

**'Fake Meat and Cabbageworms':
Connecting Perceptions of Food Safety and
Household Level Food Security in Urban China**

by

Jenelle Regnier-Davies

A thesis
presented to the University of Waterloo
in fulfillment of the
thesis requirement for the degree of
Master of Arts
in
Geography.

Waterloo, Ontario, Canada, 2015

© Jenelle Regnier-Davies 2015

Author's Declaration

I hereby declare that I am the sole author of this 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.

Abstract

Food security emerged as a term in 1974, and was developed by the United Nations Food and Agriculture Organization as a strategy to ensure the volume and stability of the global food supply. Since 1974, the internationally recognized definition has evolved to be much broader in scope, and to include facets such as food safety and nutrition, as well as social and cultural preferences. Despite this comprehensive definition, food security as conceived by the Chinese government appears to be much more narrow. Further, in academic literature by Chinese scholars, food security has largely been framed as an issue of regional poverty. However, with the unparalleled migration of rural people to urban areas, the understandings of rural versus urban poverty will become increasingly blurred. Yet, very little research examines urban food security in China. To address these gaps, the objectives of this exploratory research are threefold: (1) to determine how the Chinese government understands ‘food security,’ in terms of scale and breadth, and to assess the implications of this (2) to identify urban residents’ perceptions around threats to their food security; and (3) to determine how urban residents respond to and cope with these perceived threats. This study is based on a review of literature combined with a case study in Nanjing, China, that involved a survey of 214 city residents, plus 36 interviews with urban residents, neighbourhood committee managers and wholesale market managers. This research found that despite shifting diets and food safety concerns among Chinese consumers, food security is largely conceived of by the Chinese government in terms of grain supplies, as a means to satisfy the food needs of its growing population. This framing of food security focuses on *national level* grain supplies at the expense of *household level* experiences of food insecurity. In order for the food security needs of Chinese urban residents to be properly addressed, this research calls for a reconceptualization of food security by Chinese government agencies and researchers. The study also found that unsafe food and fluctuating food costs were the most prominent threats to food security among urban residents. The elderly, low income people, and small food businesses were most affected by fluctuating food costs, while food safety concerns were widespread among all income levels. In response to these concerns, urban residents have developed methods of food procurement and food preparation to address to food safety threats. These findings underscore how food security is much more dynamic and complex than current understandings of the term among both Chinese government agencies and academic researchers.

Acknowledgments

First and foremost, I thank my graduate supervisor Steffanie Scott for her help and support as I completed this thesis. Steffanie's excitement and interest in furthering food system research in China is contagious, and she truly inspired me to dive into the work despite my own uncertainties. I thank my partner Michael Faust for offering me his support and encouragement throughout my time at Waterloo, and for awaiting my late night calls or early morning Skype greetings during my time in China. I am grateful to Carol Faust, George Faust, Wendy Faust and Chris Boyne for the warm beds, warm meals and warming drinks while I completed my coursework at Waterloo. I thank my mother, Margaret Davies, for constantly saying, "you're a good writer, it will be great", though I know she may prefer I write a book about cooking or blog about travelling—rather than a thesis! I also thank Nicole Percival for helping me find meaning in numbers (not my strong suit), and offering words of encouragement throughout the research process. Lastly, I thank Dr. Zhenzhong Si, Professor Taiyang Zhong, Professor Xianjin Huang for their support, advice and guidance, as well as the many students and translators that helped me navigate the research while in Nanjing: YinShu Dai, Bryel Ben, Zhiying Xu, Yuqiong Chen, Siliang Liu, Huan Li, and Lily Yang.

Table of Contents

Author's declaration	ii
Abstract	iii
Acknowledgements	iv
Table of Contents	v
List of Tables	viii
List of Figures	viii
List of Plates	ix
1. Introduction	1
2. Food security, China's past and present	3
2.1 Food security as a concept in flux	3
2.2. Food security in China	5
2.3 New urban poverty, urban food security	7
2.4 Vulnerability and food insecurity	9
3 Food safety, and Nanjing's changing food system	11
3.1 Food safety scandals and environmental degradation	11
3.1.1 Decentralized system of food security	12
3.1.2 Food safety regulation and monitoring	12
3.1.3 Environmental degradation and industrial pollution	13
3.2 Contextualizing Nanjing	14
4. Methodology	17
4.1. Data collection and analysis	17
4.2 Research methods	19
4.2.1 Surveys	19
4.2.2 Structured interviews	19
4.2.3 Semi-structured interviews	21
4.3 Study sites	21
4.3.1 Chengxianjie neighbourhood	21
4.3.2 Shudeli neighbourhood	22
4.3.3 Wen Kang Yuan neighbourhood	24
4.4 Ethics and informed consent	26
4.5 Coding and analysis	26
4.6 Ensuring research quality	26
4.6.1 Translation and transcription	27
4.6.2 Limitations and cross cultural challenges	27

