified EA companies (privately owned by entrepreneur farmers), EA farms run by urban residents (privately owned by technician farmers, female farmers, and recreational farmers), farmers' cooperatives (collectively or privately owned by rural established farmers), and EA farms run by rural residents (privately owned by rural established farmers). Given the presence of these different EA farms and farmers, the heterogeneity within Nanjing provides a good setting to study horizontal relations for this study.

In addition to various types of ecological farms, Nanjing has a range of governmental supports and social organizations that assist in developing EA. Firstly, there are several governmental actors with clear roles of supporting 'green' agricultural development. These agencies directly implement plans such as funding allocations. Secondly, Nanjing is home to the first organic certification body in China: the Organic Food Development Centre (OFDC). The Organic Food Research Centre eventually branched off from OFDC to provide specific consultations for organic producers. In addition, ecological science and technology initiatives have been developed by research institutes in Nanjing, including the Jiangsu Academy of Agricultural Science and research groups at Nanjing Agricultural University working on organic agriculture. Thirdly, there are other businesses and non-profit organizations, such as IFOAM-China, Organic Slow Life magazine, and a small anthroposophy club which builds awareness about biodynamic farming. Nanjing thus provides a great study site to probe how these different organizations form the vertical context for the EA sector.

Table 4.1 Interviewees From Organizations in Nanjing Linked to Ecological Agriculture

Actor Category	Organization	Number of Interviewees	Main Activities
Government Agencies	Nanjing Rural and Agricultural Bureau	1	Coordinate regional agricultural and rural development plans according to the upper-level regulations and strategies
	Zhenjiang Rural and Agricultural Bureau	1	
	Dai Village Council	1	Broadly in charge of arranging public affairs such as land transfers, reconciling conflicts among villagers
	Zhu Town Council (Agricultural Office)	1	
	Changle Village Council	1	
Research Institutes	Jiangsu Academy of Agricultural Science (JAAS)	1	Engage in R&D programs on scientific and technical agricultural innovations and promotions
	Nanjing Agricultural University (NAU)	2	
Certification Body	Organic Food Development Centre (OFDC)	2	Provides organic certification and related knowledge and information
Consultancy Business	Organic Food Research Centre (OFRC)	1	Affiliates with OFEC to provide consultations

Umbrella Organization	International Federation of Organic Agricultural Movement (IFOAM) China	1	Provides platforms, techniques of organic farming Produces statistical reports about organic certification
Private Firm	<i>Organic Slow Life</i> Magazine	2	Reports stories of ecological farms Advocates healthy lifestyle among the public
Social Organization	Anthroposophy Association	1	Offers workshops, lectures, and discussion about biodynamic farming

4.3.2 Data Collection and Analysis

Data for this study was collected over a period of six months in the summers of 2016 and 2017. Both purposeful sampling and snowball sampling were used when collecting the data. In total, 12 EA related organizations and 30 farms (i.e., most of the ecological farms in Nanjing) were interviewed. Semi-structured interviews were conducted with 15 organizational representatives (see Table 4.1) to learn about their efforts to support the EA sector, and with 30 farm owners to understand their connections with other farms and organizations. In addition to these interviews 24 site visits took place to observe conversations and interactions between actors, and to discover additional themes. These observations were recorded as field notes with photos in Evernote software. Additionally, secondary data—including five news reports, and 12 policy documents about organic agriculture and rural development in China—were analyzed to contextualize and explain the policy orientations of local governments.

The interview transcripts, field notes, and policy documents were analyzed to triangulate our findings. This was done through applying different coding approaches for the three data sources (Decrop 1999). Chronologically, we did a rough a priori coding of interview transcripts to identify the vertical factors (e.g., governmental programs, organic certificate scheme) and horizontal factors (e.g., trust, collaborations, value-adding), as highlighted in section 2 (Brinkley 2017). Afterwards, secondary data were carefully analyzed to generate a codebook of policy supports to verify previous findings and provide a basis for second-round interpretation of interviews. We then scrutinized interview transcripts to find answers to our research questions (Belotto 2018). Finally, the field notes from observations were examined to add layers to the findings from interviews and secondary data. This strategy of triangulating multiple data sources and analysis approaches helps to improve the coding reliability (Belur et al. 2018).

4.4 Results and Discussion

4.4.1 Vertical embeddedness: policy designs and political patronage

The vertical embeddedness of the EA sector in Nanjing could be interpreted by examining farm owners' context-specific interactions with three major public institutes. The first institute is the municipal rural and agricultural bureau that implements agricultural subsidies, including certification fees, costs of organic fertilizers and other inputs, and costs of farming facilities (e.g., greenhouses) and infrastructure (e.g., rural lanes and irrigation canals). This bureau is also in charge of delivering regulatory plans of agricultural development to local village governments⁹. The second institute is the Nanjing environmental protection bureau. It established the Organic Food Development Centre (OFDC)¹⁰, which has played a critical role in promoting China's organic industry (Sanders 2006). The third institute is the Jiangsu Academy of Agricultural Sciences, a public research institute devoted to scientific research on agriculture technologies (e.g., organic fertilizer, disease resistance varieties), and to their applications in the fields. These local public institutes ground the vertical embeddedness of the EA sector.

⁹ These regulatory plans include restrictions on use of fertilizers, pesticides and herbicides, and on recycling of agricultural wastes.

¹⁰ OFDC was China's first organic certification body. It used to be an affiliate of Nanjing environmental protection bureau, and recently shifted its status to a shareholding company. It is actively involved in shaping China's national organic standards.

These public bodies are motivated to support the development of EA due to the intensifying policy focus on environmental protection. After China's constitutional amendment in the 1980s added the state's responsibility for protecting the environment, the following decade witnessed multiple administrative changes: the rural and agricultural bureaus slowly changed their primary mission from boosting agricultural productivity to reducing agricultural pollution (while stabilizing grain production); provincial and municipal environmental protection bureaus were founded in the 1990s; and many academies shifted their research orientations towards scientific innovations for environmental and resource protection. This environmental shift has shaped a political context and this context explains the policy design of supporting EA in Nanjing. This series of policies, according to our fieldwork, include both material supports of subsidies, on-farm facilities, chemical inputs and regulatory designs of distribution of these material supports.

While interviews with public institution representatives and data analysis suggest a policy background for supporting EA, interviews with various farmers reveal their different forms of involvement in the policy network. In particular, while large-scale EA farms (i.e., certified EA companies and farmers' cooperatives) have been included in multiple ways in the policy design of supporting EA, small-scale EA farms received less benefit from the policies. The "selective inclusion" of EA farms in the policy networks (Craviotti 2016) is reported in the following paragraphs where it is seen that different farmers received different supports from public organizations.

Financial Supports Our on-site visits found that greenhouses were the most prevalent facilities on ecological farms, described by many farmers as a "necessity". Low tunnels (hoop houses) were especially widely adopted. However, despite the fact that greenhouses are listed as subsidized items in policies, small-scale farmers are rarely able to receive the subsidy. The Ministry of Agriculture has stipulated that in order to apply for subsidies, farms should have more than 13.3 hectares covered by greenhouses (MOA 2010), which implies that a farm should roughly assemble land from 50 farmers to meet the requirement (as a farmer farmed 4.3 mu of land in average in China) (Zhan and Andrea 2015). However, as identified in the previous chapter, only certified EA farms, farmers' cooperatives, and a few EA farms by urban residents meet those requirements to be eligible for the subsidy. The subsidy for greenhouses can also be allocated to the village collective, which encourages farmers to join farmers' cooperatives in order to qualify for the subsidy when their small farms would not qualify. Urban new farmers who don't belong to the village and thus

can't join the cooperatives are even less likely to qualify for the subsidy. Furthermore, the subsidy program favors high-tech, 'smart' greenhouses rather than low tunnels. We found that small-scale farmers have little interest in smart greenhouses or in large numbers of greenhouses. One urban new farmer explained his dissatisfaction to government subsidies thusly;

"You always have to enlarge your farm size or purchase the technologies that look fancy (to qualify for the subsidy)...to calculate carefully, you'll end up with wasting money on greenhouses you don't need" —(interview with a small-scale farm owner on 9th Sept 2016)

We found that only a few entrepreneur farmers who had purchased high-tech 'smart' greenhouses were satisfied with the policy for greenhouse subsidies. As one farmer said,

"It's expensive. But at least governments covered nearly half of the cost of the smart greenhouses...They are automatic greenhouses with temperature and humidity adjustment systems, and will even be able to connect to the Internet in future." —(interview with a large-scale farm owner on 30th July 2016)

The policy of subsidies for greenhouses exemplifies a bias towards capital-intensive agribusinesses that better fit the state's agricultural modernization agenda. One consequence is that ecological farmers are motivated to enlarge their scale of operation to meet the criteria for receiving subsidies and other scale-sensitive policy supports. This demonstrates how ecological farms with different scales and desires for cutting-edge technologies are not equal in the policy design of financial aids.

Farmers' cooperatives and governments also had financial connections. Certification fee reimbursement is a support provided by upper levels of government to the farmers' cooperatives, so members of the cooperatives were not very concerned about certification costs. Also a public procurement scheme was in place that enabled governmental funds to be used for purchasing quality food (e.g., tea and fruits) for government employees. In Nanjing, farmers' cooperatives were often selected to provide the quality food. Two interviewees from co-ops mentioned that government agencies would pay five to ten times higher prices for their products. Although the procurement scheme brought benefits, such as encouraging farmers' cooperatives to conduct EA, it was abandoned by the state between 2012 to 2014 due to the high cost¹¹. When this happened,

¹¹ The green public procurement program has been widely promoted in China since 2004. The Ministry of Finance has been releasing lists of qualified products each year. Yet, food has never been on the lists.

many of the farmers' cooperatives we interviewed suffered from a significant and immediate drop in revenues. One representative of a farmers' cooperative explained such financial loss, "our rice is of great quality, but it is harder to sell to the market [than to governments]". Nonetheless, many farmers' cooperatives continue with EA and are able to find alternative market channels. The termination of public procurement forced many enterprises (e.g., farmers' cooperatives) who used to rely upon the government to find new markets, which corresponds to the state scheme of furthering marketization.

Analysis of financial supports highlights a differentiation between farmers who benefit from the policies. While the greenhouse subsidy is directly aimed at farmers who have larger farms and stronger interests in technology, the certification subsidy and the previous public procurement scheme mainly benefit farmers' cooperatives. Yet in both of these examples of financial relations, government policies have influenced the evolution of the EA sector by shaping its institutional context.

Technical Sources The embeddedness of ecological producers is further complicated by their adoption of technical support provided by public institutions. Compared to many European cases where exchanging knowledge between farmers is important to reinforce collaborations and social embeddedness (Tregear 2011; McKitterick et al. 2016), the demand for knowledge and techniques made by ecological farmers in Nanjing was at least partially met by building vertical relations with the Organic Food Development Centre (OFDC) and other public institutions. In our cases, all certified organic enterprises hired OFDC as both certification body and source for advice on farming techniques. These entrepreneur farmers admitted that obtaining certification is a great way to learn organic techniques. One entrepreneur farmer stressed that, "*for me, the important piece [in hiring OFDC] is not the certification itself, but the process of obtaining the certification. They [OFDC] helped farmers to regulate themselves*" (interview with a certified farmer, July 30, 2016). Two other entrepreneur farmers emphasized their limited experiences in farming as their reason for turning to OFDC to learn about techniques, market prospects, and other farm management skills.

Another critical source of technical agricultural advice was the Jiangsu Academy of Agricultural Science (JAAS), a governmental research institution that provides inputs like seeds, bio-pesticides,

However, local level governments have the access to budgetary funds in terms of official travels, which provides a source for officials to spend public funds on food. Less literatures explain this covert grey zone of food consumption. Readers can explore this phenomenon through related literatures on government corruption and public expenses.

and organic fertilizer. In our cases, most urban new farmers attested that JAAS was a reliable source for good varieties of seeds. The trust in the Academy for the quality of crop varieties was probably due to its perceived research capacity (McKitterick et al. 2016). In our fieldwork there were three cases in which new farmers installed small pilot plots to compare seeds from different sources. They all preferred the varieties provided by the Academy for easy growing and better tastes. According to our site visits, certified EA companies and EA farms by urban residents have adopted multiple varieties from JAAS including, but not limited to: corn, grape, blueberry, peach, strawberry, tomato, rice, and tea. The seed industry has been considered an important sector of technology transfer in which trust can form between seed firms and farmers in countries like Brazil and Argentina (Craviotti 2016). In China, such relations are formed between farmers and public service providers, rather than with the private sector.

Political patronage In addition to the policy design that mobilized multiple financial and technical resources to support different types of EA farms, this study also identified the relationships that small-scale rural farmers built with governmental actors as it relates to profitability. This type of relation is associated with political patronage that improves chances for profitability for small farmers. We saw this political patronage in our observations of day-to-day interactions between rural farmers and local village cadres (i.e., officers in village government). During our visit in Tianwang Village, a village cadre was preparing to launch a temporary farmers' market to promote quality food producers to prospective customers. After the cadre informed a small-scale watermelon farmer about this event, the farmer voluntarily undertook the responsibility to invite other farmers and arrange transportation for the market. The temporary farmers' market was a success, earning the farmer's satisfaction and gratitude. In this case, there was no set definition of the cadre's duty and the farmer's duty. There were cases of farmers kindly lending a hand on multiple occasions in order to maintain good relations with local cadres. Other observations of similar political patronage are not directly associated with marketing products: we saw villagers frequently visited local cadres' office, helped cadres to disseminate notices and information to other villagers, brought self-cooked dishes and harvested fruits to cadres. Although we have not witnessed the gained benefits to these villagers directly attributed to their efforts of getting along with local cadres, we encountered one case in which a local villager lost his entitlement to apartments provided to villagers as a result of "not having a good relationship with village cadres." In these cases, the asymmetric relations with the cadre would turn into profit-making opportunities for some farmers (e.g., accessing timely policy and market information) (Wong 2016), or even

terrible consequences for others who do not maintain good relations with cadres. Such biased political relations developed between villagers and local cadres have been witnessed in other rural studies as well (Tsai 2007).

In this section, we outline the significant financial and technical resources offered by public institutions for developing EA. However, a deeper analysis reveals that these resources are not consistently nor equitably accessible by all ecological farms (see Table 4.2). In actuality, certified EA companies and farmers’ cooperatives are beneficiaries of vertical embeddedness. The policy design provided certified EA companies with production-related resources (e.g., financial aid for facilities and knowledge and techniques about organic farming), and provided farmers’ cooperatives with commercial resources to enhance their market accessibility (e.g., lower certification costs and direct marketing channels). In contrast, small-scale farms were much less likely to be involved in such policies, and we only identified the interpersonal relations between rural small farmers and local cadres for patronage. Some small-scale farmers were concerned about how difficult it was for them to access institutional help due to “not meeting conditions”.

Table 4.2 Supports Received in the Vertical Networks

	Financial supports	Technical resources	Political patronage
Providers	Municipal rural and agricultural bureau, & Other governmental agencies	Organic food development center & Jiangsu Academy of Agricultural Science	Local village cadres
Receivers	Certified EA companies, & Farmers’ cooperatives	Certified EA companies, & EA farms by urban residents	EA farms by rural residents

Goods and services received	Farm facilities (e.g., greenhouses), & Public procurement (cancelled)	Farming and management methods & Commercial goods (e.g., seeds)	Profit-making opportunities
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These examples reflect diverse types of vertical embeddedness, in terms of how and in what forms the embeddedness takes place, among different types of ecological agricultural farms. To understand the differences, we first look to the centralized governance structure that shapes policy implementation, through which specific targets should be met (Stein, Pahl-Wostl, and Barron 2018). In China’s institutional networks there is a strong “top-down” emphasis in policy formation. Previous policy targets prioritized penetration of a large-scale, capital-intensive model of agriculture into ecological agricultural practices. Therefore, local governments and affiliated public institutes have provided different levels of access to resources for different ecological farmers. That policy focus may lead to small-scale farmers feeling disconnected from the governmental bodies, since they receive less institutional support (McKitterick et al. 2016). This reinforces our argument that the highly-structured policy networks have imposed limits on the expansion of the EA sector (Zhou 2015).

The policy networks characterize a vertical context in which farm operators of different backgrounds are linked to varied public institutions and resources: while entrepreneur farmers often lack farming experience and knowledge, rural established farmers are often less familiar with marketing and business operations. So the former is connected to institutions with production assistance, and the latter is linked to institutions with market information and access. Clearly, vertical networks strongly nurture the EA sector of large-scale EA farms. However, compared to policy arrangements in other countries where closer social ties were encouraged between farmers (e.g., fostering initial connections between farmers in Northern Ireland (McKitterick et al. 2016), facilitating the collective identity among farmers in eastern France (Bowen 2011), the vertical policy context in Nanjing merely encourages interactions, rather than connections, between farmers.

4.4.2 Horizontal relations: bonds and tensions

The horizontal embeddedness of Nanjing's EA sector is analyzed through investigating the interactions and relations between different farmers. Broadly speaking, we found different interactive models and degrees of collaboration between urban new farmers, rural established farmers, and local villagers. Local villagers were often hired workers on either EA farms or conventional farms located in the same village as the interviewed farmers. Generally, this study reveals both bonds and tensions in three types of relations: relations with kin, neighbors, and like-minded individuals. The following paragraphs delineate both conflicts and mutual supports in the three relations.