4.6.3 Positionality and reflexivity	29
4.6.4 Research variables	29
5. Results & Discussion	31
5.1 Examining Nanjing residents' perceptions on access and utility	31
5.1.1 Food access	32
5.1.2 Utility	33
5.2 Sources of vulnerability	36
5.2.1 Concerns for food safety	36
5.2.2 Food cost	40
5.3 Responses to vulnerability	42
5.4 Systems of food distribution	45
6. Conclusion	52
References	54
 APPENDICES	
Appendix 1: Survey questions with Chinese translations	60
Appendix 2: Results of survey questions	62
Appendix 3: Structured interview questions for market shoppers:	65
Appendix 4: Structured interview questions for market managers	68
Appendix 5: Semi-structured interview questions for Neighbourhood Committees	69
Appendix 6: Semi-structured interview questions for employees at Zhongcai Agricultural Distribution Centre	70
Appendix 7: List of codes from HyperRESEARCH	71

List of Tables

1. Sen's Entitlement Types	10
2. Framework for understanding household vulnerability	10
3. Key attributes of the three research locations	25
4. Survey participation	30
5. Survey questions that address access and utility of food	31
6. Survey questions left out of assessment.....	32
7. Perceptions of food cost and accessibility in Nanjing	33
8. Sources of and responses to food security vulnerability among Nanjing residents.....	45

List of Figures

1. Four Pillars of Food Security	4
2. Sources of possible contamination in the food supply chain.....	14
3. Nanjing in Eastern China	18
4. Neighbourhoods of study in urban Nanjing.....	18
5. Chengxianjie community in Nanjing, near Jinxianghe Trade Market	22
6. Shudeli community in Nanjing, near Kexiang Vegetable Market	23
7. Wen Kang Yuan community in Nanjing, near Nanwanying Vegetable Market	24
8. Conflicting perceptions on food safety in Nanjing.....	35
9. Residents' concerns over environmental degradation and GMOs in the food system	35

List of Plates

1. Survey booth at wet market in Nanjing, July 2014	20
2. Research participants completing surveys in Nanjing wet market, July 2014	20
3. Leek supplier at Zhongcai Agricultural Distribution Centre	49
4. Bird's eye view at Zhongcai Agricultural Distribution Centre	49
5. Testing a celery sample for contaminants at Zhongcai Agricultural Distribution Centre	50
6. Demonstrating contaminant testing at Zhongcai Agricultural Distribution Centre	50
7. Using a IC Card reader at Kexiang Vegetable Market.....	51
8. Error on IC Card reader at Kexiang Vegetable Market	51

1. Introduction

Since the development of the Declaration of Human Rights in 1948, food has been recognized as a core element in achieving a healthy standard of living (Maxwell & Smith, 1992b). Food security explicitly emerged as a term in 1974, a time of international food crises, and was developed as an “organizational strategy” to ensure the volume and stability of the global food supply (Maxwell & Smith, 1992a, p.6). Since 1974, the internationally recognized definition has evolved to be much broader in scope, and to include facets such as food safety and nutrition, as well as social and cultural preferences (FAO, 2003). Today’s most commonly cited version of the term is defined as a condition “when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO, 2009).

China has long been concerned with its food supply for its large populations. The country has experienced many famines in its history, the last ending in the early 1960s. Since then, China has been tremendously successful in mitigating famine and large scale food insecurity through the introduction of the household responsibility system, and improved systems of food distribution (Zhou, 2014). However, rapid urbanization along with intense food production (and the heavy use of chemical inputs) has also led to widespread degradation of agricultural lands and natural resources, causing new concerns for China’s future food security (Zhou, 2014; Lang & Miao, 2013; Smil, 2004; Lam, Remais, Fung, Xu, & Sun, 2013). As soils, air and water become increasingly polluted, China’s environmental degradation has also meant widespread anxiety about food safety, severely compromising the utility of food (Lam, Remais, Fung, Xu, & Sun, 2013; Fan, 2014).

Since the 1950s, food security, according to the Chinese government, has largely been understood in terms of food availability through the production of grain, oil crops and tubers (Christiansen, 2009). However, today’s diets and food preferences in China have shifted dramatically, with an inclusion of more meat, dairy, and vegetables, and less reliance on staple grains than previous generations (Christiansen, 2009). Despite the comprehensive and internationally recognized version of the term, food security as it is understood in China remains narrowly conceived. Further, in academic literature by Chinese scholars, food security has largely been framed as an issue of regional poverty. However, with the unparalleled migration of rural people to urban areas, the understandings of rural versus urban poverty will become increasingly blurred. In addition, few studies have examined household food security in China, despite there being extensive research in many other countries in the world on this topic (in Sub-Saharan African countries, USA and Canada, for example), and despite there being an extensive list of household food security frameworks available for researchers (Crush & Frayne, 2010; Bickel, et al, 2000; Maxwell & Smith, 1992b; Tarasuk, Mitchell, & Dachner, 2012).

Considering this list of wide-ranging gaps in the literature, the objective of this exploratory research is threefold: (1) to determine how the Chinese government understands food security (in terms of scale and breadth), and identify the implications of this; (2) to identify the perceived threats to food insecurity at the household or individual

level in urban China; and (3) to determine how urban residents respond to and cope with perceived threats. This study is based on a review of literature combined with a case study in Nanjing that involved a survey of 214 city residents, plus 36 interviews with urban residents, neighbourhood committee managers and wholesale market managers. This research found that despite shifting diets and food safety concerns among Chinese consumers, food security is largely conceived by the Chinese government in terms of grain supplies, as a means to satisfy the food needs of its growing population. This framing of food security underscores food availability, and does not sufficiently address other aspects of food security, such as access or the utility of food. It also focuses on *national level* grain supplies at the expense of *household level* experiences of food insecurity. In order for the food security needs of Chinese urban residents to be properly addressed, this research calls for a reconceptualization of food security by Chinese government agencies and researchers. The study also found that unsafe food and fluctuating food costs were the most prominent threats to food security among urban residents. The elderly, low income people, and small food businesses were most affected by fluctuating food costs, while food safety concerns were widespread among all income levels. In response to these concerns, urban residents have developed methods of food procurement and food preparation to address food safety threats. These findings emphasize how food security is much more dynamic and complex than current understandings of the term among both Chinese government agencies and Chinese academic researchers.

The thesis is organized as follows. Chapter 2 demonstrates the significance of the research through a review of literature on food security. The chapter looks at China's food security, past and present, and discusses the study's analytical framework for examining household food security. Chapter 3 builds the connection between food safety and food security through a review of China's system of food regulation and monitoring. The chapter also contextualizes the city where the study took place, Nanjing, examining the city's changing food system. Chapter 4 reviews the methods chosen for this study and reflects on the limitations and barriers of the research. Chapter 5 presents the findings of this study, and examines the various perceived threats affecting food security, as experienced by urban residents. The thesis closes with Chapter 6, which sums up the main findings of the research and offers suggested paths for future research.

2. Food security, China's past and present

This chapter demonstrates how food security remains narrowly conceived in Chinese academic scholarship and in Chinese government policy through a review of literature. This section first reviews the evolution of food security as a concept as it emerged through an international institution, the Food and Agriculture Organization (FAO) of the United Nations. It chapter then looks at China's food security, past and present, and discusses poverty measurements as a platform for understanding household food security. Lastly, this chapter also reviews the study's analytical framework for examining household food security.