Kinship The kinship associated with strong social ties is a kind of relationship frequently captured in rural studies (Fei et al. 1992; Fisher 2013; Ring et al. 2010; McKitterick et al. 2016; Si et al. 2019). Likewise, rural established farmers testified receiving various supports from their relatives (i.e., local villagers). They reported that their relatives provided financial support as the farm's initial start-up capital. A farmer who started a farmers' cooperative after receiving money from his uncle, provided jobs to his uncle and nephews in return. In addition, the study also found two urban new farmers (a female farmer and a recreational farmer) asking their siblings to help manage production or employment on the farm. Specifically, they reached out to their siblings when they needed a hand with the production side of the business, so they could then take on management tasks such as marketing, hiring laborers, and handling customer service. The horizontal embeddedness is thus characterized by these financial and labor supports that embed ecological farms in the strong kinship ties. As a farm manager explained the help he extended to the farm owner (i.e., his elder brother), "*a pastoral life on a rural farm has always been my big brother's dream. I'm only here to take care of his farm because he is too busy outside*".

Although the strong kinship ties partially address the challenges of lack of resources (particularly labor) facing many newly started farms (Barzola et al. 2019), the in-group solidarity derived from the strong kinship ties often reduces cooperation with outsiders (Fukuyama 2001). However this study found that the difficulties in collaborating with outsiders resulted in a reliance on kinship. For example, the aforementioned female farmer once hired a local villager as farm manager, but he turned out to be lazy in carrying out his work and also stole some produce. The farmer then asked her older brother to supervise the farm due to her mistrust of hiring local villagers. In this case the

reliance on kinship was not due to in-group solidarity, but rather the conflictive relations with local villagers. A further analysis of such conflicts is explored in the next paragraphs.

Neighborly relations of collaboration and conflict Before illustrating the conflicts, we also want to point out the collaborations and solidarity we identified among neighboring rural farmers in our research. The collaborations and mutually supportive relations based on geographical proximity are termed as territorial embeddedness in previous food studies (Sonnino 2007, Bowen 2011). From our interviews and observations, it was not surprising to find territorial embeddedness, for example, manifested by rural established farmers in the same cooperative helping each other with pruning and harvesting during peak seasons—with or without compensation. Furthermore, a shared locality can also cultivate immaterial social capital to glue members (Morgan and Murdoch 2000) and collective values that lead to commitments to the sector (Tregear 2011). One interesting example is a peach farm where there were always a number of bruised peaches during the harvest, and the farmer would share these peaches with neighbors who lent him a helping hand.

Despite the identified territorial embeddedness, we also found that farmers' differing commitments to ecological farming would break down the collaborations between neighboring farmers. In villages where ecological farmers are the minority, few mutual interactions between ecological farmers and conventional farmers could be identified. Ecological farmers opted out of the dominant agricultural system in the village by adopting different production approaches and marketing channels. One corn farmer, for example, explained that,

“Local villagers use water from the nearby creek and purchase fertilizers from the downtown factory store, but our water is from the collected rainfall in this self-dug pond, and our fertilizer is the composted manure sourced from a cattle farm nearby... There is little chance for us to interact with local farmers. Even when the wholesaler comes to purchase products, we won't join their conventional markets.” — (interview with a small-scale farmer on 10th July 2016)

Moreover, a more hostile relation was observed between urban new farmers conducting EA and local villagers. For example, a new farmer from urban Nanjing who leased a piece of farmland in the village was asked to stop using water from the collective pond because she was not considered local. However as soon as she dug a small canal to bring in water from a nearby creek, some local farmers came with buckets to collect the residue-free creek water. New farmers often resorted to hiring local farmers when they needed laborers, which caused more troubles. For instance, some

found it hard to recruit laborers; some were dissatisfied with hired farmers' work; some even found that hired workers would steal their produce. It is probably because while new farmers considered the employer-employee relation with hired local villagers fair and reasonable, rural farmers believed they were subordinated in the relationship. One new farmer even complained that "rural farmers lack professional ethics to respect their jobs (as hired-farmers)" (interview with an owner of a certified organic farm, July 30, 2016). The misunderstanding between new farmers and local villagers is exacerbated by the different understandings of EA. While urban new farmers who accumulated enough capital and other resources shifted careers to EA due to the food safety concerns, rural villagers who have relied on conventional agriculture are skeptical about the productivity of EA and are confused by the new farmers' investments in EA.

"They [rural residents] consider us [new farmers] as big bosses, rich people who spend some money here and go away...They don't think we will keep farming here in the long run." — (interview with a small-scale farmer on 9th Sep 9 2016)

In general, the horizontal relations between EA farmers and neighbors are shaped by both territorial bonds and social conflicts. Socially, the disconnect between new farmers and local villagers comes from what is known as the rural-urban divide: a divide—in terms of life experiences, education, values, and as a consequence approaches to personal relations (Yang et al. 2014; Wu et al. 2016)—between new farmers with an urban background and local villagers with a rural background. In addition, the conflicting views of EA have increased the difficulty for collaborations between different farmers. The territorial-social nexus thus gradually shapes a social-cultural context that encourages independent operations of many new farmers. Nonetheless, the study also observed a few cases in which new farmers and rural farmers did get along with each other. When a new farmer has been in a village for at least a few years, the local villagers gradually become convinced that he or she comes for farming rather than wasting money. The other is in the aforementioned cooperative where the young local officials are encouraged by the city government to start a by-line of organic farming. These local officials organized training courses in terms of organic farming, and invited local villagers to attend the courses. Such experience facilitated the relations between local officials and farmers¹².

¹² Different from the political patronage I describe in 4.4.1, in which local villagers have to maintain good relations with local cadres to access some benefits. In this case the services (e.g., provide training to villagers) are quite equally accessed by villagers.

Relations with like-minded people The peer relations among urban new farmers also serve a context for horizontal embeddedness. First of all, their similar experiences—such as suffering from foodborne illnesses and worrying about healthy food for their children—led to a similar strong food anxiety and demand for quality food (Si et al. 2015). The pursuit of alternative farming lifestyles reinforced the mutual trust between new farmers. As a result, several new farmers exchange produce when there is a shortage of certain vegetables to supply to customers. One farmer explained her trust in another farmer as “because she also started farming worrying about her child’s diet”. In addition, the like-minded pursuit is also demonstrated in the similar farm styles: small-scale and highly diversified farms that provide food to themselves while distributing food boxes to their members. Among these new farmers, we witnessed peer-to-peer interactions through which they were able to gain farming knowledge, market information, and a sense of solidarity and belonging, as found in other AFNs elsewhere (Sage 2003; Oñederra-Aramendi et al. 2018).

In addition to the like-minded pursuit between new farmers, organizational actors also facilitate connecting new farmers. In Nanjing, these actors include an anthroposophy club that derived from the Demeter certification body to promote biodynamic agriculture and the Organic Slow Life magazine that provides a platform to link farmers, disseminate organic related ideas, and promote the development of the organic sector. The editor explained his commitment as follows:

“I pay attention to small-scale organic farms because I understand their struggles to survive...The magazine also suffered serious hard time when I was in debt...But I think it is the right thing to do and it has a future. ” —(interview with magazine editor on 7th September 2016)

Other than these organizations, there are emerging efforts beyond the dominant policy framework to contribute to the transition to EA. A professor at Nanjing Agricultural University (NAU) told us that she was unable to develop an organic agriculture course due to the rigid program arrangements within the faculty. Her strategies were organizing training workshops for farmers outside classes and using mobile apps to answer their questions in her spare time. In addition, OFDC was considering employing a participatory guarantee system (PGS) to benefit small-scale farmers through group certification. Such voluntary self-organizing driven by common interest, values and vision for the future enhances the solidarity within the community and demonstrates these actors’ commitments to this sector (Migliore et al. 2014; Fonte and Cucco 2017).

The perceived shared visions and beliefs are believed to be a significant feature of collaborations (Sage 2003; Bowen 2011). For instance, Tregear and Cooper (2016) noted that a cooperative member in UK exhausted his entire stock to help other members when they were experiencing scarce harvests, and this action was largely based on mutual recognition and collective spirit. Chiffolleau’s (2009) case in south France also indicated weak collaborations of exchange products and strong collaborations of co-founding alternative projects based on different mutual identifications. However, the study in Nanjing only found a few collaborations of sharing farming experiences and markets between new farmers. Some farmers received help from the slow life magazine or other actors, but seldom developed long-term collaborations with each other. This is probably because they are the first generation that has developed alternative food initiatives within the mainstream market economy in China. They have demonstrated a strong motivation and a pioneering spirit to adopt self-reliant solutions to food problems and take risks to switch from their previous occupations to ecological farming. In the words of Tregear and Cooper (2016, 108), “those who have been drawn to it are typically entrepreneurial-minded... proactive learners used to acquiring knowledge about production in a relatively ad hoc, individualistic way”. Although it contributes to the mutual appreciation among farmers, this strong adventurous and individualistic way of doing things limits the willingness of new farmers to collaborate with others.

To conclude, this section highlighted three types of relations found between farmers, each entailing different supports as well as challenges for different farmers (see Table 4.3). Kinship provided rural farmers with financial and labor supports, and urban farmers with labor forces when they encountered conflicts with local villagers. Neighborly relations between rural established farmers, especially farmers in the same cooperative, entailed benign mutual understanding and collaborations. However, neighborly relations were a cause of conflict between urban new farmers and local villagers, and between ecological farmers and conventional farmers. The last like-minded relations, based on shared recognition of EA, were only identified between new farmers and a few other organizations.

Table 4.3 Horizontal Relations between Farmers and Other Actors

	Kinship	Neighborly relations	Shared Visions
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Actors	Small-scale farmers and relatives	Between members in farmers' coop	Between ecological farmers and conventional farmers	Between urban new farmers and local villagers	Between urban new farmers
Contents	Providing financial and labor supports from relatives to farmers	Mutual identification and supports	Rejection of sharing resources (e.g., water)	Misunderstanding of each other & Conflicting views on EA	Shared belief in EA & collaborations on marketing and sharing knowledge

Last but not least, agri-food scholars have captured various ways that horizontal embeddedness has been reinforced by policy contexts, such as building collective recognition of the territory through geographical identification scheme (Bowen 2011), and filling in the gap of connecting producers (McKitterick et al. 2016). However, the policy context in our case, as we have illustrated, focuses on supporting large-scale agricultural operations while leaving small-scale alternatives unrecognized and unsupported. The political restrictions constrain the vitality of social organizations that can play a bridging role in facilitating connections between various farmers. We thus argue that the horizontal embeddedness of the ecological agricultural sector lacks both a policy context and a social-cultural context of encouraging collaborations between ecological farms. To create more collaborations among these farmers political restrictions (Zhou 2015), rural-urban disconnections (Chan and Zhang 1999; Chu 2012; Yang et al. 2014; Rao and Ye 2016), and the distinct understandings of EA all need to be addressed.

4.5 Conclusions

China is undergoing a remarkable yet controversial transition to pursue modernization, a marketized economy, and sustainable development. The thriving EA sector that has emerged in

recent decades reflects this controversy, in terms of the enabling environment and social-cultural contexts that shape various types of ecological farms. These dynamics have not been well analyzed to date in the academic literature. Building on Sonnino and Marsden's (2006) recognition of agri-food system embeddedness in both the vertical context of policies and regulations and horizontal context of territory and culture, this study goes beyond the simplistic assumption of embeddedness in Nanjing's EA sector as present or absent, and conducts a more nuanced and systematic investigation of dynamics of vertical and horizontal embeddedness. It examines the process by analyzing the relationship between different ecological farms and other agencies. As a result, our research characterizes two major policy and social-cultural contexts in which the EA is being less collaborative. We are thus able to identify the main challenges for advancing the transition to EA. Firstly, vertical context is characterized by the dominant policy design, which prioritizes the model of large-scale, capital-intensive EA, following the major trend in the rest of the world. Despite the bias within the policy, this study does not deny the achievements of the state in fostering the growth of and transition to EA, especially given the severe challenges China's agricultural sector faces such as the degrading environment and heavy reliance on external agricultural inputs (Qin and Liao 2016). This paper indeed documents the remarkable institutional contributions to the rapid development of the EA sector.

Nonetheless, if understanding vertical embeddedness as intensifying social ties between farmers attributed to the vertical context, then the EA sector is not that embedded as the vertical policy context in Nanjing merely encourages interactions between farmers. This contrasts with policy arrangements in many other countries where closer social ties were encouraged between farmers. For example, governmental agencies help to foster initial connections between farmers in Northern Ireland (McKitterick et al. 2016); and policy design of production control and profit distribution facilitates the collective identity among farmers in eastern France (Bowen 2011). The policy of supporting large-scale EA in Nanjing highlights the differences between farms, which could exacerbate the mutual exclusion between different farms. In other places like Brazil, scholars find farmers to change the context by mobilizing their local resources (e.g., social ties with local people) to negotiate with policy makers (Craviotti 2016). This study only finds the building of interpersonal ties for political patronage, instead of as an effort to change the policy context. This study thus identifies the need for supports beyond those available through public institutions. I thus

suggest that third-party actors (e.g., scholars, consumers who interested in promoting alternative forms of EA) should work to build networks that can strengthen collaborations.

Secondly, the EA sector is horizontally embedded in a social-cultural context that encourages relatively independent farm operations. When we examine the horizontal embeddedness in the EA sector through the lens of proximity and social ties among farmers, we identify financial, labor, and emotional supports for farmers based on kinship and neighborly relations. In-group solidarity often results in “over-embeddedness” whereby farmers tend to rely on existing relationships rather than building new connections (Renting et al. 2009). However, this study finds the reverse: urban farmers had to turn to existing kinships for help when they failed in building relationships with local villagers.

Furthermore, we observe a deep disconnection between new farmers from urban backgrounds and rural farmers—where the conflicting views towards farming and interpersonal relations attributed to the broader structural urban-rural divide. This imposes various challenges on ecological farmers to build benign, reciprocal relations with local villagers, particularly when the former is not the majority in the village. This paper thus complements Tregear and Cooper’s (2016) argument that over-embeddedness is not the only relational block for rural collaborations, by adding this rural-urban divide.

The most effective mutual supports and understanding are found in neighborly relations between rural established farmers, especially farmers in the same cooperative. The shared locality and socio-economic background facilitate their recognition of each other. Within the new farmers group, despite their shared visions of EA, they seem to be somewhat reluctant to build peer relations that could further reinforce knowledge exchange and enhance collaborations. One possible explanation is that the strong individualistic way of doing things limits new farmers’ willingness to form collaborations. Additionally, studies in North America and Europe have highlighted many non-profit organizations that facilitate the collaborations in food systems (Chiffolleau 2009; Levkoe 2014, McKitterick et al. 2016). The nascent stage of the civil society-led food sector and the lack of experienced social actors to build rapport with farmers in Nanjing are likely explanations for the observed weak collaborations among ecological farmers.

Although this study focuses on the EA sector in Nanjing, the structural characteristics such as the top-down policy structure and urban-rural divide are universal in China. Existing studies also point out the significance of food safety, the predominant top-down policy structure and the lack of

social organizations in defining the EA sector in China (Scott et al. 2018). Our study in Nanjing concurs with these observations at a larger scale and further details the nuances in a local political and social context. However, it should be noted that Nanjing is an economically wealthy provincial capital in China. It differs from both metropolises like Beijing and Shanghai with more active social actors (e.g., CSA association), and cities where less EA initiatives are seen. Thus, this study deepens our understanding of the political and social embeddedness of EA and illustrates potential conflicts and challenges for EA initiatives in Nanjing and in other places with similar socio-political settings.

For policy makers, this study highlights two problems that impede the ecological agricultural sector from becoming more vibrant and collaborative. The first is the lack of social actors—such as sector support organizations common in many other countries—that can play the role of connecting dispersed and often individual ecological agricultural practices and facilitate interactions between them. A more encompassing environment that invites collaborative efforts to solve environmental problems, as argued by Zhou (2015), is critical for the long-term viability of the EA. Second, policies need to take the specific conditions of farms (e.g., the ownership structure, the operational scale, the owner’s background) into consideration in terms of catering to their special needs. A more tailored policy formulation is required to address the diversity within the EA sector.

Chapter 5

Adding A Socio-Ecological Dimension to the Concept of Rural Restructuring: Insights from Two Modes of Ecological Agricultural Transition in Nanjing, China

Abstract:

Ecological agriculture (EA) has been gaining importance in the rural development strategy of China. However, the conceptualization of China's rural restructuring is concentrated on out-migration, land abandonment, and agricultural industrialization. There is a missing perspective of how the emerging paradigm shift towards EA renovates the existing theorization of rural restructuring in China. We conducted comparative research in two villages shifting to EA practices in the city of Nanjing. While Jinci village adopted an agribusiness mode to facilitate a massive land transfer, the relocation of villagers, and “de-peasantization” by engaging farmers in agritourist industries, Dai village took the mode of a farmers' cooperative to encourage the pooling of land resources, the adoption of collective economy, and “re-peasantization” by realizing the economic and social values of farming. The findings suggest that conceptualization of socio-ecological changes should be added to the rural restructuring literature to distinguish procedural differences of varied rural transformation processes. We also point out the danger of obscuring socioeconomic aspects of EA if only emphasizing the environmental benefits unilaterally.