2.1 Food security as concept in flux

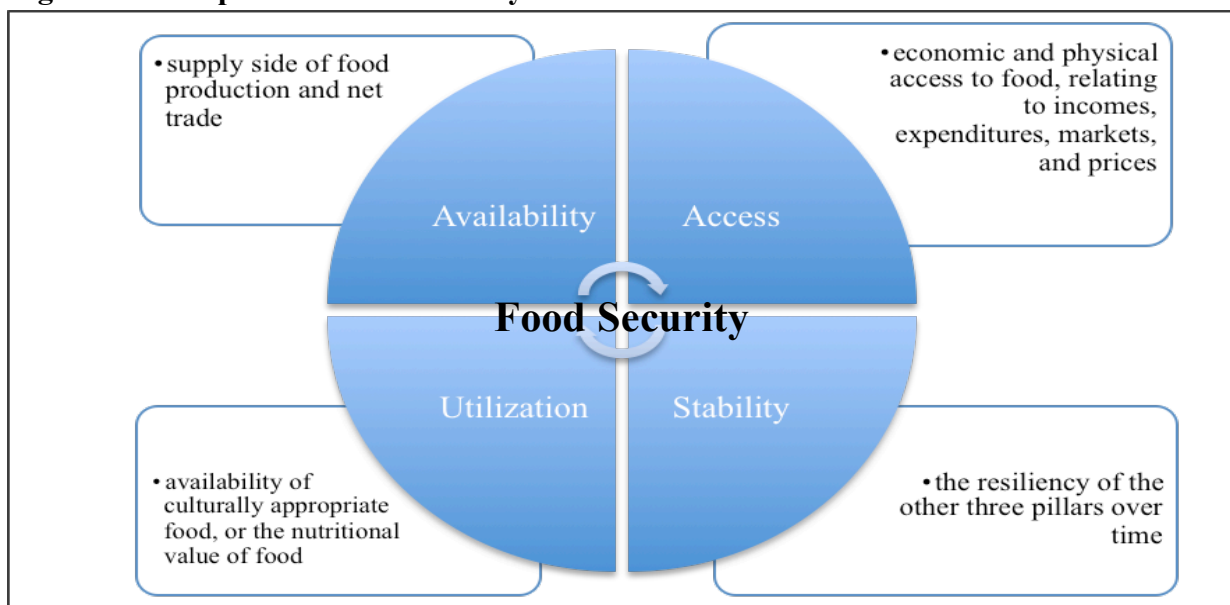
Since the development of the Declaration of Human Rights in 1948, food has been recognized as a core element in achieving a healthy standard of living (Maxwell & Smith, 1992b). However, it was not until 1974 at the World Food Conference that food security explicitly emerged as a term. It was during this time of international food crises that food security was developed as an “organizational strategy”, out of concern for national and global food supplies (Maxwell & Smith, 1992a, p.6). Food security in 1974 was defined as “[a]vailability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices” (FAO, 2006). This definition was an attempt to address global food supply problems, and generally looked at the volume and stability of the global food supply (FAO, 2003). The 1974 version was crucial, as it was the first step in developing an internationally recognized concept for nations to adapt in public policy (FAO, 2003). However, overtime the definitions were reconstructed as official thinking on the concepts evolved (FAO, 2003).

In the 1980s, the definition expanded conceptually to also include food access by vulnerable people to available supplies (FAO, 2003). As famine swept through several African countries, scholars critiqued the approaches taken by aid organizations to address issues of hunger and famine (Maxwell & Smith, 1992b). Amartya Sen's seminal work on the ‘entitlement approach’ emerged in response to the prominent discourse on famines, highlighting that famines are a result of unequal access to resources, rather than a lack of food—displacing the notion that shortages in food production are the principal cause for famine and food insecurity (Adger, 2006). By 1983, the term food security as presented by the FAO evolved to focus on the balance between food supply on the macro level, and access on the micro level—and was defined as “ensuring that all people at all times have both physical and economic access to the basic food that they need” (Maxwell, 1996, p. 157). In 1986, the term was further revised, and included an assessment of individual and household level food security, further emphasizing the ‘temporal dynamics’ of food insecurity (FAO, 2006). Specifically, it made a distinction between *chronic food insecurity* (ongoing pressure due to systemic poverty and marginalized incomes), and *transitory or temporary food insecurity* (caused by periods of natural disaster, conflict, economic collapse, etc.) (FAO, 2006).

By the 1990s, the definition was broadened further to include food safety and nutrition as part of an active and healthy life (FAO, 2003). Food preferences, both

socially and culturally, were also included as an important facet to food security (FAO, 2003). Today’s most commonly cited version of the term (developed in 1996) is defined as a condition “when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (Pinstrup-Andersen, 2009). By 2009, four pillars were also added to the definition. As outlined in Figure 1, the four pillars are: availability, access, utilization, and stability (FAO, 2009). *Availability* refers to the supply side of food production and net trade; *access* denotes the economic and physical access to food, relating also to incomes, expenditures, markets, and prices; *utilization* refers to cultural accessibility, safety, or the nutritional value of food; and *stability*, the last pillar, requires that the three previously mentioned pillars are maintained over time (FAO, 2012).

Figure 1: Four pillars of food security.



Source: Adapted from FAO, 2012, p.5.

Since its inception, food security was used to measure whether or not a country had enough food available to ensure people could meet their daily energy and nutritional requirements (Pinstrup-Andersen, 2009). Yet, in many cases, it is not made clear whether or not all citizens in a country are receiving enough food to fulfill their energy and nutritional requirements in practice, or whether the domestic production of a country is simply enough to claim national food self-sufficiency (Pinstrup-Andersen, 2009). For this reason, micro level assessments and household food security measurement tools were developed to examine food security beyond the national level. Household level food security is expressed as “the ability of a household to produce or purchase the food needed by all household members to meet their dietary requirements and food preferences, as well as the assets and services necessary to achieve and maintain an optimal nutritional status” (IFPRI, 2012, p. 3).

Since the 1980s, household food security literature has flourished worldwide (Maxwell & Smith, 1992a). Significant recent contributions to the literature come from

sub-Saharan Africa (Crush & Frayne, 2010), the United States (Bickel, Nord, Price, Hamilton, & Cook, 2000), and Canada (Tarasuk, Mitchell, & Dachner, 2012). Crush and Frayne (2010) highlight that in sub-Saharan African countries, food production may be adequate enough to ensure a healthful diet for the population, yet malnutrition is shockingly high across both urban and rural regions (p.7). These findings suggest that food security is not simply an issue of food *availability*, but rather an issue of *access* and *utility*—an argument that is weaved throughout this thesis. Within Bickel, Nord, Price, Hamilton, & Cook’s “Guide to Measuring Household Food Security” (2000), the authors also argue that even if extreme forms of food insecurity and famine may not exist in a country, lack of access and the utility of food often remains a significant issue. They highlight that household food insecurity is experienced to various degrees, and that households engage with a wide range of coping strategies to deal with food-resource inadequacies (p. 2). Similarly, Tarasuk, Mitchell, & Dachner (2012) agree that food insecurity can be experienced in a range of severity, and can be experienced in different ways, such as “having anxiety that food will run out before household members have money to buy more, to modifying the amount of food consumed, to experiencing hunger”—and in extreme cases, going a day without eating (p.7).

Yet, in Chinese government documents, the focus of food security remains largely on food production. It departs from FAO discourse and the above-mentioned household food security publications, in that it emphasizes food availability on the macro level, and places limited emphasis on access or utility on the micro level. Though there is a significant amount of research on household food security worldwide, China has not developed assessments of food security beyond the national scale. To date, the understanding of food security in China remains narrowly conceived.

2.2 Food security in China

Throughout many dynasties, China has long concerned itself with food supply for its large population (Smil, 2004). The nation has made great strides in securing sufficient food supply since the famine of the ‘Great Leap Forward’ (1959-1961), when roughly 30 million people died due to lack of access to food (Smil, 2004). This tragedy, seen by many as a human-made catastrophe, happened in the early years of China’s industrialization plan. The leader at the time, Mao Zedong, sought to push China into modernity with rapid industrialization (Smil, 2004; Miller, 2012).

Through the period of a decade, China implemented a set of codes, laws and regulations to differentiate groups in order to control population movement and mobility, and to shape state developmental priorities (Cheng & Selden, 1994). As part of this industrialization plan, rural and urban regions were defined as two distinct districts with specific responsibilities to satisfy the goal of rapid economic development (Chan, 2009, p. 199). Urban regions were designated as the epicenters of industry—the region of utmost importance, while the rural was seen as a provider of raw materials and cheap labour for food production (Cheng & Selden, 1994; Chan, 2014).

To ensure that one region served the other, institutional policies were set in place at the national level, including rural collectivization (a collective farming strategy) and the household registration system (*hukou*), which limited the mobility of residents between the two regions (Chan, 2009; Smil, 2004; Miller, 2012). In the 1950s people were largely given one of two designations: agricultural *hukou* or non-agricultural *hukou*

(Miller, 2012). Those with agricultural *hukou* were typically rural residents, and likely to be assigned farm or rural industrial work (Chan, 2009; Miller, 2012). Those with non-agricultural status predominantly lived and worked in urban regions (Chan, 2009). Incorporated into the official administration, China's populations were distinctly classified and categorized (Pow, 2007, p. 1545).

For a period of time, this system of organization served the nation well and secured food supply for industrial regions. However, it began to topple in 1958, as the state mobilized the majority of rural workers to work in steel production, leaving little labour for agriculture (Cheng & Selden, 1994; Smil, 2004). Knowing that this imbalance was having massive implications on food supply, the state reduced urban populations by laying-off more than five million urban workers and pushed them to the rural areas—all in an attempt to lessen the amount of grain rations needed for urban populations (Cheng & Selden, 1994). By 1960, the nation had fully plunged into famine, and restrictions to mobility were enforced more violently than before (Miller, 2012).