Key words: rural restructuring, ecological agriculture, land transfer, farmers' cooperative

5.1 Introduction

In recent decades China has witnessed enormous changes in rural areas due to the fast urbanization and far-reaching agricultural modernization processes. By 2019, more than 60% of the population resided in cities; by 2017, more than 35% of farmland had been transferred to agribusinesses,

farmers' cooperatives, and other types of commercial farms. These changes resonate with experiences in other parts of the world in the last century in which modernization underscores rural development paradigms (Long and Woods 2011). For example, in Wales, rural population decline was accelerated to 4% per year between 1951 and 1961 (Woods 2010). In Spain, the percentage of agricultural workforce dropped from 40% to 20% between 1960 and 1976 (Hoggart and Paniagua 2001). In developed countries, the past few decades has seen the rural development paradigm that was dominated by modernization be challenged by trends of counter-urbanization and rural in-migration (Woods 2009), which have shifted the policy focus towards an environmental scheme of agriculture (Marsden and Sonnino 2008) and the new peasantries (van der Ploeg 2010). Scholars have adopted frameworks of rural restructuring to conceptualize "the reshaping of social and economic structures in rural areas" alongside the above changes (Woods 2009, p429).

The literature centered on rural restructuring globally has been notably updated by parallel research on rural changes in China more recently. Scholars have associated rural restructuring with prominent modernization phenomena: the "village-hollowing" and the coping strategy of land consolidation (Long et al 2012; Liu et al 2016), the loss of traditional settlements culture (Wang et al 2016), the weakening socio-economic status of peasant farmers (Zhang and Donaldson 2008, Schneider 2014), and the construction of petty commodity economy-based rural daily life (Lin et al. 2016). Long and Liu (2016) further generalize three major dimensions--spatial restructuring, economic restructuring, and social restructuring--to characterize contemporary rural restructuring in China. However, in this scholarship, there is a gap in portraying rural restructuring because it fails to examine the shift towards ecological agriculture (EA). In the global north, re-directing rural development based on multifunctional agriculture and agroecology is a central piece of the rural restructuring literature (Hoggart and Paniagua 2001, McCarthy 2005, Marsden and Sonnino 2008, Woods 2008). Overlooking this critical perspective might dilute the conceptualization of rural restructuring to the tune of the overwhelming globalization and industrialization.

This study aims to learn about how EA development in rural areas renovates the existing conceptualization of rural restructuring. In China, EA is gaining importance in re-directing rural development. The Communist Party of China had successively underscored the construction of ecological civilization in the 17th, 18th, and 19th Party Congresses (Zhang et al. 2016). This framework indicates the government's growing attention to environmental protection and natural resource conservation in agriculture (Yi et al. 2015; Sun 2017). For example, the Chinese Ministry of

Agriculture released a plan in 2017 regarding zero growth of chemical usage in farming by 2020. However, except for a few studies that examine farmers' adoption of EA in the broad context of food anxiety and alternative food movements (Si and Scott 2015; Day and Schneider 2017; Si et al. 2019), the widespread implementation of EA in rural villages is underexplored. Rural changes (e.g., land redistribution, new employment and working relations) alongside the process of promoting EA constitute key elements that complement the theorization of rural restructuring.

In order to explore these rural changes that accompany EA developments, we researched the experiences of two villages in Nanjing, China, that reflect different approaches to EA. While one village witnessed an agri-business leading EA, developments in the other EA was promoted through a farmers' cooperative. The purpose of selecting two cases is to compare different processes of implementing EA and to thoroughly understand how and why the structures of rural space, economy, and society are reshaped similarly or differently. By comparing the two cases, we seek to generate insights on the construction of social patterns and economic rules during rural transformation. The comparative findings suggest that significant work should be added to the rural restructuring concept to distinguish procedural differences of varied rural transformation processes.

The paper is organized as follows. In Section 2 we conceptualize rural restructuring by reviewing both theoretical and empirical studies that describe the rural restructuring processes in China and elsewhere. The literature review helps to contextualize the rural social and cultural dynamics in which farmers' EA practices are rooted. In Section 3 we introduce the two cases of developing EA in Nanjing, and explain how they represent contrasting models of rural restructuring. In section 4, the research results are presented through comparing the rural restructuring processes in terms of spatial, economic, and social dimensions in the two villages. We highlight that villagers developed opposite farmer-land relations, capacity building, and perception of farming. In conclusion, we reveal that using the three spatial, economic, and social dimensions is insufficient to appropriately characterize rural restructuring, and we thus propose a further dimension of socio-ecological restructuring. We also point out the danger of obscuring socioeconomic aspects of EA if only emphasizing the environmental benefits unilaterally.

5.2 Conceptualizing and Contextualizing Rural Restructuring in China

Rural restructuring is a notion commonly adopted by Western scholars to describe and explain significant transformation that has taken place in rural society (Hoggart and Paniagua 2001, Woods

2010, Heather et al. 2017). In the late twentieth century, there has been a changing view of rural and agricultural development patterns in Europe. Marsden and Sonnino (2008) summarize three dimensions of the changing views: 1) the changing view of growing food as the major on-farm activity to a view that promotes a plurality of economic activities on farm; 2) the changing view of rural land as an element of agricultural production to a view that recognizes multiple ecological and social functions of land; 3) the changing view of productivist development to a view that considers agroecology for sustainable economic and environmental rural development. In these processes of carrying out pluralist, multi-functional agricultural developments, other rural sociological scholars also identify the significant shifting structure of rural society (e.g., the declining economic significance of agriculture, both out-migration and in-migration in the countryside, new actors in rural spaces) (Whatmore et al. 1990, Woods 2008, Long and Woods 2011). They thus use the term rural restructuring to highlight the reshaping of social and economic structures in rural areas.

Despite rural restructuring being a useful concept to describe socio-economic changes happening alongside changing views and models of rural and agricultural development (i.e., to the so-called multifunctional agriculture), scholars argue for theoretical improvement on the concept to characterize and analyze holistic change processes (Hoggart and Paniagua 2001). They further ask what changes constitute rural restructuring, what are the starting and ending points, and how can we understand the structural changes rather than merely listing changes. More recently, these questions have been partly addressed in the applications of the rural restructuring concept to the Chinese context in a special issue of empirical studies of rural China. Long and Liu (2016) synthesize three dimensions of spatial, economic, and social restructuring to examine rural changes. Different from the original European conception of rural restructuring that is rooted in transitions to multifunctional agriculture, the Chinese conception is based upon the development of agricultural modernization. The following paragraphs review the “starting points” (e.g., the policy reform) and major contents of changes in the three dimensions, with particular focus on farmers’ situations.

5.2.1 Land Policies and Spatial Restructuring

Since the implementation of the household responsibility system (HRS) that allocates the collective farmland to individual village households in 1978¹³, scholars noticed two stages of farmers’ changing

¹³ The village collective retains the farmland ownership. Households have the use right and contract right of the pieces of farmland that allocated to them.

relations with land. The first stage was when the HRS de-collectivized the commune-based agricultural model and revitalized household-based production (Brandth and Haugen 2011). This resulted in a highly-fragmented land system because rural households were allocated a small piece of farmland (typically less than half a hectare) (Andreas and Zhan 2015). Later on, as more and more farmers migrated from the villages in search of jobs in cities, changes occurred such as land abandonment, “hollowed out villages”, and the loss of farmland to construction for transportation, infrastructure and urbanization (Qin and Liao 2016). Therefore, the second stage was built on these problems to assemble “scattered” land plots to improve farmland productivity. These goals were realized through incentivizing land transfer – the so-called deeper reform of land rights (*shen hua tu di zhi du gai ge* in Chinese) in 2004. This marks “an obvious shift from strict prohibition of land transfers to relaxation, and even promotion” (Ye 2015, p.324). Usually, the village governments managed to persuade households to pool land together by providing them with land rent. After dozens of hectares of farmland have been gathered, the village government invites agri-businesses to lease the land altogether. Such processes facilitate land consolidation and the capitalization of land resources, which legitimizes land transfers to interested agrarian capitalists (Fang 2015). By 2013, 22.6 million hectares of land management rights had already been transferred from individual households to other land users. The percentage of farmland transferred to other users (e.g., dragon-heads, family farms, farmers’ cooperatives) increased further from 26% in 2013 to 35% in 2017 (Schneider 2017).

In the spatial restructuring derived from land transfer, there is a chance for some farmers to gain property. Especially throughout the 1990s and 2000s when the real estate economy was thriving and the state had not strictly controlled the conversion of farmland to commercial uses, many local governments enticed farmers to leave their farmland and residential land by helping them to get an urban hukou identity (Ye 2015; Andreas and Zhan 2015). An urban hukou is attractive because better public services are provided to urban citizens. Meanwhile, local villagers who resided in locations near a vigorous real estate or rental housing market are also eager to trade their residential lands in exchange for monetary and other types of compensation (e.g., low-cost apartments in new buildings) (Wong 2015). However, as rural villagers lost their farmlands, it raised the question of the decline of traditional peasant farming and the increase of new agricultural enterprises (e.g., agribusinesses) (Zhang and Donaldson 2010; Ye 2015).

Other issues arise from the industrialization of agriculture such as environmental pollution and soil degradation (Spaargaren and Oosterveer 2012; Krul and Ho 2017). In addition, studies have documented that local elites and local governments, rather than peasant farmers, have more opportunities to obtain land premiums and generate fiscal revenues via implementation of land transfers (Xu 2016). Therefore, although land transfer leads to the relief of problems such as land abandonment (Long and Liu 2016), more attention needs to be paid to farmers in the process of spatial restructuring. As Niroula and Thapa (2005, p368) argued, “The success of any land consolidation program rests on how well farmers’ needs, capabilities, and aspirations are reconciled and integrated into it”.

5.2.2 Agricultural Modernization and Economic Restructuring

Economic restructuring in rural China is framed by the state’s goals of agricultural modernization (Long and Woods 2011; van der Ploeg, Ye, and Schneider 2012; Long and Liu 2016). As indicated above, agribusinesses have been invited to take over the aggregated land in villages. Such a process is not only encouraged by the central state’s slogan of “letting agribusinesses lead agricultural modernization”, but also realized through local governmental programs of bringing in businesses and investment into the countryside. These agribusinesses comprise multiple actors, including dragon-head companies started by urban commercial capital, family farms and farmers’ cooperatives started by village elites or local villagers who can afford land rents (Huang and Yuan 2013, Yan and Chen 2015). Dragon-head enterprises are declared as the leading actors of agricultural modernization by most levels of government (Andreas and Zhan 2015). They are strongly supported by a governmental financial subsidy. From 2000 to 2005 for example, the state allocated 11.9 billion CNY (1.78 billion USD) to subsidize national-level dragon-head companies (Huang 2011). Family farms have been promoted more recently as the ‘new subjects of agriculture’ to contract more farmland and operate big farms. According to a national survey in 2012, family farms represented only 0.34 percent of total rural households, but occupied 13.4 percent of the total village farmland (Yan and Chen 2015). These family farms are often operated by local villagers who manage to afford an expansion of production. Compared to previous family farms that each household were allocated with half a hectare of land, the surveyed family farms all have land larger than 13 ha. Farmers’ cooperatives have also been

playing an important role in enlarging the scale of production, and managing the economic surplus (Hu et al. 2017). The operators of co-ops are also local ‘big’ households¹⁴. Many times, co-ops have been used by the ‘big’ households to acquire government subsidies (Yan and Chen 2015).

The expansion of agribusinesses in rural China has led to much research on capitalist relations within the many business forms, as increasing numbers of small-scale farmers have been incorporated into the agri-businesses as hired workers (Yan and Chen 2015). Moreover, as farmers are relying on the many technical, managerial, and marketing resources provided by the agribusinesses, they are also easily locked into industrial modes of farming and food production. Therefore, for agroecology scholars who see the environmental and social sustainability in small-scale farming (Woodhouse 2010; Altieri, Funes-Monzote, and Petersen 2012), it is crucial to evaluate whether and how the modern agri-food system provokes vulnerability for and discriminates against small-scale farmers in China’s ongoing economic restructuring.

Economic restructuring in rural China is also grounded in the shift away from agriculture and in rural depopulation (van der Ploeg et al. 2012; Li et al 2011; Zhang et al. 2016). There are more than 250 million migrant workers in China, most of whom have migrated from rural to urban areas for jobs (Yeh, O’Brien, and Ye 2013). While European countries have largely undergone the same processes, they have also witnessed the counter migration to the countryside of wealthy urban residents and the thriving of the so-called “consumption countryside” or “post-productivist countryside” (McCarthy 2005, Long and Woods 2011, Li et al. 2016). Van der Ploeg et al. (2012, p.134-135) further concludes a possible rural development that introduces vigor to the farming sector: “the inclusion of non-agricultural activities into the farms, the creation of more value added to the products, and the reducing dependence on external resources”. These studies have suggested different ways of continuing economic restructuring – constructing an industrial productivist countryside versus revitalizing the farming sector via value added on-farm activities. Therefore, it is important to know the impact on economic restructuring posed by promoting EA in rural China.

¹⁴ Local ‘big’ households usually refer to local villagers who contract large-scale of farmland and operate farms larger than family farms. But the specific criteria of distinguishing a ‘big’ household vary from provinces to provinces, usually require land size larger than 500 mu.

5.2.3 Social restructuring

Under the circumstances of increasing land transfer and agricultural modernization, the differentiation of farmers is one of the most prominent social changes. Due to the possessed land rights and the level of market autonomy of farmers, Zhang and Donaldson (2010) probe into independent farmers who retain full land rights, and own greater control over both production and marketing of harvests; semi-proletarian farmers who transfer the land use rights to big companies and may obtain a farming job in these companies; and proletarian farmers who have completely lost farmland in the complex procedures of urbanization and land reforms, and turn to non-farm wage labor. As land rights and independence of farmers decreases, the more vulnerable they become in the labor force. For example, since landless farmers demand higher wages for renting or purchasing living places, they might be squeezed out of the job market when there are laborers with lower income demands (Chuang 2015).

Another highly discussed element of social restructuring centers around the confrontational relations between agricultural modernization and the social category of peasants (Yeh et al. 2013). The intensification of businesses to take over agriculture signals the tendency of de-peasantization (Yan and Chen 2015). De-peasantization is not only the declining population of peasant farmers, but also the weakening presence of small-scale agriculture through portraying the backwardness of peasants in the main political discourses (Schneider 2014). In addition to political orientations, the mainstream opinion from society has exacerbated the devaluation of small-scale traditional farming. Rural farmers also desire to rid themselves of their social status as peasants. Corresponding to that desire, the society has witnessed the collapse of traditional rural society that was characterized by strong farming tradition, village culture, and family clanship (Long and Liu 2016). The construction of new social rules are documented in research on new rural modern lifestyles, such as moving farmers from previous houses into high-rise buildings (Yep and Forrest 2016), farmers' adaptation to the Internet age (Lin et al. 2016), and the transformation of village collectives in the process of urbanization (Kan 2016).

In general, studies on rural restructuring in China indicate a different rural transformation picture from rural restructuring in Europe. While the latter is characterized mainly by the shifting paradigm to an image of counter-urbanization and multi-functional countryside, the former is characterized by land consolidation, increasing agrarian capital, agricultural modernization, class differentiation, and de-peasantization (Long and Wood 2011). To enrich these portrayals, this study sheds light on the role of EA. More specifically, it provides three dimensions in which to understand the place of

farmers in rural development: rural spaces in which they reside and work, how they carry out EA, and how are they encompassed or excluded by new EA activities.

5.3 Case Studies of Ecological Agriculture in Two Villages

The city of Nanjing has given rise to many ecological agricultural initiatives including organic farms, China's first organic certification body, the *Organic Slow Life* magazine, and more. Public institutes such as the Nanjing Rural and Agricultural Council, the Nanjing Environment Department, and the Jiangsu Academy of Agricultural Science are also engaged in promoting ecological agriculture.

Interviews with these key stakeholders led the authors to identify two well-known cases of transitioning to EA in rural Nanjing. The first is an agritourist company that developed an agri-business called Barolo Eco-Valley, in Jinci Village. The second is a farmers' cooperative producing organic rice in Dai village. The fieldwork was conducted over a number of visits in September 2016, August and September 2017, and April 2019. Ten in-depth interviews were conducted with key actors (i.e., the leader and council members of the farmers' cooperative in Dai village, the governmental representative of agricultural development in Jinci village, the production manager and production team members). Observations of on-farm production, rural residences and working environments in the two villages are also important data collection method. In addition, 32 primary sources including policy papers, news reports and published journal articles regarding agricultural development in the two villages were read and analyzed. The interviews were transcribed into transcripts, and observations were written down as field notes. The qualitative data analysis was based on these transcripts, fieldnotes, and secondary data. Key issues concerning rural spatial, economic, and social restructuring were coded, highlighted and scrutinized. Differences between the two villages in terms of developing ecological agriculture were scrutinized and compared.

5.3.1 Barolo Eco-Valley in Jinci Village

Barolo is a privately-owned agritourist farm founded by a catering business in 2014. Barolo occupies more than ten thousand *mu* (667 ha) of arable land, which is divided into multiple regions to develop different theme parks. For example, the land parcel with a small pond is planted with lotus as the lotus park; the pasture is used for raising horses and cattle. Such design evokes tourists' desire to explore different parks. It also plants a variety of species in order to be attractive to tourists all the year round. Shuttle buses carry local tourists from Nanjing city to the farm during weekends and holidays. Barolo also designed a camp site inside for camper vans. By creating an attractive trip

environment, Barolo has become the most favorable agritourist destination among Nanjing residents. In fact, during the peak season around national day and other holidays, thousands of tourists crowd into the valley, and many have to wait for hours to get in.