In many ways, national-scale food security policy today in China has been influenced by the (now downplayed) “three years of natural disasters” or the “three years of difficulties” that was the Great Leap Forward and the associated famine (Yang, 2012). Strict national policies regarding agriculture and food production have been set to ensure adequate grain production for China's populations, and to avoid repetition of such a disaster. However, new concerns in the realm of food security surface as the nation's environment declines, agricultural lands become increasingly polluted, and valuable arable lands are converted for non-agricultural uses (Brown, 1995; Lang & Miao, 2013; Smil, 2004). Today, it is often cited that China is home to 20 percent of the world's population with only 7-10 percent of the world's arable land—a situation that reinforces anxieties about food security for a growing population in an era of rapid urbanization (Brown, 1995; Lang & Miao, 2013; Smil, 2004).

Today, food security is typically interpreted by Chinese officials as *liangshi anquan*, meaning ‘grain security’, and is driven by the assumption that agricultural commodity production must increase to safeguard national supply (Zhang, 2011; Fan, 2014). Recent reports on China's food security indicate improvements through agricultural protections and policies aimed at sustaining rural grain production (Chen, 2007). Such protections and policies include the renewal of long term land-use agreements to ensure ongoing access to land for rural people; subsidies for grain producers to ensure economic stability; reduction of agricultural taxes for major grain producing regions; the protection of farmland from industrial growth or private development; and the establishment of a market oriented grain distribution system to set prices based on supply and demand (Xiao & Nie, 2009). Despite the emphasis on understanding regional vulnerability, assessments of food security and the development of policies largely emphasize grain production and financial supports for rural regions. Consequentially, the examination of household food security across both rural and urban regions is significantly limited. The 2009 official government assessment of China's food security status states:

...due to limitations in data, the status of consumption and nutrition in poor counties can be evaluated only with their averages at the provincial level, and cannot show disparities between counties. The research project examines the food security situation at the county level but does not touch on that at the

household level. Therefore, the actual food security problems affecting poor populations have not been thoroughly understood (Xiao & Nie, 2009, p. x).

Arguably, the state is justified in placing its energies on the more vulnerable rural regions where poverty may proliferate to a greater degree, and where the majority of grain production takes place (Leppman, 1999; Zhang, Xu, Zhou, Zhang, & Xie, 2013). The legacy of social segregation in China has also been an important factor in this focus on rural regions. As Christiansen (2009) points out, rural people have struggled to assimilate in urban spaces, and many are bound to the household-based village structure. However, with the Chinese government's recent push for rural-urban migration, China's urban food security and poverty will increasingly be an issue (Chen, Gu, & Wu, 2006; Jourdan & Goodman, 2014; Lang & Miao, 2013; Smart & Smart, 2001). According to the national census in 2012, over 236 million people considered 'migrants' were living in Chinese cities (Lin, 2013; Wei, 2012), and more than 22 million of those were estimated to be impoverished (Park & Wang, 2010).

Poverty and unequal distribution of wealth are key drivers of food insecurity for individuals and households. People need access to water, shelter, sanitation, health care, education and information—in addition to actual food—in order to be food secure (Ecker & Breisinger, 2012). As Zhang (2011) illustrates in “China and global food security: Conflicting notions”, the emphasis of national grain production in state policy overlooks the actual diets and needs of Chinese populations (Zhang, 2011). Zhang contends, “it is far from sufficient to stress grain production alone to guarantee the Chinese people's access to (and utility of) food” (Zhang, 2011, p. 2). Though the government has taken significant strides in mitigating large-scale food insecurity and famine since the era of the Great Leap Forward, the country has yet to further develop tools to measure food security beyond the national scale. However, as discussed below, the Chinese government has developed poverty measurements and strategies to reduce poverty in both rural and urban regions, which can help build on the understanding on food security on the household level.

2.3 New urban poverty, urban food insecurity

Though urban poverty and urban food insecurity are not synonymous, publications on poverty can provide a platform to inform research on urban household food security. In the late 1990s up to the mid 2000s, scholars published many papers on the phenomenon now labeled 'new urban poverty' in China, which proliferated in large urbanizing regions. It stood apart from 'traditional poverty' as it moved beyond the typology seen through the eras of more centralized governance, labeled the “3 no's” (no household, no income, and no support systems) (Babar & Kesteloot, 2009, p. 534). Since the 1990s, two prominent shifts occurred in Chinese urban labour markets, which gave rise to patterns of 'new urban poverty': the first was an extensive downsizing and closure of state-owned enterprises (SOEs), which meant the loss of employment for millions of workers, and little compensation or social security (Park & Wang, 2010); the second was the proliferation of rural-to-urban migrants to eastern China, which led to a large 'floating population' in urban regions that had little to no access to social supports (Park & Wang, 2010). By 2004, over 150 million rural-to-urban migrants resided in China's cities, a jump of 80 million people in only 10 years (Gao, 2009).

In the 1990s, cities began to address the issue of ‘new urban poverty’ as it became an issue of observable contention. In 1993, Shanghai developed a program called the ‘Minimum Standard of Living’ system (MLS), which was designed to curb the impacts of poverty through an economic alleviation strategy (Gao, 2009). By 1997, the Shanghai program was deemed successful, and expanded to other urban regions throughout the country (Chen & Barrientos, 2006). Presently, most city governments offer assistance to residents based on the local minimum standard and *per capita* income (Gao, 2009). Assistance, given to those below the minimum standard income, is designed to cover basic consumptions needs such as food, clothing, shelter, medical care, and expenses such as utilities and tuition (Gao, 2009). By 2003, approximately 23 million urban residents were recipients of MLS in China, accounting for 4 percent of the urban population (Gao, 2011).

Though the program has had tremendous success in curbing extreme poverty, it remains widely criticized for its inability to truly address socio-economic disparity in cities. Since the program is regionally determined, it depends on the local government’s ability to allocate funding towards social support systems (Gao, 2009). The assistance program across China is also widely criticized for failing to actually alleviate poverty, as funds offered are much lower than what is needed to lift people to a basic standard of living (Chen & Barrientos, 2006). Further, despite the intensions to address the issue of ‘new urban poverty’, migrants from outside the urban region largely fall through the cracks of the system, as surveys measuring income and expenditure are limited to those with local status, and migrant households are typically left out of local assessments (Chen & Barrientos, 2006).

Despite the progressive systems of supports for populations in China, the state has thus far been limited in its ability to adequately address social polarity. The history of marginalization and social organization in China continues to influence social hierarchies, as well as the *de facto* allocation of welfare and services. Migrants, often an unseen ‘floating population’, continue to serve industrial growth and urbanization through low-waged labour. To many, large urban regions still conjure the ideal of opportunity and social advancement, but in reality, systemic marginalization endures, separating classes based on their origins of birth.

Although there has been a considerable amount of research on urban poverty in China, it does not adequately inform the literature on household food security. Though the two concepts are interrelated, food security is intended to measure something conceptually different from poverty (Bhattacharya, 2003). Poverty is often measured by determining whether or not a household has the adequate resources to obtain basic living needs, such as food, clothing, and shelter (Bhattacharya, 2003, p. 839). Household food security materialized as a concept to measure household vulnerabilities to hunger, in relation to access to food (Bhattacharya, 2003). Relying on poverty alone as a measurement is problematic, because it ignores the more direct determinants of food insecurity, such as the fluctuating costs of housing and food, and the lack of adequate social supports, such as health care and pension (Rose, 1999). Rose (1999) argues that poverty measurements also overlook the importance of utility and adequacy of food, meaning that food sources must be *sufficient*, *safe* and *nutritious* in order for households to be food secure. As Moser (1998) contends, ‘vulnerability’ might be a more useful term, as poverty measurements are fixed in time, making poverty a static concept (Moser,

1998). Vulnerability is a much more dynamic term, as it better captures shifts and changes in people's lives as they move in and out of poverty (Moser, 1998).

One objective of this research is to address some of the significant gaps in the literature by moving past the focus on urban poverty, and to examine perceptions of vulnerability at the household or individual level. In doing this, this research assesses how residents *perceive* their sources of food to be sufficient, safe, and nutritious, and how they *perceive* limitations in availability, access and utility. As Maxwell & Smith (1992a) argue, the perspective people hold about their own food needs is a key and defining characteristic of household food security. In "Household Food Security: A Conceptual Review" Maxwell & Smith (1992a) assert that the "highest state of food security requires not just secure and stable access to sufficient sources of food, but also access to food that is nutritionally of adequate quality, culturally acceptable, procured without any loss of dignity and self-determination, and consistent with the realization of any other basic need" (p.41). These multi-dimensional elements of food security are not easily quantifiable or measurable, and are factors that cannot be weighed without reference to the food insecure people themselves (Maxwell & Smith, 1992a). As the authors state, "food insecurity is not an objectively defined level of access to food or quality thereof, but rather the level or quality that the people *perceive* to be inadequate" (Maxwell & Smith, 1992a, p.41) (emphasis added).