The headquarters of Barolo developed branded ecological food products. They launched a marketing program called Cloud Kitchen, which has opened more than 100 small shops near urban residential communities in Nanjing. However, except for a few vegetables and fruits, most of the agricultural products sold by Cloud Kitchen were not grown by this company. The products from Barolo are green certified, which is similar to organic certification but allows the use of a few kinds of chemical inputs with regulated amounts (Scott et al. 2014). The company recruited local villagers to engage in production and service departments. Since the company relied less on income from selling food products, it designed the agricultural landscape mainly for agritourism rather than for producing food.

5.3.2 Dai Farmers' Cooperative in Dai Village

Dai farmers' cooperative was established in 2005 and an increasing number of villagers joined in the following years. At the very beginning, a retired agronomist arrived Dai in 2001 with the purpose of practicing and proving the profitability of EA. After a few tests of soil conditions and the growing conditions in Dai village, he started with lobbying local farmers to switch to ecological farming. Considering that most local farmers were skeptical about the economic benefits of making such a shift, he also promised to purchase their produce from local farmers in the beginning. Two households joined his project of ecological peach cultivation. They harvested quality products and sold them at a high price. The successful experiences of ecological production and marketing products have to some extent shifted villagers' views on EA. In addition, the agronomist who had spent several years living in the village, has built rapport with villagers. Over time, more and more villagers recognized the productivity and profitability of EA.

Dai had been one of the poorest villages economically. The village government soon recognized the opportunity of promoting EA to enhance the village economy. With the help of the agronomist, the village council decided to build a farmers' cooperative for organic rice production. The process also involved assembling land through which villagers pooled land to become shareholders in the cooperative. They were still allowed to keep other plots of their land for their own food production. The village council is in charge of organizing production and selling products collectively as a cooperative. In contrast to the case of Barolo in Jinci village, Dai farmers' cooperative facilitates

quality food production as the primary economic activity. They received organic rice certification in 2008. Table 5.1 summarizes the differences in the general context of developing EA between Jinci village and Dai village.

Table 5.1 A Comparison of Rural Contexts between Jinci Village and Dai Village

	Jinci Village	Dai Village
Total Arable Land in the Village (ha)	1273	487
Land Acquired by Enterprise/Co-op (ha)	667	267
Number of households	1207	866
Households Involved in Enterprise/Co-op	571 villagers, estimate as 190 households	812
Agricultural Type	Certified Green Agriculture	Certified Organic Agriculture
Organizational Form	Agribusiness	Farmers' Cooperative
Period of land assembly	2006-2009	2001-2009

5.4 Rural Restructuring in Jinci Village and Dai Village

These cases of EA development have resulted in significant rural transformations in both Jinci Village and Dai village. While both villages had witnessed land consolidation, income improvement, and changing village culture, villagers developed opposite farmer-land relations, capacity building,

and perception of farming. The following paragraphs elucidate in detail how rural restructuring in the two villages unfold in different directions.

5.4.1 Spatial restructuring

Spatial restructuring in Jinci is characterized by a government-led land program, through which Jinci becomes a role model of promoting the land program. Jiangsu provincial government launched a land-use program called “creating 10,000 ha of fertile land” to promote large-scale agriculture in 2008. The program sought firstly to effectively integrate fragmented land parcels into officially called “well-facilitated farmland” (with water, electric facilities), and secondly to move rural residents from traditional, dispersed dwellings to newly constructed high-rise buildings. This latter process would enable more residential space to be used as farmlands. Jinci village was selected as one of the pilot locations to conduct the land transfer in 2009. The selection of Jinci was partly because the high out-migration rate: in 2009, 87% of the adults (all except senior citizens) had migrated to cities (downtown Nanjing in particular) for non-farm jobs (Nanjing Municipal Propaganda Department 2018). The land program has created more farmland in Jinci village. Specifically, the average area of residential space declined from 0.12 ha per household to 0.03 ha after conducting the “10,000 ha” program, which means 72% of residential land was converted to farmland. The program also assembled the vacant farmland of the out-migrants. The program to create “well-facilitated farmland” in Jinci village also installed an irrigation system and other farming equipment on more than 1000 ha of farmland. After that, the company of Barolo Eco-valley rented 667 ha of farmland through the transfer of land use rights. Therefore, the program restructured rural spaces in terms of land use rights and the consolidation of land. Such spatial restructuring was an effective strategy to address farmland abandonment (Qin and Liao 2016, Long and Liu 2016).

The land program also resulted in changes of habitat conditions and farming habits of local villagers. The land transfer relocated villagers to the Jinci residential community, which is adjacent to Barolo, where 571 villagers (around 15% villagers in Jinci) work. The residential community comprises dozens of three-storey apartment buildings of 0.4 ha and a public green plaza of 0.06 ha. Four apartment types of 62 m², 96 m², 121 m², and 178 m² are available for local households of multiple family members. Although the dwelling area is smaller than it used to be, the new apartments enable villagers to access modern living facilities such as upgraded bathrooms, lighting, and Internet. In addition, since the relocation allowed villagers to exchange their old dwelling sites with the new apartments with little expense, most villagers are satisfied with the exchange process.

The local government also developed a large community garden beside the apartments (see Figure 5). The community garden was divided into tiny pieces (< 0.0066 ha) of farmland and allocated to the residents for producing self-consumed food. Site visits found that villagers used the garden to plant leafy greens mainly. Most villagers drive motorbikes to their land pieces for gardening. Rules of the community garden forbid villagers to raise livestock. According to local governmental officials, they didn't encounter the situation of villagers refusing to join the "10,000 ha" program. Officials attributed the smooth implementation of the land program to lowering the economic costs and maintaining the farming opportunities for local farmers. But elsewhere in China, it is common to see protest against such land consolidation by local villagers and social celebrities (e.g., famous scholars), of which they argue that authoritative individuals are taking the most advantage.



Figure 5 Farmland and Residential Land in Jinci Village

Although it looks like the land program went smoothly in Jinci, villagers didn't receive equal benefits. In fact, spatial restructuring in Jinci village has caused the problem of distributive justice (Bedore 2010), a question regarding whose rights are prioritized and guaranteed during the implementation of the "10,000 ha" program. Local elites managed to take advantage of the land program in several ways. First, there was a corruption case of local cadres exposed between 2011 to 2012 (Chen et al. 2012). Six local village cadres privately took the public funds of 600,000 CNY [84,854 USD] designated for facilitating the relocation of villagers. The vulnerability of such land programs to corruption is due to collusion between officials. The above six cadres also offered a bribe

to local town cadres to defraud the government of another 700,000 CNY [99,000 USD]. This reinforces the trend of land transfer projects serving as a means for local cadres and other business leaders to capture profits (Yep and Forrest 2016). In 2012, the court sentenced the six local cadres guilty of corruption and recovered 4.7 million CNY [664,714 USD]¹⁵. Second, there was the problem of local cadres persistently oppressing villagers. During our fieldwork, we encountered a household that had built a rustic dwelling shelter (with clay, wood, and canvas). The owner said that his uncle had taken possession of his allocated apartment, and he was unable to take it back because he was not in good favor with local cadres.

The spatial restructuring in Jinci village reflects the intertwined claims of the state to promote land transfer, of the local cadres to seek rent, and of the local villagers to enhance living conditions and change lifestyles. These aims have collectively shaped spatial restructuring across rural China, as illustrated by several cases such as the “land bill” model to facilitate land transfer in Chongqing (i.e., the local land administration develop a bill system to manage the contract rights of land, and initiate auction for investors to bid for the bills) , the model of “upstairsing” peasants in Shandong (i.e., local governments moved a few hundred peasant to high-rise buildings) and the “10,000 ha” project in Jiangsu (Yep and Forrest 2016).

In contrast to the land transfer program in Jinci village to promote company investment, the land consolidation in Dai village was a collective decision by villagers to enable a farmers’ cooperative and profit-sharing. As explained earlier, after villagers witnessed the productivity and profitability of ecological farming, there was a common interest in transitioning to EA in Dai village. In 2005, the village government conducted a household survey about the willingness of villagers to join a farmers’ cooperative for organic production, and 53% of them voted yes. In 2006, the local government started the co-op for organic rice production, and more than 100 households pooled 2.67 ha of farmland to establish the co-op. Later on, more and more villagers pooled land together as the co-op expanded its management and marketing capacity and obtained more support from the provincial government. By 2013, 812 households (93% of households in the village) had joined the co-op and ten times more farmland (267 ha) was claimed by the co-op. The land consolidation effort reflected the villagers’ eagerness/willingness to conduct EA as a cooperative.

¹⁵ The exceed part of the recovered fund include properties and other assets.

In terms of the residential space, villagers mostly stay with the traditional houses spread out around the village, rather than being relocated into high-rises to generate more land for farming (see Figure 6). Because the local government made no plan of relocation of villagers to obtain more farmland, it also encourages local villagers to carry out various ecological practices (other than rice) and engage in on-farm activities (e.g., agritourism). Many local villagers build family farms to plant peaches, kiwi, strawberries, grapes and to raise chickens, ducks, and geese. Even households that do not engage in farming maintain a small garden for growing their own food. Compared to the community garden in Jinci village, farmers in Dai village have more privacy and convenience in their home garden. Therefore, Dai village exhibits another form of spatial restructuring that is directly driven by the interest in EA. It does not follow the conventional rationale of land consolidation that sees “industrialization and urbanization [as] the basic driving factors of urban-rural land use transformation” (Liu et al. 2016). A comparison of spatial restructuring between Jinci Village and Dai Village is summarized in Table 5.2.



Figure 6 Farmland and Residential Land in Dai Village

Table 5.2 A Comparison of Spatial Changes Between Dai Village and Jinci Village

	Jinci Village	Dai Village

Driving Forces of Land Reform	“10,000 ha” project	Land pooling for organic farmers’ cooperative
Transfer of Land Use Rights	Transferred to businesses (e.g., Barolo eco-valley)	Pooling for the co-op
Dwelling	Jinci residential community (high-rise)	Traditional spread out dwellings
Self-consumed Food	Produced in Community garden	Produced in private home garden

5.4.2 Economic Restructuring

Discussion on economic restructuring has been centred on agriculture modernization and the declining importance of agriculture in the rural economy (Long and Liu 2016). Processes of modernizing agriculture also took place in Jinci village accompanied by the spatial restructuring. The “10,000 ha” program has allowed the Barolo Eco-Valley to take over most of the farmland in Jinci. Barolo rents land from the village government, the latter then pays rents to local villagers at an annually fixed price ($3,375 \text{ kg} * \text{the market price of rice last year} * \text{land size}$, e.g., the household with 2 mu of land get $3,375 * 0.8 * 2 = 5,400$ CNY). In 2017 in fact, the land transfer provided villagers with an average annual rent revenue of 5,300 CNY (750 USD) per household.

Economic improvements stimulate local villagers to join the land program. Governments have been granting each household in Jinci 430 CNY (60 USD) per year at least since 2012 for joining the land consolidation program, in the name of allowances for farmland protection and allowance for agriculture. In addition to the land rent, 571 villagers who are employed by Barolo also earn wages—the annual per capita wage is over 30,000 CNY (4243 USD). The hired managers even receive annual income over 100,000 CNY (14145 USD). The economic incomes of Jinci villagers have indeed improved remarkably compared to the incomes before land transfer: in 2007, the land rent was 6000 CNY (849 USD) per ha, and the monthly income was 500 CNY. Another explicit economic improvement is the gain in value of real estate property. Before Barolo came to Jinci, both the

farmland and the residential land of villagers were worthless in terms of market price. The construction of Jinci residential community has thus attached a market price to the apartments. Since Jinci is only 2 hours' drive to downtown Nanjing, and close to the Liuhe district in Nanjing, there is a fairly active rental market.

As a fairly great number of villagers became hired laborers in Barolo eco-valley, the production department of Barolo became a dominant actor in agricultural production. The company hired several graduates from Nanjing Agricultural University to manage the production department, making and implementing farming plans. A group of local male villagers who have farming experience were hired as sub-managers to lead multiple production teams in different greenhouses for vegetables and fruits; female villagers were often hired as farm workers. The company also hired young villagers who have urban job experience in other customer-related departments (e.g., dining, accommodation, reception, farm tours). This agri-business of ecological agritourism facilitates the economic restructuring in Jinci village by increasing local villagers' income, but changing their main economic activities from farming to various service-sector jobs. Therefore, when it comes to the question of whether the EA project contributes to economic sustainability for farmers in Jinci village, the answer is not clear. As concluded by Yep and Forrest (2016), "They [villagers] may be able to derive a greater share of the proceeds of land conversion, but in doing so weaken their longer term futures as they become severed from their traditional economic activities and social networks" (p.483).

The economic restructuring in Dai village is primarily characterized by the emerging farmers' cooperative and the associated collective economy. The co-op started by purchasing the harvested rice from their members to ensure a minimum payment to them. The fixed price was 18000 CNY (2543 USD) per ha before 2010. However, it resulted in the decline of yields since members had little stimulus to increase yields. The co-op changed the price to 4.2 CNY (0.6 USD) per kg, which caused another problem of worsening rice quality as some members violated the organic farming principles and adopted fertilizers to increase yields. In 2015, the co-op decided to change back to "distribution according to land shares" (31000 CNY (4380 USD) per ha) to guarantee the quality and strengthened team management on fields to encourage yields. The co-op is also in charge of managing rice processing and selling rice to consumers. They share 80% of the profit with villagers and save the remaining 20% for a public fund for potential risks. The final surplus of the public fund, after reaching a certain amount, will be distributed to members according to the land shares. By providing the three rounds of profit distribution to members, the co-op builds up a collective economy based on

land. It encourages rural households to pool land together for achieving a higher volume, improving product quality, and enhancing economic revenues (Tregear and Cooper 2016). Nevertheless, different from the Barolo project through which farmers are drawn away from farming the land, Dai co-op manages to link farmers to the land.

Dai village has witnessed a plurality of agricultural activities. There are family farms of diverse organic vegetables and fruits established by villagers, which are not commonly seen in rural China. In fact, in order to build farmers’ confidence in household organic production, the village government encouraged young village officials to play an exemplary role for farmers by practicing organic farming themselves. Since 2014, these officials were exempted from land rents for three years if developing organic farms. After several years of practice, these young officials helped to launch mutual learning with local farmers. They also organized multiple team study courses and investigation tours to study organic farming. Officials and local farmers have thus co-shaped an enabling environment of organic farming, in which the latter can establish their farms. Compared to Barolo where graduates, local male farmers, and local female farmers are employed in a hierarchical wage-based structure, Dai village facilitates a more horizontal structure in which young officials and local farmers collaborate with each other within and beyond the co-op. The comparison of economic restructuring between Dai Village and Jinci Village is summarized in Table 5.3.

Table 5.3 A Comparison of Economic Changes between Dai Village and Jinci Village

	Jinci Village	Dai Village
Farmers’ Revenues	Land rent & Wages from Barolo	Dividends from the co-op & Profits from family farms
Economic Activities	Production managers and workers & jobs related to agritourism	Collective organic rice production & Managing Private Farms

5.4.3 Social Restructuring

Along with the dimensions of spatial and economic restructuring, our study identifies the corresponding social restructuring in both villages, as demonstrated by changes in farmers' everyday routines. In Jinci village, the relocation of farmers to a residential community (high-rise) means that most of them transferred away their land use rights. As farmers become semi-proletarian in terms of land use rights (Zhang and Donaldson 2010), more than half of them took positions with Barolo, either as farm labourers or taking care of agritourism projects. Farmers adopted a stable working routine because of the close distance between the dwellings, the community garden, and Barolo Eco-Valley: they worked at Barolo between 8 am and noon, and between 1 and 5 pm, and took a one-hour break at mid-day to have lunch at home, take a nap, or manage their community garden. Their monthly income strengthens farmers' sense of stability, while reinforcing their reliance on Barolo. Compared to their previous income fluctuations as farmers selling agricultural products on their own, the secured wage payments enable farmers a more relaxed and secure lifestyle, without worrying about yields and finding a market for their products.

By joining Barolo, Jinci villagers are distancing themselves from the status of farmers, as they take on multiple non-farming positions. Barolo has 13 agri-tourist sites (e.g., fishing, grape picking, digging lotus roots), four accommodation sites (e.g., campsites, inns), three restaurants, a reception office and a shopping site. Jinci villagers take these service positions rather than pure farming jobs. In fact, villagers often resort to *guanxi* to obtain these positions, once they have relatives in human resource positions in the company. The daily language used by the villagers to refer to their jobs is "work in the restaurant/hotel", "manage the fields".

Villagers prefer to take non-farming positions rather than farming jobs as they often use their social relations with hired employees to obtain the former positions. Accompanied by the shifting of job conditions, the land has been imbued with new associations of generating land rents and securing their positions in Barolo, rather than producing food. Only in the community garden villagers retain their farming habits of producing food for self-consumption (Si et al. 2019). From the perspective of local villagers, the land transferred to Barolo has lost some of its quality as a foundation to ensure agriculture. Although Barolo maintains agricultural activities on the land and adopts precision farming to protect the environment, such activities do not help villagers to value land as natural

capital, to provide environmental services and to produce goods (Pretty 2008). Because villagers simply follow the instructions provided by production team managers to conduct farming (e.g., harvest strawberries tomorrow morning between 9 to 11). They are deprived of the rights to make farming decisions as land use right owners.

In Dai village, in contrast, agriculture is still the main economic activity for villagers. The dividends from the co-op and revenues from farmers' private family farms constitute their main sources of income. Furthermore, the co-op does not require a fixed working time; it enables farmers to manage their own schedules. In this way, farmers have greater autonomy to apply their knowledge and experiences. Although the village council and the agronomist are in charge of making dominant farming plans, the committee formed by a few villagers hold meetings from time to time to discuss the plans with the village council. The engagement in managing their farms indeed offers a decent life to farmers. Not only do the earnings enable farmers to afford to buy housing and other assets, farmers also develop stronger self-confidence (identity) and satisfaction of being farmers. This is because many farmers build relations with multiple agronomists and urban consumers through conducting ecological agriculture. The improvements of social engagement and individual capacity prevent farmers from being relegated to being solely food producers.

This study witnessed the shifting of local villagers' perception of farming and of being farmers in Dai village. Firstly, they become prouder of being peasant farmers. Through running their farms, many villagers built the capacity to maintain customer relationships via multiple approaches, achieving higher economic autonomy, and affording self-provisioning independently. Secondly, villagers developed respect for and cherished the natural environment. Villagers we interviewed expressed their appreciation for environmental improvements. For example, one said that "*the organic farming methods ensure a better environment for farming*"; another said that "*ecological farming not only protects the soils and plants, but also is more attractive to customers*"; yet another said that "*I saw more birds, frogs, and snakes on the field, which had disappeared for years*". The shift of appreciating farming and being farmers in Dai village corresponds to what Van der Ploeg (2010) defined as an identity as new peasants in the twenty-first century. They develop plural activities to add value on farms, recognize the ecological value of land and nature, and strengthen their farming skills and capacity to manage independent operations. Although previous studies argue that the political discourses in China portray peasants as backward (Schneider 2014), our study finds that

farmers can develop more substantial confidence and satisfaction of being peasants. Table 5.4 provides a comparison between Dai Village and Jinci Village.

Table 5.4 A Comparison of Social Changes between Dai Village and Jinci Village

	Jinci Village	Dai Village
Farmers' identities	Hired employees and recipients of land rent	Shareholders in the co-op and farm operators
Farmers' perceptions of land	Resources for secure jobs and incomes	Natural resources to produce food, maintain a good environment, and incomes.

5.5 Conclusions and Discussions

This study describes and compares the developments of EA and associated rural restructuring in two villages in Nanjing. Existing literature on rural restructuring in China highlights three dominant areas of restructuring in spatial, economic, and social dimensions. Based on these dimensions, our study addresses the first research aim of knowing what changes happened in the countryside throughout implementing EA. It finds similar rural changes in general, e.g., land consolidation, income improvement, changing village culture. However, a deeper scrutiny reveals that both farmers' autonomy and confidence in farming, and their recognitions of EA are different in the two villages.

Exploring the second research aim of identifying the construction of social patterns and economic rules helps to answer how farmers generate different views on EA. The different organizational forms of EA in the two villages entail contrasting economic rules and social patterns. On the one hand, the agribusiness mode in Jinci village facilitates extensive land transfer, relocation of villagers, and “de-peasantization” by engaging farmers in service industries. Some policy experts would consider the “de-peasantization” as the inevitable outcome attributed to agricultural modernization and the structural adjustment to replace peasant farmers with new professional farmers (Tu and Long 2017).

But at worst, the simple assumption of businesses taking over agriculture and the loss of autonomy of farmers could jeopardize the longer term sustainability of rural society (Yep and Forrest 2016). In Jinci, the business model reinforces the market economy that commercializes not only food, but also labour and land. There is thus hardly the construction of social patterns that value farmers. The case of business-lead EA exhibits the overwhelming trend of rural modernization in terms of dominating EA development.

On the other hand, the co-op form in Dai village encourages the pooling of land resources, the adoption of a collective economy, and “re-peasantization” by promoting economic and social values of farming. The constructed recognition of EA would facilitate farmers to explore pluriactivity on farms and alternative approaches to rural restructuring: there has been the rejuvenation of rural community and the widespread adoption of EA in Dai village. In China, another county of Wanzai, Jiangxi has witnessed similar revitalization of organic farming and improving economic levels of farmers (Qiao et al. 2018). Although Dai village (and perhaps Wanzai county) is a special case assisted by many agronomists and multiple levels of governments, it still provides experiences and the possibility of reimagining rural restructuring.

As this study scrutinizes two opposite ways of rural restructuring with developing EA in China, it further argues that significant work should be added to the rural restructuring concept to examine dynamics of building and changing social-ecological values. To make this argument clearer, for example, farmers in the two villages develop different recognitions of land as income security and as natural resources for producing food. The varied understandings of human-nature relations developed by farmers alongside the transition to EA, however, are not captured by existing literature on rural restructuring. The three dimensions of rural restructuring—spatial, economic, and social—concern, respectively, changes in rural production, living, and ecological spaces; the entry of industrial and agri-business models; and the decline of traditional village culture and community structure (Long and Liu 2016; Zhang et al. 2016). Such a conceptualization of rural restructuring underscores the *de facto* experiences and challenges facing rural China and perhaps the rest of the world. But it lacks consideration of farmers and the social construction of their mindsets within that tendency (e.g., the recognition of land as ecological capital).

Through the empirical comparative case study, our analysis touches on the incorporation of individual-level experiences into the rural restructuring framework, but only briefly and superficially. It proposes to add to rural restructuring a direction of socio-ecological restructuring, which concerns

both environmental restoration and people's changing understandings of and relations with natural ecosystems. The socio-ecological restructuring corresponds to Hoggart and Paniagua's (2001) argument for identifying the end points of changes: the restoration of environment as well as revitalization of farming. As reflected in Dai village, farmers gradually recognize the economic, environmental, and social values of ecological agriculture, and engage in building a more sustainable countryside.

This study corresponds to the strong call for highlighting the socioeconomic aspects of ecological agriculture. By specifying the ecological restructuring and broadening the connotations of ecological agriculture in China, this study is not to deny the environmental achievements of agribusinesses that adopt ecological farming methods. Instead, we are asking for deeper thoughts and more innovative approaches to realize a new rural restructuring based on the understanding and integration of ecological values. Meanwhile, recognizing socioeconomic values of EA is of extreme importance for encouraging cooperatives like Dai's to spread out to more villages. In fact, Dai cooperative is somehow an exception in China, which can barely succeed without the efforts of the agronomists, villagers and the local government. In 2018, the Jiangsu provincial government issued a public paper called "advice on learning and promoting the experiences from Dai village in building ecological agriculture". It took more than ten years for the village to be praised like that. However, except for one paragraph the paper summarized Dai's experience of building new profit distribution mechanism, the rest of the paper introduces the methods and techniques adopted by Dai to realize EA. There is a danger of obscuring Dai's fascinating experiences of mobilizing farmers and building collective capacity by only emphasizing the environmental and economic benefits. Future research could usefully examine the linkages between EA and rural development from the socio-ecological perspective.

Chapter 6

Conclusion

China's transition to sustainable farming to date has been largely influenced by three broad trends: ecological civilization, agricultural modernization, and transitions in the agro-food sector. First, the Chinese government has established the conceptual framework of ecological civilization, which preserves the mainstream economic logic while highlighting science and technology in addressing environmental problems within agriculture (Hansen et al. 2018; Wen et al. 2012). Second, similar to the rest of the world, the modernization and capitalization of agriculture has significantly injured traditional agriculture and transformed rural demographics (Sutherland et al. 2012; Zhang and Donaldson 2008; Yan and Chen 2013; Long and Liu 2016). The associated land consolidation, shifting of agricultural patterns, and building of food chains have all exacerbated the path-dependency on the agro-industrial paradigm. Third, changes have emerged in the agro-food sector due to the pursuit of quality food, social inclusiveness and justice, as well as environmental farming styles (Hinrichs 2014; van der Ploeg, Ye, and Schneider 2012; Si, Schumilas, and Scott 2014; Scott et al. 2014b). Transitions in the agro-food sector have opened the gate for innovative and sustainable food practices, which challenge the mainstream agro-industrial paradigm. Therefore, as these three trends direct three different directions in agricultural development, it is unclear how the interactions of these three trends influence the sector's transition towards sustainable agriculture.

Geels' framework of multi-level perspective (MLP) inspires this research to examine the intersections of these three trends from a structural level. In MLP framing, niches are innovative practices that deviate from the existing regime, creating stronger networks that unlock the transition towards a new regime. Regimes refer to stable rules, routines, regulations, and social patterns that formulate the deep structure, shaping the behaviors and mindsets of social groups. Landscape is the even deeper-structured, stable context that influences both regimes and niches (Geels 2011; Smith, Voß, and Grin 2010). In the introduction chapter, I aligned these three trends in China's agriculture and rural sector to the three levels in the MLP framing: 1) by incorporating environmental awareness into the major political ideology for future development, the ecological civilization framework captures a landscape-level modification, 2) by dominating the policies, agri-businesses models, behavior of investors and other social actors, agricultural modernization constitutes a regime-level configuration, 3) by calling

for new actors to initiate organic farming, CSA farms, AFNs and so on, the emerging transition in the agri-food sector to quality food production is a niche-level innovation.

Early studies of MLP further present a clear yet idealized format of sustainability transition: landscape-level developments impose pressures on regime-level structures, thereby creating opportunities for niche-level initiatives, some niche innovations can grab the opportunity to confront, transform, and eventually take over the regimes (Geels 2013, Ingram 2015). However, an over-emphasis on changes that begin with niches overlooks greater complexities within the transition. For example, the endogenous renewal within the regime, mutual adaptations between niche and regime, changes directly formulated under the landscape, etc. (Geels and Schot 2007; Schot and Geels 2008; Ingram 2015). At worst, the sustainability transition pathway shortcut may risk simplifying the practical difficulties and inevitable contests related to transitional processes (Smith and Raven 2012; Shove 2010). Therefore, this study embraces the merit of the MLP framework in providing a clear structure to position the three trends of ecological civilization, agricultural modernization, and transition to quality food production on the one hand, and builds on the critique of the MLP framework in overlooking agencies and the inevitable tensions and complexities on the other hand. This study focuses on the transitional processes undertaken and participated in by various actors, and how their practices been influenced by the trends.

6.1 Summaries and Discussions of Research Findings in Nanjing

This dissertation focuses on the development of ecological agriculture. The notion of ecological agriculture encompasses a broad range of ecological farming practices, from governmental agricultural projects to innovative food initiatives carried out by civil society, as well as from certified organic farms to PGS (participatory guarantee system)-certified farms (Scott et al. 2014). Additionally, since the 18th National Congress of the Communist Party of China in 2012 announced that ecological agriculture is a significant component of ecological civilization, the term EA has been widely adopted in policy papers and academic publications. In fact, compared to the written term “sustainable agriculture”, the phrase “ecologically-civilized modern agriculture” is more frequently used, as ecological agriculture has wider acceptance in Chinese society. Generally, ecological agriculture provides an appropriate study domain that includes organic agriculture, natural farming, biodynamic farming, and other chemical-free farming styles. This research benefits from avoiding focus on just one particular type of ecological agriculture that may represent special niche-led or

regime-led agricultural initiatives. Exploring ecological agriculture suits the research aim of characterizing the transition towards sustainable agriculture in the broader scope of rural and agricultural transformation.

My fieldwork was carried out in Nanjing, China to explore the construction and current configuration of the ecological agriculture sector. Drawing on literature discussions related to agricultural and food system changes as well as sustainability transitions, the research results were interpreted, formulated, and divided into three papers to illustrate the broad trends of ecological agriculture development from different perspectives. The first paper created a typology of ecological farms that serve as seeds for transition, and of farmers who undertake different types of ecological farms. It depicts various transitional pathways to ecological agriculture carried out by farmers on a farm level. To better understand the institutional and socio-cultural reasons behind the complex forms of ecological agriculture, the second paper reveals the vertical and horizontal mechanisms of network building between farm operators and other related stakeholders. This paper analyzed the broad trends on a network and relational level. The first two papers suggest a significant urban-rural inequity in characterizing ecological agriculture, and emphasize the lack of input from small-scale farmers who join, rather than initiate, ecological agriculture. Thus, to better understand the ecological agriculture sector, there was a need to focus on farmers incorporated in ecological agriculture programs. The third paper compares transitions to ecological agriculture in two villages. It reveals different rural transformation pathways through the way ecological agriculture is organized on a community level. The research framework, primary findings, and contributions of each manuscript are listed in Table 6.1.

Table 6.1 Research Findings and Summary

	Research Goals	Primary Findings	Primary Contributions
Paper 1	To understand farm-level reflections about the broad trends	1. Ecological farms are categorized into four types: certified organic companies, EA farms by new farmers, farmers'	1. It contributes to literature on sustainability transitions in the agri-food sector by adding the producer perspective: the contrasting view between new farmers and established farmers;

	of co-shaping ecological agriculture	<p>cooperatives, and EA farms by established farmers;</p> <p>2. Different social groups of ecological farm owners, i.e., urban new farmers (farmers entrepreneurs, farmers technicians, female farmers, recreational farmers) and rural established farmers who joined farmers' cooperatives or not;</p> <p>3. Market demand and profitability are still crucial stimuli for rural established farmers to shift towards ecological farming;</p> <p>4. The EA sector is shaped by diverse ecological practices, marketing channels, and relations because of the different groups of farmers.</p>	<p>2. Existing assessment of EA has been overwhelmingly concentrating on creating qualitative index systems. It contributes to this literature by understanding farmers' personal history and knowledge sources;</p> <p>3. It interrogates the concept of EA as both farm operations in natural eco-systems and agri-food systems. It thus broadens ecological agriculture beyond only farming practices.</p>
Paper 2	To understand the institutional and social relations for establishing EA farms	<p>1. The institutional and governmental context for developing EA is influenced by the state scheme of environmental protection;</p> <p>2. The vertical relations between farmers and institutional actors are characterized mainly by the acquisition of financial aid and technical assistance;</p>	<p>1. It provides an illustration of landscape-driven changes in a regime by introducing the focus shift of local governments and public institutes towards supporting EA;</p> <p>2. It reveals challenges for small-scale farmers and new farmers in developing EA in current political and socio-cultural settings;</p>

		<p>3. The socio-cultural context for developing EA comprises mutual support between relatives and friends, as well as the disconnect between new farmers and established farmers;</p> <p>4. The horizontal relations among various farmers are based on kinship, neighborly relations, and like-minded relations.</p>	<p>3. It contributes to the theorizations of embeddedness in agri-food studies by articulating the vertical and horizontal contexts in which the EA sector is embedded.</p>
Paper 3	To understand community-level development of ecological agriculture and farmers' engagement	<p>1. The transitions to ecological agriculture in Dai Village and Jinci Village are accompanied by different rural changes involving spatial, economic, and social dimensions;</p> <p>2. Rural restructuring that features urbanization, rural out-migration, de-peasantisation reinforces the agro-industrial model in ecological agriculture implementation;</p> <p>3. Villagers' multiple identities as local dwellers, land rights owners, and farmers co-shape their involvements in the transition towards ecological agriculture;</p>	<p>1. It proves that rural restructuring is an important factor for conceptualizing the agri-food regime and understanding niche development;</p> <p>2. It clarifies the overlapping relations for farmers to engage in both the ecological agriculture program and the associated the land transfer schedules;</p> <p>3. It suggests that although both villages have seen land consolidation and income improvement, the farmers' autonomy and relations to land are different.</p> <p>4. It thus proposes the concept of ecological restructuring to distinguish ecological agricultural</p>

		4. Farmers' self-confidence is built through various benefits from conducting ecological agriculture: economic profitability, environmental improvements, recognition from consumers.	projects that discriminate against small-scale farmers versus those that rejuvenate farmers' autonomy and confidence in farming.
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The first paper identifies four types of EA farms and two major groups of farmers. It contributes to literature on sustainability transitions in the agri-food sector (Shove and Walker 2007, Smith et al. 2010, Hinrichs 2014) by adding the producer perspective: the contrasting view between new farmers and established farmers. It contributes to the literature regarding EA assessment (Xue et al. 2016) by understanding farmers' personal history and knowledge sources. The concept of EA is also interrogated as both farm operations in natural eco-systems and agri-food systems. It thus broadens EA beyond only farming practices (Magdoff 2007). The second paper explores relation building mechanisms and different supports provided to EA farms. It provides an illustration of landscape-driven changes in a regime by introducing the focus shift of local governments and public institutes towards supporting EA (Ingram 2015). It also reveals challenges for small-scale farmers and new farmers in developing EA in current political and socio-cultural settings. The third paper investigates two different approaches to rural restructuring through developing EA. It clarifies the overlapping relations for farmers to engage in both the ecological agriculture program and the associated the land transfer schedules (Smith and Raven 2012). It also proposes the concept of socio-ecological restructuring to distinguish ecological agricultural projects that discriminate against small-scale farmers versus those that rejuvenate farmers' autonomy and confidence in farming (Long and Liu 2016).

These three papers discuss different perspectives and explore the pathways of developing ecological agriculture on a farm level, a network and relational level, and a village level in Nanjing, China. They collectively contribute to the comprehensive understanding of ecological agriculture in terms of its practical implementations in various farms and villages, and the conceptual implications for different stakeholders, including policymakers, local governmental agents, public institute employees, business

actors, farmers, and consumers. Existing studies have proposed different divisions of agriculture to focus on a more sustainable direction for agricultural development, such as weak-to-strong ecological modernizations (Horlings and Marsden 2011), weak-to-strong multifunctional agriculture (Wilson 2008), and substitution-based agriculture and biodiversity-based agriculture (Duru et al. 2015). However, this study has found that it is difficult to employ the strong or weak dual view to interpret ecological agriculture in China, because the design of an index system (e.g., care for the environment and social justice) to distinguish the strong from the weak does not capture complexities within ecological agriculture. The conceptual frameworks represent the theoretical idealization of moving towards sustainable ends. However, ecological agriculture practices are by-products of interactive changes in landscape, regime, and niche level. Ecological agriculture should not be considered as static, because niche practices aim to transform the regime, or carry out regime reformations to incorporate niches. Instead, ecological agriculture represents the dynamic outcomes of how different stakeholders are driven by opportunities and confined by barriers.

This study concludes with three major driving forces from policy, market, and individual farmers that push forward ecological agriculture. The first is policy orientation for ecological production (e.g., certification programs, research projects). The central government's overarching emphasis on environmental protection constitutes the first phase of policy reforms and institutional transitions. Through the creation of political space, more governmental actors (e.g., municipal governments) were empowered to enforce environmental regulations and schemes according to the central government's environmental strategy. The second phase entails a broader range of public actors beyond governments (e.g., certification bodies, the Jiangsu Academy of Agricultural Science). Furthermore, the work of these public actors has set boundaries for the ecological agricultural sector by both providing and restricting access to resources. In the case of Nanjing's ecological agriculture promotion, public actors played an important role in building networks and connecting actors with different backgrounds (McKitterick et al. 2016). Both certified organic enterprises and farmers' cooperatives benefited from the policy reforms to promote ecological agriculture. Although the policies foster rapid growth of the ecological agriculture sector, they lack considerations of enhancing interactions and social ties among ecological farmers.

The second driving force is market demand for quality food, which emerged from significant food safety worries and a rising consumer purchasing power for quality food (Sanders 2006; Chen 2014; Yu et al. 2014). For certified organic companies, the price premium of quality products can be

achieved through selling certified products in high-end supermarkets. This demand directly encourages entrepreneur farmers to establish organic farm enterprises and farmers' cooperatives to shift towards ecological agriculture. For farmers' cooperatives, the price premium achieved through public procurement has been the top incentive to carry out EA. In contrast to the more institutionalized food selling channels, rising alternative marketing channels such as community food stores, agritourism, delivery service to consumers, and thriving mobile platforms all help small-scale farmers gain higher income from ecological agriculture. In order for rural established farmers to practice ecological agriculture, owning a company and having a steady base of urban consumers are vital factors in gaining critical revenues, and this helps mitigate the farmers' skepticism and concerns regarding ecological agriculture. In addition, the market demand for quality food also encourages urban new farmers to establish their own small-scale farms, to provide chemical-free and quality food to consumers and for themselves.

The third driving force is personal motivation— the belief that a desired lifestyle can be achieved by conducting ecological agriculture. Previous studies on AFNs in China have highlighted the desire to address food anxiety and produce safe and healthy food as two major reasons why new farmers establish CSA farms (Chen 2013; Scott et al. 2014a). This research adds to the existing explanations for why new farmers start their own farms by identifying their specific pursuits in terms of changing lifestyles. There are a number of different categories among new farmers. *Farmer technicians* are a group of adventurous people who have accumulated farming-related knowledge from previous experiences, and have subsequently decided to apply their learning into action by establishing ecological farms. *Female farmers* see ecological agriculture as a way to address serious food concerns their families encounter, while also keeping them active and earning an income. While *recreational farmers*, find that ecological agriculture is an approach that satisfies the nostalgia for rural lifestyles. In other words, new farmers have endowed ecological farming with many other-than-food meanings, including environmental benefits (e.g., better air quality, connecting with nature), autonomy (e.g., determining their own careers and paces, experimenting with farming plans), and social bonds (e.g., providing quality food to families and friends). Meanwhile, the same recognition of values of EA has been found with established farmers as well. Farmers in Dai cooperative, for example, develop the pursuit for ecological quality and social connections through joining EA. Similar changes associated with conducting sustainable farming are happened in multiple places in China in a variety of farming models such as farmers' cooperatives and family farming (Cook 2015). But unlike new farmers who

want to realize these pursuits even if they are losing money (many become economically deficient), rural established farmers are still primarily driven by economic incentives to conduct EA.

The research also identifies three primary barriers to continuing to develop ecological agricultural in China. First, while the dominant policy framework prioritizes environmental protection in agricultural production, it focuses on ‘business as usual’ styles when supporting farm companies. In fact, all farm businesses supported by policy networks share the following three features. First, they adopt a commercial business model. These companies directly lease farmlands from rural villagers and hire local villagers (or sometimes migrant farmers from other provinces) as wage laborers. They also distribute products through mass markets (Zhang and Donaldson 2010). Second, they manage relatively large-scale farmlands - over 66 hectares in size (1000 mu). In terms of leasing land, companies can more easily secure leases of larger-sized farmlands. In fact, some farmers who were interviewed shared their personal experiences of not receiving approval from village councils as they sought to rent only small areas of land. In addition, the state expects agribusinesses to demonstrate leadership (as dragon-head enterprises do) by offering more jobs to local villagers (Yan and Chen 2013). To respond to this, many farm companies are inclined to scale up farm sizes and hire more villagers. Third, these farms are well-equipped with high-tech systems such as temperature and humidity control systems in greenhouses, smart irrigation systems, cameras for farm surveillance, and the like. Policymakers favor this high-tech farming and offer subsidies for using such equipment.

The above three features of adopting commercial farming, scaling up, and capital-intensive inputs of farm businesses coincide with the state’s vision for ecological agriculture. However, locking into this paradigm fails to incorporate producers other than large-scale enterprises. When conducting ecological agriculture, small-scale farms encounter institutional barriers that large-scale farms do not. For example, difficulties associated with leasing a small piece of land. Another example is that it is very difficult for small-scale farmers to get subsidies for facilities like greenhouses. This is because only farms larger than 13.3 hectare qualify for the subsidy. Thus while certified EA farms, farmers’ cooperatives, and a few EA farms by urban residents are eligible, many small-scale farms are excluded. Another policy’s procedure of allocating the subsidy to a village collective discounts independent farmers and urban farmers who don’t belong to the village collective. Small-scale farmers concerned about how difficult it is for them to access institutional help have turned instead to political patronage. Moreover, large-scale farms risk losing viability by being locked into the “top-down” paradigm. The supportive policy contexts in which the state and its agencies play predominant

roles may result in an over-reliance on the government (Zhou 2015), which jeopardizes the long-term sustainability of large-scale farms. In fact, findings from ecological farms in Nanjing suggest that certified organic enterprises exhibited the lowest diversity in marketing channels. Farmers are also somewhat locked into the conventional market channels such as local supermarket under the certification system. Furthermore, the policy of supporting large-scale EA in Nanjing highlights the differences between farms, which could exacerbate the mutual exclusion between different farms, and thus harm the chances for them to collaborate. This contrasts with policy arrangements in many other countries where closer social ties were encouraged between farmers. For example, governmental agencies help to foster initial connections between farmers in Northern Ireland (McKitterick et al. 2016); and the policy design of production control and profit distribution facilitates the collective identity among farmers in eastern France (Bowen 2011).

The second barrier facing the ecological agriculture sector is a disconnect between established farmers and new farmers. There has been an atmosphere of excluding newcomers in the countryside, which generates problems for new farmers. This research notes an obvious disparity between ecological farms operated by rural established farmers and ecological farms operated by urban new farmers in terms of the collaborative atmosphere. Established farmers practice a long-standing culture of “in-group” collectivism (Fukuyama 2001). For example, local established farmers find it easy to attract local labor to assist in weeding and harvesting. In contrast, new farmers from urban backgrounds reported challenges in building and maintaining relations with local farmers and labor. The two types of farmers also embrace different understandings of EA: while new farmers who accumulated enough capital and other resources shifted careers to EA due to the food safety concerns, established farmers who relied on conventional agriculture for a life are skeptical about the productivity of EA. New farmers’ bonding with rural villagers is impeded by a deep urban-rural divide. In summary, the urban-rural divide is deeply rooted in the dualism of land ownership and household registration, which has evolved into crucial differentiations in terms of the allocation of critical resources (Long et al 2016). Eventually, new farmers and local farmers confront circumstances that contribute to a lack of mutual empathy, trust, and understanding. The relationship they share may not be one of competition, but one that promotes mutual exclusion. New farmers must resort to different approaches to solve issues, such as hiring a local farmer with a good reputation or asking for assistance from the village council to mediate between them and the local farmers. It is still worth noting that this rural-urban divide and the consequent disconnection between new and established farmers, contribute to a serious barrier against developing EA in the countryside by new

farmers even as new farmers constitute the major force behind Nanjing's EA sector. Among the 31 cases of ecological farms, 22 of them are owned by new farmers who have no rural bases and have shifted to farming from other job positions. Except for a few ecological farms that rely on themselves or volunteers for farm labor, they all require hiring temporary or long-term local farmers. This social exclusion is an important factor that impedes these farms' operations to varying degrees.

The last barrier that this research identified is a deep structural factor of declining importance of traditional peasant farming in rural China. Rural sociologists worldwide have noticed far-reaching changes in rural areas including the declining economic significance of agriculture (Woods 2009), extensive rural out-migration (Long and Liu 2016) and land abandonment (Zhang et al. 2016). This research finds that the spatial, economic, and social restructuring that has transpired in rural areas has significantly weakened the forms of peasant farming in the countryside. More specifically, in terms of spatial restructuring, local villagers shifted their dwelling styles from individual houses to multi-residential buildings; in terms of economic restructuring, there is a reliance on land rents and wages as major revenues; and in terms of social restructuring, they also changed their views on land as real-estate resources for gaining residential properties or generating cash flows. Under such rural restructuring trends, the agro-industrial paradigm that has advanced the land transfer schemes and invited agri-businesses to take over agriculture is the most prevalent model in the countryside. For example, the Barolo Eco-Valley in Jinci village exists because the village invited a catering business to operate an agritourist farm there. Barolo occupied more than ten thousand *mu* (667 ha) of arable land, and provided 591 job positions to local villagers. The business model has reinforced farmers' recognition of economic values of land and familiarized them to the wage-worker lifestyle. Therefore, the promotion of ecological agriculture has been constrained by applying the agribusiness model to rural areas. This thesis argues that rural restructuring processes have reinforced the agro-industrial regime and made it harder to push forward agro-ecological initiatives started beyond the regime.

For the EA sector entirely, the state scheme of ecological civilization plays a binary role. It recognizes the regime of agricultural modernization by continuously supporting large-scale and capital-intensive agriculture. Meanwhile, it also prioritizes the incorporation of ecological principles (e.g., reducing chemicals applications as much as possible, applying farming techniques that stimulate ecosystem vitality) into the major policy and institutional framework. Therefore, the ecological civilization scheme essentially corresponds to ecological modernization. I then agree with Geall and

Ely's (2018) argument that we should take a conservative attitude in reading the ecological civilization discourses before any social change and government reforms happen in the future.

6.2 Linking Nanjing's Case with the Multi-Level Perspective Framework

Agri-food systems studies from around the world have identified two major forces: one is the neoliberal force characterized by the overwhelming marketization and the agri-industrial models of food production and distribution; the other is the local-level alternative agro-ecological food initiatives that are more environmentally concerned, place-based, and socially inclusive (Goodman 2000; McMichael 2014; Hinrichs 2014; Horlings and Marsden 2011).

Stakeholders on both the industrial side and the ecological side can claim a sustainable food system transition. For example, by claiming the problem of hunger resulted from insufficient yield and lack of pest resistance, industrial stakeholders propose the use of GMO for an enhanced food system. In contrast, by claiming other problems such as distribution of food, insufficient incorporation of local knowledge and farmers, consumption patterns and so on, ecological stakeholders propose other approaches to change (Lawhon and Murphy 2012). Nonetheless, the dominant policy frameworks worldwide are focusing on the industrial force to address problems related to sustainability (Kitchen and Marsden 2011), embellished with various terms like "sustainable intensification", "bio-economy", and lately the "ecological civilization" in China. These notions all allow for capitalist penetration in different arenas.

Why do we always see the prevalence of the industrial paradigm? Will we see a potential absorption of the ecological paradigm by the industrial one? What are the confrontational relations between the two? These questions require the deeper analysis of socio-technical configurations (e.g., the alignments of a variety of elements such as policies and rules, production conditions, and infrastructure for distribution) (Geels 2002). Furthermore, Geels (2002), Geels and Schot (2007), and Geels (2011) propose the multi-level perspective (MLP) framework, in which they consider regimes as the existing stable configurations of the current institutions, social rules and routines that often structure existing (and unsustainable) development. Niches are the incubators for the emerging (and more sustainable) alternatives that differ from regime-practices. This framework explains the predominance of the industrial regime by linking it to the incumbent institutions and social routines.

First, to explain the predominance of the industrial regime against the ecological agriculture niches, this study unpacks a mutual stabilization process between agricultural modernization and the

overwhelming rural spatial and economic restructuring. Since the dominant trend of rural restructuring has significantly changed the spatial, economic, and social orders in rural China (Long and Liu 2016), it attributes to the corresponding construction of the countryside that fits the deepening of the agro-industrial regime. In Jinci Village, farmers continuously distance themselves from farming as they aim for more stable monetary paybacks from working for employers and greater land rents and other allowance from joining the land transfer schemes. The changed spatial arrangement and economic activity has been familiarizing villagers as workers, or “professional farmers” if following the instruction is the norm. In rural parts, agri-businesses and land consolidation schemes are still privileged by the governments. Therefore, rural restructuring processes of altering rural spatial and socio-economic patterns have reinforced the agro-industrial regime and have made it harder for agroecological initiatives to grow.

Although the conceptualization of rural restructuring underscores the *de facto* experiences and challenges facing rural China and perhaps the rest of the world, it leaves room for greater rationalization of agroecological niches. More importantly, there is a danger of hiding the practical efforts of niches by overlooking them theoretically. Therefore, it is crucial for both empirical and theoretical studies to incorporate individual-level experiences into the rural restructuring framework. Future research can probe into broader and more in-depth knowledge about how rural restructuring been reinforced or re-conceptualized in other places.

Second, under the MLP framing of regime-niche relation, sustainability transition is defined as the shifting of regimes by niche interventions, which envisions a bias towards bottom-up approaches (Geels 2011). The lens of niche-regime linkage has been adopted by many food scholars to understand the food system transition. However, rather than outlining bottom-up approaches to replacing regimes or top-down approaches to suppressing niches, scholars uncover regime-niche coexistence. For example, Smith (2006) documents the evolution of the organic sector in UK, and finds that the organic niche exerts greater influence when it shows compatibility with the regime. Similarly, Ingram’s (2015) work suggests the adaptive nature of the regime to absorb new approaches. For example, the niche of promoting a low external-input approach to raising cows in the Netherlands has been formalized and legitimized by policy makers through setting rules and a certification system for that approach.

This study in Nanjing further reveals complex combinations of regime-niche relations. Mapping out the four types of EA farms (see figure 7) and their embeddedness in vertical and horizontal networks

in Nanjing, China, this study indicates both regime-absorb/formalize-niche and niche independent from the regime. There are certified organic companies and farmers' cooperatives supported by various technological and financial policies. Moreover, the closer examination of the establishment of these farms suggests the regime-create-niche, because many of the organic companies and farmers' cooperatives are encouraged by the beneficial policies (e.g., the public procurement scheme, the establishment of organic food development centre). EA farms run by new farmers and established farmers are examples of the latter. They haven't formed a larger network that articulates their visions and demands. As implied in chapter 4, there is a relatively low degree of collaboration between farmers, except for the occasional sharing of markets and techniques. In addition, these niches are weak in terms of forming their voices that challenge the regime. Many individual farmers are in villages with conventional farmers. The geographical distances between ecological farmers also impede them from frequent socially connecting communication. In generally, it appears that the regime-niche relations are not always opposed and confrontational.

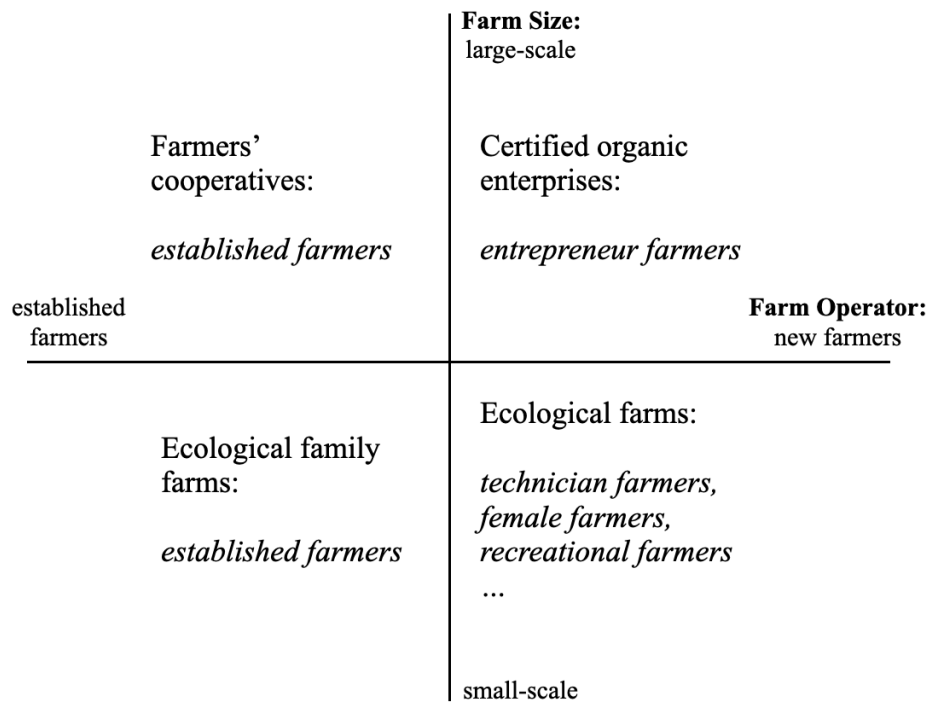


Figure 7 A Coordinate Axis of Different types of Farms and Farmers

Adopting the lens of regime-niche linkage further facilitates an open-minded interpretation of EA. It involves a variety of farm operations and farmer types (see Figure 7). The typology of ecological farming reflects the complexity of transitions to sustainable farming in the Chinese context, which should not be considered a uniform or uncontested pathway (Shove and Walker 2007), nor even dual pathways of either governmental schemes or grassroots innovations. Instead, transitional pathways to sustainable agriculture are embodied in farmers' perceptions of agri-food systems, access to knowledge and resources, and specific farming practices. In addition, this study highlights the dynamic nature of EA, evidenced in the ever-changing farming practices and management practices. The more in-depth analysis reveals how individual memories of farmers (e.g., being a successful businessman, learning farming knowledge, nostalgia, hesitation on the profitability of EA, inherited knowledge) result in different attributes of farmers (e.g., entrepreneurship, vocational spirit, monetary pursuits). These attributes are of central importance to understanding the changing trajectories of EA operations.

As this study, in general, adopts the individual perspectives to examine the EA sector, I ended up with a relatively rich understanding of farmers and their agency. This understanding significantly complements the MLP framework, which has long been critiqued as overemphasizing structural factors in affecting transitions and underplaying the agency (Smith et al.2010; Geels 2011). More specifically, the structural divide of regimes and niches in MLP may lead to the corresponding differentiation of food producers and other related stakeholders into regime actors and niche actors. It thus underestimates the complexity of agency embedded in these actors. Food producers worldwide show greater complexity and dynamic in articulating themselves. For example, Pinto-Correia et al. 's (2014) book suggest several cases in which niche exhibits low ambitions to transform the regimes, and some other cases in which regime facilitates niche innovations and developments. The complexity of agency should be identified by recognizing food producers as both practitioners of niche construction and carriers of regime reproduction (Smith and Raven 2012).

This empirical study reveals the complexity of farmers. It contributes to the discussion on new peasantries. While in the global scale there is a rising of the new peasantry that construct new rural lifestyles and introduce new interpretations to farming and farmers, the same phenomenon in China is mainly shaped by new farmers – a group of middle-class, well-educated people shifting careers to

farming (Xie 2020). This study in Nanjing also reveals the group of new farmers who have more specific expectations on farming (e.g., building more friendly networks, enrich personal lifestyles, realize environmental values), and thus endow farming with greater meaning than mere food production. This research has noted growing interest among urban dwellers (and young farmers) to move to the countryside. Furthermore, many of them exhibit the attribute of entrepreneurship. Their ways of operating companies correspond to regime practices. In addition to new farmers, this study also documents how established farmers constitute the new peasantry. Established farmers can shift towards ecological agriculture when benefits are recognized. The rising consumption force rejuvenates these ecological farms. However, apart from being farmers, they are also local dwellers, and "owners" of lands. The multiple identities have resulted in intricately involved farmers in agroecological niches and the industrial regime.

Generally, to understand farmers and their agency, there is a need to look beyond the agri-food system, but to embrace broadened conceptualization of regimes that cover broader social elements and issues that co-determine the structure of agri-food system and how it functions (Smith et al. 2010). Existing MLP studies have contributed to the broadened notions of regimes by highlighting food retailing chains, food consumption patterns, agricultural policies (Smith 2006). This study sheds light on the changing of social and economic structure in rural areas (e.g., job opportunities, farmers' lifestyles) as similarly essential elements that stabilize or destabilize the agri-food regime.

The analysis suggests that regime and niche are divided when focusing on whether certain farming practices or techniques are adopted or not (e.g., conducting on-farm nutrient recycle as niche and using conventional inputs as a regime). Nevertheless, regime and niche are connected when exploring the multiple identities of individuals (e.g., a farmer who operates an ecological farm and sells to conventional markets) or the systematic operations of initiatives (e.g., an organic farm for export). Moreover, adopting the former technological perspective, we lose the cutting edge of the MLP framework that considers regimes as stable configurations that stabilize people's behavior and routines. In this vein, we will also lose the opportunity to use the MLP framework to identify challenges and opportunities facing stakeholders to make changes. As Dai's case in Chapter 5 shows, there is a danger of obscuring the fascinating experiences of mobilizing farmers and building collective capacity if only emphasizing the environmental benefits. Instead, there is a chance of generating experiences of how the regime is modified from various aspects if a more holistic view is adopted.

Overall, this dissertation begins with presenting the three interwoven trends of agricultural modernization, transition to quality food production, and ecological civilization. It asks the question of how the intersection between the three trends is reflected on agricultural transition. It then resorts to the MLP framework to organize the three trends, and probes into the ecological agricultural sector in Nanjing. The results suggest an important correction to my initial framing of ecological civilization as a pure landscape-level trend. On the one hand, by rationalizing agricultural modernization and supporting ecological production at the same time, ecological civilization demonstrates a regime-level endeavor to incorporate environmental values. On the other hand, the environmental awareness is growing among the broad Chinese society and governments at various level (especially at the central level). For example, climate change is recognized as a global issue by the state, renders a series of zoning policies to cope with it. Whether and how EA is incorporated into these policies are interesting topics for future studies. There are other landscape-level factors as well, as identified in this study, include the severe urban-rural disparity (evidenced in urban-rural disconnect), the loss of vitality of the farming-based economy and a growing land rental-based economy. It does not mean that they are undefeatable plights for transitions to ecological agriculture. Instead, it touches on a few possibilities to unpack the profoundly rooted structural obstacles. For example, new farmers and established farmers are respectively and separately exploring the roads to ecological agriculture. The rural-urban disconnect blocks the appropriate communication and collaboration between established farmers and new farmers. Reconciling this disconnect assists the former in recognizing the latter's pursuits for ecological agriculture rather than resisting them. More long-term research is required to capture and probe the social-cultural division between the two social groups, and to identify solutions to the disconnect.

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Appendix

Instruments

生态农场调查问卷

Survey of Ecological Farms

您好，我叫齐丹舒，是加拿大滑铁卢大学的一名博士生。我们正在进行一项关于生态食品体系的调查。作为中国生态食品体系的参与者，您的观点对于我们的研究是非常有益且重要的。是否参与本项调查完全自愿，也并不存在任何已知的或预测的风险。您可以拒绝回答任何您不想回答的题目。另外，您所提供的所有信息都将妥善放置，并完全保密。我们承诺由任何此项调查所产生的论文，报告等一切刊发物，都不会提及您的个人信息。

*填写指南：除了是否题，填写题，以及有专门标注的题目，此问卷中的所有题目都为多项选择题。

一，基本信息

您的姓名：_____ 您的职位：_____

您农场的名字：_____ 您农场的网站或博客：_____

您农场的地址：_____

1. 您的农场有多少亩地？ _____ (亩)

2. 您是在哪年创立/加入农场的呢？ _____ 这些年农场的面积变化了吗？

增加了， _____ (亩)

保持不变

减少了， _____ (亩)

不清楚

3. 农场的土地是如何获取的？

自有土地

租用土地

部分自有，部分租用

其他: _____

4. 包括您自己在内，农场总共有多少员工? _____ 有多少在加入农场之前就是农民?

二，生产实践

5. 您的农产主要种植/养殖哪些产品?

蔬菜 水果 猪肉 牛肉 羊肉 奶制品 禽类
蛋类 谷物 豆类 菌菇 水产品 蜂蜜 其他:

6. 为了提升农场生态系统（例如保持土壤肥力，虫害防护等），您的农场还种养了哪些其他的物种呢?

7. 您的农场有采用下列生产方式吗?

	有	没有
覆盖作物/犁下作物	<input type="checkbox"/>	<input type="checkbox"/>
混种/轮种/间种	<input type="checkbox"/>	<input type="checkbox"/>
发酵	<input type="checkbox"/>	<input type="checkbox"/>
生物防治病虫害	<input type="checkbox"/>	<input type="checkbox"/>
雨水收集	<input type="checkbox"/>	<input type="checkbox"/>
自留种子/未处理种子	<input type="checkbox"/>	<input type="checkbox"/>
给牲口喂养农场的自种产品	<input type="checkbox"/>	<input type="checkbox"/>
有机肥料	<input type="checkbox"/>	<input type="checkbox"/>
堆肥	<input type="checkbox"/>	<input type="checkbox"/>
(如果有，堆肥是 <input type="checkbox"/> 购买的 还是 <input type="checkbox"/> 农场自产的?)		
粪肥	<input type="checkbox"/>	<input type="checkbox"/>
(如果有，粪肥是 <input type="checkbox"/> 购买的 还是 <input type="checkbox"/> 农场自产的?)		

您是从哪获取这些种养技术和知识的呢?

8. 您会如何描述或标注您的耕作方式和农产品呢?

有机农业 绿色农业 生态农业 自然农法 永续农业
 生物动力农业 其他: _____

9. 您是否为产品进行了地理标识认证? 是/ 否

您是否为产品进行了产品质量认证? 是/ 否

如果是, 您选择了 有机认证 绿色食品认证 无公害食品认证 其他认证:

如果否, 您并不打算认证 曾经认证过之后退出了 将来会认证 正处于过渡期

三, 农产管理和市场营销

10. 在您的农场生意成立的初期, 您从哪获得最初的资金来源?

个人存款 银行借款 政府津贴 公司投资 亲朋好友筹款
 其他: _____

成立之后, 农场的经营还从哪获得了资金来源?

农场盈利 个人存款 银行借款 政府津贴 公司投资
亲朋好友筹款 其他: _____

11. 经营这个农场您是否收支平衡? 是/ 否

除了在农场的工作, 您还有其他收入来源吗? 是/ 否

12. 农场产品的定价有哪些参与方?

农产主 农场员工/农民 消费者 收购者
批发商/企业 (例如餐厅, 龙头企业) 其他: _____

农场产品的定价最终由谁决定?

农产主 农场员工/农民 消费者 收购者
批发商/企业 (例如餐厅, 龙头企业) 其他: _____

13. 请标明您最常用的 3 个农产品销售渠道。

- 农场销售 社区支持农业（会员制） 农夫市集 菜市场 消费者俱乐部
 休闲农业 饭店/餐饮业 零售店 收购者 加工行业
 网上销售 事业单位（例如学校，医院等） 其他:
-

14. 如果您直接销售给消费者，下面哪个群体比较符合您的主要消费者群体？

年龄: 20 至 29 30 至 39 40 至 49 超过 49 不知道

大致的平均月收入: 少于 2000 2000-3000 3000-4000 4000-5000 大于 5000 不知道

15. 农场的产品最终会往哪销售？

本市 本省其他城市 其他省份 出口 不知道

16. 请标明您经营农场遇到的最大的 3 个挑战？

生态环境 劳动力 缺少消费者 营销渠道
 财务压力 技术挑战（例如医治动物）或没有渠道学习种养技术
 制度或管理条例的障碍 获取土地 其他: _____

四，社会关系

17. 您的农场和其他的农场，社会机构，政府或事业单位，批发零售商，餐饮业，或其他类型公司有接触和联系吗？

如果和这些组织单位的联系互动是生产活动方面的，例如获取生产知识，技术，资源（土地，种子，肥料），接受培训，获取认证等，请您在 1) 生产活动这一列的 中打 。

如果和这些组织单位的联系互动在生产活动之外，例如市场营销和推广，分享市场信息，交流生态有机理念等活动上，请您在 2) 市场，信息，理念交流这一列的 中打 。

最后一列中，请您列出您最常打交道的三个公司/单位的名称。

	1) 生产活动	2) 市场, 信息, 理念交流	三个最常打交道的公司 /单位的名称
1. 和其他农场有互动吗?	<input type="checkbox"/>	<input type="checkbox"/>	
2. 和社会组织 (例如 NGO, 农夫市集等) 有互动吗?	<input type="checkbox"/>	<input type="checkbox"/>	
3. 和政府单位 (例如农业部, 环境部等) 有互动吗?	<input type="checkbox"/>	<input type="checkbox"/>	
4. 和机构或事业单位 (例如认证机构, 研究单位等) 有互动吗?	<input type="checkbox"/>	<input type="checkbox"/>	
5. 和批发商, 零售商有互动吗?	<input type="checkbox"/>	<input type="checkbox"/>	
6. 和加工商 (包括餐饮业) 有互动吗?	<input type="checkbox"/>	<input type="checkbox"/>	
7. 和其他类型的公司有互动吗?	<input type="checkbox"/>	<input type="checkbox"/>	

Ecological Farms Survey

Hello, my name is Danshu Qi. I am a PhD student in University of Waterloo in Canada, conducting research on the ecological food sectors in Nanjing. As a participant in ecological food sectors, your opinions may be helpful and important to this study. Your involvement in this survey is entirely voluntary and there are no known or anticipated risks to participation in this study. And you may decline answering any questions you feel you do not wish to answer. All information you provide will be considered confidential and will be grouped with responses from other participants. Further, you will not be identified by name in any thesis, report or publication resulting from this study.

*Filling guide: all the questions are multiple choice except for fill-in-the-blank questions, yes/no questions, and questions with specific notes.

A. Basic Information

Your name: _____ Your position: _____

Your farm name: _____ Your farm address:

Website or blog of your farm: _____

1. What's the size of your farm? _____ (mu)

2. In which year did you establish/join in the farm? _____ Over the year(s), how much has the farm size changed?

- increased _____ (mu)
- stayed the same
- decreased _____ (mu)
- Not sure

3. How did the farm access farmland?

- owned
- rented
- combine

other: _____

4. Including yourself, how many farmers work on the farm? _____
How many were traditional small farmers originally? _____

B. Production Practices

5. What are the main products you grow/raise on the farm?

vegetables fruits pork milk beef goats chicken
egg grain beans mushroom aquatic products honey
 other: _____

6. What are other varieties/species on the farm, in order to enhance the ecosystem of your farm (e.g., maintain soil fertility, control pest)?

7. Do you employ the following practices on your farm?

	Yes	No
Cover/plow down crops	<input type="checkbox"/>	<input type="checkbox"/>
Mixed cropping/rotations/inter planting	<input type="checkbox"/>	<input type="checkbox"/>
Fermentation	<input type="checkbox"/>	<input type="checkbox"/>
Biological pest management	<input type="checkbox"/>	<input type="checkbox"/>
Rain collection	<input type="checkbox"/>	<input type="checkbox"/>
Untreated seed/seed saving	<input type="checkbox"/>	<input type="checkbox"/>
Feed grown on the farm	<input type="checkbox"/>	<input type="checkbox"/>
Organic fertilizer	<input type="checkbox"/>	<input type="checkbox"/>
Compost	<input type="checkbox"/>	<input type="checkbox"/>
(If yes, is the compost <input type="checkbox"/> purchased or <input type="checkbox"/> produced on farm?)		
Manure	<input type="checkbox"/>	<input type="checkbox"/>
(If yes, is the manure <input type="checkbox"/> purchased or <input type="checkbox"/> produced on farm?)		

Where did you learn about these practices?

8. How do you describe/label your farming practices/agro-products?

- organic agriculture green agriculture ecological agriculture
natural farming permaculture biodynamic agriculture other:

9. Did you get geographical identification for your products? yes/ no

Did you get food quality certification for your products? yes/ no

If yes, you get organic products green food hazard-free food other:

If no, I don't plan to I did but I quit I'll in do in future I'm in the transition period

C. Management and Marketing

10. When your farm business was first established, what was your original source of capital?

- personal savings bank loan government subsidy company investment
 acquaintances other: _____

Since getting established, have you had other sources of capital, aside from profit?

- personal savings bank loan government subsidy company investment
 acquaintances other: _____

11. Do you make ends meet in operating this farm? yes/ no

Do you have income sources other than working here? yes/ no

12. Who is involve in setting prices for products?

- farm owner staff/farmers consumers brokers
wholesalers/companies (e.g., restaurants, dragon-head companies) other:

Who make the final decision?

- farm owner staff/farmers consumers retailers/brokers
wholesalers/companies (e.g., restaurants, dragon-head companies) other:

13. Indicate the top 3 marketing channels you use to sell products.

- on-farm sales CSAs ecological farmers' market wet markets
buying clubs agro-tourism restaurants/catering retail shops
brokers processors online marketplaces institutions (e.g., hospital,
school, government, enterprises) other: _____

14. If you sell direct to consumers, which group constitutes your main customers?

- Age: 20 to 29 30 to 39 40 to 49 over 49 I don't know

What is the approximate average income (per month) of your customers: below 2000
 2000-3000 3000-4000 4000-5000 above 5000

15. Where are the agro-products from your farm finally sold?

- locally other cities in the province other provinces export I don't
know

16. What are the top 3 operational challenges for your farm?

- ecological conditions labour issues lack of consumers
marketing issues financial issues technical (growing or veterinary)
challenges & lack of information about how to address these
regulations/administrative barriers land access other: _____

D. Relations and Social Networks

17. The following part requires you to place a \checkmark in the :

With which of the following sectors does your organization/business regularly interact for
production-related activities or auxiliary activities related to ecological food?

- By *production-related activities* we mean forms such as obtaining production knowledge and resources (land, seed, compost, etc.), training, getting certification, and so on.
- By *auxiliary activities* we mean all supporting practices other than production, including transactions of products, marketing and promoting, information sharing, community building, and so on.

If you have interactions (e.g., providing or receiving products, materials, services, information, and other supports) with the following sectors in production-related activities or in auxiliary activities, please place a \checkmark in the .

Furthermore, please indicate the names of the top 3 organizations you connect with the most.

	Production-related activities		Auxiliary activities		Top 3 Names
	Provide	Receive	Provide	Receive	
1. Farms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Social organizations (e.g., NGOs, farmers' markets)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
3. Wholesalers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
4. Retailers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
5. Processors (including restaurants and catering)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

6. Other companies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
7. Government agencies (e.g., agricultural ministry, environment department)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
8. Institutions (e.g., certification body, research institutions)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

农场的访问指导

Interview Guide with Principal Farm Owners/Operators

1.根据问卷，您的农场里种植了 / 养殖了 xxxxxx。简单的解释一下您是如何决定种植 / 养殖这些植物 / 动物的呢？

1.1 关于生态种植的实践

谈谈在做这些种植的决定时，对于生态有机的考虑对您或者决策者有多重要？本地的 / 该地区的生态环境基础，不同物种之间共生或相克现象，对于您的选择有什么影响呢？

混种重要吗？

您是根据自己之前的知识或经验来决定种养什么的吗？

对于其他非作物的品种的选择，您是如何做决定的呢？

为了保护 / 增强土壤肥力，保证灌溉和水循环，保持营养和有机质，控制杂草和害虫，预防疾病，您还运用了什么生态种养手法吗？

关于种植 / 养殖的知识来源，您提到了 xxxxx，可以再多谈谈 xxxx 吗？

您是如何获取这些知识的呢？

你们见面或交流的频率大概是怎样的？

除了提供生态种植的知识以外，这个老师 / 信息来源还会因为别的事宜和你打交道吗？这些打交道的事宜都是什么呢？

您对于这个知识源是怎么看的？有效吗？有帮助吗？

1.2 关于做决定的自主性

谈谈您和其他的决定者是如何共同做种养的决定的？

是全权由您来决定，还是会与农夫，同事，股东等商量决定？

这些决定会被其他的公司，例如龙头企业或者机构单位影响吗？

根据您的记忆，举一个您和 xxxxx 商量种养产品的例子吧。

农产品价格制定的决策过程是否和种养决定的过程相似呢？同事，消费者，采购员，其他公司是如何影响价格决定的呢？

举一个您和 xxxx 商量价格的例子吧。

2.您的原始资金来源包括 xxxxx。谈谈这些原始资源是如何帮助你成立这个农场的？例如，是用于认证，还是采购机械等。

后续的资金支持也是用于相同的目的是吗？

您是如何申请 / 获得这笔资金的呢？描述一下你申请的过程吧？

你如何评价这个资金源？有帮助吗？容易得到吗？

他们的筛选机制是怎样的？监管机制是怎样的？

3.关于营销 / 销售渠道，说说你是如何通过这些渠道销售的？例如，你如何决定采取 csa 模式或者休闲农业的模式？你是如何加入有机市集的？你是如何于采购员议价的呢？

部门采购：你觉得把产品销售给公共部门 / 私人企业的优势是什么？劣势是什么？对比一下 csa/其他 afn 的消费者和这些机构吧？

消费者和采购者从你这购买产品是一个怎么样的过程？可否举一个你印象比较深的例子？

他们选择产品的标准 / 指标是什么呢？

你认同他们这些标准吗？谈谈你对有机食品 / 生态种植的看法？

4.关于有机认证，你为何 / 为何不认证呢？

5.你和 xxxxx 有来往。你最早是如何认识 / 结交 xxxx 的呢？

你们之间的联系是怎样的？你对于这样的关系怎么看？

6. 关于传统小农

6.1 就是传统小农，你为何选择加入生态种植？是个人考虑还是其他的鼓励激励制度？你为何放弃普通的耕作方式？

转型期，你是如何决定转型到生态种植的？

转型以来你注意到有哪些提升呢？损失呢？

你想象的理想的生态种植是怎么样的？具体体现在耕作方式，规模大小，产品价值等上，生态种植应该是怎样的？

在转型的过程中，你遇到过什么困难 / 障碍吗？说说这些障碍吧。

5.2 新农民：

你农场里有传统小农工作吗？没有的话，你与传统农民有什么联系吗？

你是如何遇到 / 认识 / 雇佣他们到你的农场干活的呢？

他们在农场的主要工作是什么？出了种田之外，他们还负责其他事情吗？他们的薪酬待遇怎么样？有其他福利吗？

你是否从他们那租用土地？为什么 / 为什么不？

你是从哪租用到这块土地的？

你和他们之前的关系是怎样的呢？工作上？个人感情上？

7. 问卷中有 xx 人在你的农场工作。农场里都有哪些类型的工作呢？分别有多少人？

8. 经验这个农场有什么限制或挑战吗？

9. 对于中国的生态食品，你持有什么样的看法？

10. 关于生态食品，生态农业，还有什么其他的你想和我谈谈的吗？

11. 你有什么要问我的吗？如果感兴趣的话，我们愿意提供一些加拿大的有机食品组织的名单。

Interview Guide for Farms

1. Based on the survey you completed for us, you have planted/raised ____ on your farm. Could you briefly explain **how you decided what to grow or raise**?

Probes:

1.1 In terms of the ecological practices, could you tell me more about the **importance of ecological considerations in your decision-making** [or for whomever is the key decision-maker]?

In choosing to grow these agricultural products, how important is it to in consider the **local/regional ecology**, or the **symbiosis (interactions)** between different varieties, e.g., beans with other crops?

Is mixed cropping important?

Do you base decisions on your **previous knowledge or experience** in growing these products?

What about your decision in choosing **other varieties/species**—could you tell me how you decided to grow/raise them?

What are other ecological practices you used to protect/enhance **soil**, enable irrigation and **water** cycling, hold **nutrient** and organic matter, control **weed** and **pest**, prevent **diseases**?

You indicate that your **knowledge source (for advice on growing crops or raising animals)** is _____. Can you tell me more about this?

How did you access relevant information from this source?

How often do you meet or communicate with each other?

Do they [teachers / source of info] interact with you other than providing information about ecological farming?

What are the other interactions?

What's your opinion about it? Is it effective and helpful?

1.2 In terms of the autonomy in making decisions, could you tell me how **you and other stakeholders** make decisions?

Do you make decisions all by yourself, or discuss with farmers, colleagues, shareholders?

Are these decisions influenced by other companies, e.g., dragon-head companies, or institutions?

From your memory, can you give me an example of how you discuss with ___?

Are your decision-making processes about **price setting** similar to decisions about what and how to grow? How do colleagues, consumers, brokers, or companies influence the setting of prices?

Can you give me another example of how you discuss price-setting with ___?

2. Your original source of capital includes ____. Can you explain how these sources of capital help to support your farm business? E.g., are they used to pay for getting certification?

Is the **follow-up support** for the same purposes?

Can you tell me how you **applied** for it/how you got it? What was the process of applying for (or requesting) it?

How do you **evaluate** the funding source? (Was it helpful and easy to access?)

Probes:

How do you **evaluate** and decide whom to support? What about the **monitoring** process?

3. In terms of your **marketing channels**, can you tell me more about how you sell to these channels? E.g., how you decide to adopt a CSA model or agri-tourism, or how you joined an organic farmers' market, or how you make deals with brokers?

[if they have buyers from public institutions or private companies] How do you view the advantages and disadvantages of selling their products to public institutions? How about private companies? How do you compare these buyers to CSAs or other alternative food networks?

Probes:

How do the customers or brokers buy things from you? Could you give me an example and describe the process of the transaction?

What **standards** or criteria do they use in choosing to buy your products?

What are **your own standards** about the ecological products?

4. You indicated that you have interactions with ____ in terms of either production-related activities or auxiliary activities. How did you **meet or get to know each other** in the first place?

What kinds of **connections** you have with ____?

How do you feel about this relationship?

5. In terms of the certification, why do you/don't you get certified?

6. In terms of traditional small farmers...

6.1 **If he/she was a traditional small farmer:** Why did you get involved in ecological farming (**individual considerations or other encouragements**)? Why don't you use **conventional** farming methods?

Probes:

If they are in the **transition** to ecological farming: how did you make the decision to transition?

What kind of improvements or losses did you notice after shifting to ecological farming?

What are your thoughts about the ideal ecological farming system, in terms of **ecological criteria**, farming methods, scale, values, and so on?

Did you encounter any **barriers** in converting to ecological farming? Can you tell me about that?

6.2 **If he/she was a new farmer:**

Do you have connections with traditional small farmers? How did you meet, get to know, or hire them to work on your farm?

What are their **main jobs** on the farm?

Besides farming, are they responsible for other jobs?

Do you rent **land** from them?

Where do you rent/borrow land?

Can you tell me about the **payments** or other benefits you give to the traditional small farmers?

How would you describe your relationship with them?

7. in the survey, you mentioned that there are ___ people working on your farm. Can you tell me the **types of jobs** they have?

8. Could you tell me more about the limitations and challenges in operating the farm?

9. What is your opinion about the ecological food sectors in China overall?

10. Do you have anything else you'd like to share with me about the ecological food sectors and ecological agriculture?

11. Do you have any questions for me? [We will offer to send them a list of organic sector organizations in Canada, if they are interested to learn more about this.]

传统小农的访谈提纲

Interview Guide with Hired Local Farmers

1.介绍一下你在农场每天的基本工作吧。你是如何保护 / 增强土壤肥力，保证灌溉和水循环，保持营养和有机质，控制杂草和害虫，预防疾病的呢？

另外你还有什么生态种植手法吗？有使用什么其他的投入吗？你对于这些投入怎么看呢？

这些知识都是你的祖传经验 / 个人经验吗？是否有其他的知识来源？他们是如何联系上你们的？他们的主要工作是什么？帮助解决了什么问题？

2.这个农场是你的农田吗？是的话，为什么不考虑出租农田？不是的话，你的农田在哪呢？你为什么决定把农田承包出去？对比一下在自己的农田工作，和在租用的农田上工作的区别。

3. 你是如何销售产品的呢？更详细的描述一下销售的过程吧。可否举一个你通过 xxxx 销售产品的例子？在销售产品方面，你有感觉到 xxxx 的支持吗？xxxx 只在市场营销上提供帮助吗？他们还带来了哪些其他的好处？在销售和营销的过程中，你感觉到了什么阻碍和困难吗？

4. 根据介绍人，请问你和 xxx 是什么关系？

在生态种植 / 营销渠道上，您和一些公司 / 机构 / 政府部门有互动联系吗？说说你们之间的联系吧。在生态种植，提供市场信息，获取更多权益上，你觉得这些单位有什么帮助吗？

5. 你为何加入生态种植呢？个人因素和其他激励因素？为什么不使用普通的种植方式？

Probe: 转型期，你是如何决定转型的呢？转型以来有什么提升或损失吗？对于生态种植，在农场规模，种植方式，原理上你决定应该有什么标准呢？

生态种植上你是否遇到什么障碍？可以具体说说吗？

在引领生态种植方面，政府起到了什么作用呢？你是否收到过政府的帮助，或者其他帮助？

6.总体上，你对于生态食品体系的看法是怎样的？关于未来发展，机会，挑战，限制等。

7.有关生态食品体系 / 生态种植，你是否有其他想与我聊聊的事情？

Interview Guide for Traditional Small Farmers

1. Could you tell me your **daily work** on the farm? What do you do to protect/enhance **soil**, enable irrigation and **water** cycling, hold **nutrient** and organic matter, control **weed and pest**, prevent **diseases**? What are other ecological farming practices you'd like to share? What are the **inputs** you used for farming? What do you think of the inputs?
2. Are you working on your own **farmland**? Where is your farmland? How do you make the decision to rent your land out? How do you feel to own the land/rent the land out?
3. How do you **sell** your products? Could you tell me more detail about the selling process? Could you give me an example of how you sell products to XXXX? Do you feel that XXXX has been a support for you in selling products? Does the XXXX only assist in marketing? What about other benefits they bring to you? What barriers do you feel in selling or marketing?
4. Based on the person/organization introducing me to the traditional small farmers, what are your **relations** with XXXX?

In terms of ecological farming/food marketing, do you have **interactions** with other companies/institutions/government agencies? Could you tell me more about these interactions? What do you feel about these organizations (in terms of ecological farming, providing information and markets, gain power, etc.)?

5. Why do you join ecological farming (**individual considerations or other encouragements**)? Why don't you use the conventional farming methods?

(Probes: if they are in the **transition** to ecological farming, how do you make the decision to transform? What are the improvements/loss after using ecological farming? Could you provide your ideas about **ecological criteria**, in terms of scale, farming methods, rationales and so on?)

Did you encounter any **barrier** in conducting ecological farming? Can you tell me in detail?

What about **governments' role** in leading you to ecological farming? Did you receive governments' assistance or any other assistance in farming?

6. Generally, what's your opinion about the ecological food sectors? (In terms of future developments, opportunities, challenges and limitations.)
7. Do you have anything else you'd like to share with me in terms of ecological food sectors/ecological agriculture?

机构的访谈提纲

Interview Guide with Organizations

这个访谈主要根据社会网络关系的问卷，了解不同机构之间互动的细节。

1.介绍一下您的单位 / 部门 / 机构是主要工作是什么？在生态种植 / 生态食品方面，主要做哪些工作呢？

你们如何支持生态农场 / 其他的相关机构呢

2.问卷上看，你们和 xxxx 有联系，介绍一下你们之间的互动吧。

如与生态技术 / 知识相关，问你是如何学习 / 掌握 / 发展这项技术的，又是如何将它向农场推广的？另外，在推广这个技术 / 知识的过程中，你觉得农民在接受成都怎么样，有什么环境上的 / 制度上的支持和障碍吗？可否举个例子？

如与销售，市场，信息分享有关，问这个农产品关系网是如何发起的，如何构建的，如何保持的，这个过程主要是谁在领导，构建这个关系网得到了什么支持和阻碍呢？可否举个例子？

如果机构是采购者，这个关系是怎么开始 / 保持的？支持因素和障碍分别有哪些呢？

3.说说你们最早是如何认识 xxxx 的？又是怎么决定 / 选择 / 被选择喝这个机构有来往的呢？描述一下这个过程吧？

与 xxx 之间有着持续的互动吗？描述一下后续的互动过程吧？

Probe: 在你们的互动过程中，你们得到了什么样的反馈吗？他们最常会问的问题是什么？他们比较关心什么？

4.你想象中，一个农场怎么样才算是生态的？在规模，种植，原理上有没有什么指标呢？

5.你们和传统小农有什么互动联系吗？如果有，你们是怎么认识他们的？什么却道？你们之间的互动是怎样的？你对于你们的关系是怎么看的？如果没有，为什么？

6.能否举一个你们和 xxxx 之间互动联系的你印象深刻的例子？

7.总体上说，你对于生态食品 / 生态农业持有怎样的看法 / 观点？例如未来的发展，机会，挑战，限制等。

8. 关于生态食品 / 生态农业，还有什么 是你想跟我说的吗？

Interview Guide for Organizations

Based on the survey answers on social networks, the interview will ask for details about the interactions between different organizations.

1. Generally, what's the job of your organization/what do you generally do with regards to ecological farming/food? (Probes: what do you do to help ecological farms/support other organizations?)

2. You indicate that you have the connections with farms/companies/government agencies/institutions, what kinds of interactions you have with them?

(Probes: if the interactions relate to ecological technique/knowledge, ask how you **learned/developed/mastered** this technique/knowledge and how you **extend** it to farms. Furthermore, how do you feel in extending the technique/knowledge in terms of the **acceptance of farmers, contextual/institutional assistance or barrier**? Ask for specific example.

If the interactions relate to transactions, marketing or information sharing, ask how the **agro-food network** is initiated and constructed, who leads the process, how the construction of the network get supported or hindered generally. Ask for specific example)

3. Could you tell me how you meet/know/select/selected by the farms/companies/government agencies/institutions at first? Could you describe the process?

Do you have continuous interactions with them? Could you describe the follow-up process?

(Probes: in your imagination, how should a farm be ecological? Could you provide your ideas about **ecological criteria**, in terms of scale, farming methods, rationales and so on?

During the process, what about the **feedbacks** from the organizations you interacted with? What's the general problem asked by them?)

5. Do you have interactions with **traditional small farmers**? If yes, what's the channel to meet/know them? How do you interact them? What do you think of the interactions? If no, why the interactions do not exist?

6. Could you tell me a specific/memorable example of your interactions with.....?

7. Generally, what's your opinion about the ecological food sectors? (In terms of future developments, opportunities, challenges and limitations.)

8. Do you have anything else you'd like to share with me in terms of ecological food sectors/ecological agriculture?