2.4 Vulnerability and food insecurity

'Vulnerability' as a term in food security literature emerged in the 1980s with Sen's (1981) 'entitlement approach'. Sen's essay "Poverty and Famines" theorized the causes of famine and characterized the conditions under which food insecurity may deteriorate into mass starvation (Sen, 1981; Watts, 1993). Through Sen's account, *entitlements* can be explained as the "actual or potential resources available to individuals based on their own production, assets or reciprocal arrangements", and *vulnerabilities* are the factors that impede one's ability to realize those entitlements (Adger, 2006, p. 270). Similar to the pillars of food security outlined in section 2.1, 'entitlement' types can be expressed as availability, access, and utility (Ericksen, 2008; Maxwell, 2001). *Availability* refers to both the production of food as well as the methods of distribution; *access* refers to affordability of food, the degree to which food preferences are being met, as well as the overall function of the market to supply food; and lastly, *utility* refers to value of food, both nutritionally and socially, as well as the safety of food sources available (Ericksen, 2008). There is consensus among scholars that food security vulnerability can occur when there are one or more failures among the three types of entitlements (Ericksen, 2008). Table 1 outlines Sen's entitlement types with examples.

Despite this seemingly simplified vision of 'vulnerability' in food security literature, the concept may be perceived differently depending on the theoretical lens. As noted by Adger (2006), "a number of traditions and disciplines, from economics and anthropology to psychology and engineering, use the term vulnerability" (p. 269). Both Adger (2006) and Ericksen (2008) argue that it is necessary for understandings of food security vulnerability to include socio-ecological perspectives, by which vulnerability is determined by assessing the functions of resources in the system; the distribution of resources; the capacity of institutions (governments) to manage resources and mediate

interactions, and the degree to which the extraction of resources impedes on ecological and social systems (Adger, 2006; Ericksen, 2008).

Table 1: Sen’s Entitlement Types

Entitlement types	Examples of entitlements
Availability	<ul style="list-style-type: none"> • Production of food can sufficiently feed people • Systems of distribution allow for adequate access by all
Access	<ul style="list-style-type: none"> • The market enables equitable access to food • Food is affordable enough to sustain healthy diets of populations
Utility	<ul style="list-style-type: none"> • Food is nutritionally adequate • Food available to populations is culturally appropriate • Food sources are reliable and safe for consumption

Source: Adapted from Sen, 1981.

In addition to Sen’s entitlement approach, this research was also influenced by the framework presented by Caroline Moser (1998) in “The Asset Vulnerability Framework: Reassessing Urban Poverty Reduction Strategies”. In this well-cited publication, Moser contends that it is necessary to assess not only the sources or threats of vulnerability, but also “the ‘resilience’ or responsiveness [of stakeholders] in exploiting opportunities, and resisting or recovering from the negative effects of a changing environment” (Moser, 1998, p. 3). This research examines the *sources* of food security vulnerability as well as the *strategies used* to mitigate exposure to vulnerability. As Moser states, “the means of resistance are the assets and entitlements that individuals, households or communities can mobilize and manage in face of hardship” (Moser, 1998, p. 3). Table 2 illustrates the research framework, as adapted from Moser (1998).

Table 2: Framework for understanding household vulnerability

Source of vulnerability		Resilience/responsiveness to vulnerability
<i>Exposure</i>	<i>Sensitivity</i>	<i>Coping strategy/adaptive capacity</i>
<ul style="list-style-type: none"> • the ways in which a unit is exposed to shock or stress 	<ul style="list-style-type: none"> • the degree to which a unit is impacted from exposure 	<ul style="list-style-type: none"> • <i>coping capacity</i> is the short term, reactive methods of dealing with shock or stress; <i>adaptive capacity</i> is the long term, or proactive methods of dealing with shock or stress

Source: Adapted from Moser, 1998.

3. Food safety, and Nanjing's changing food system

This chapter emphasizes the connection between food safety and food security through a review of China's prominent food safety causes and effects. This section also examines the implication of the industrializing food system on both on the environment and society in China. Lastly, this chapter contextualizes Nanjing, the area of focus in the study, through an account of the city's changing food system.

3.1 Food safety scandal and environmental degradation

More recently, actors within the Chinese academic community have begun to come forward with critiques of China's interpretation and approach to food security. For example, in a recent interview, Professor Zhu Xinkai from Renmin University in Beijing called for a reconceptualization of the term food security, arguing that food security cannot be obtained while China experiences such immense food safety scandals (China News, 2014). Over the last 35 years, China's rapid industrial growth has meant a significant increase in food and agricultural productivity, as well as shifts in diet and food preference (FORHEAD, 2014). Though issues of hunger are not as prevalent as they were in China's recent past, concerns over food safety¹ are emerging to a greater degree than before (FORHEAD, 2014). Yan (2012) broadly states, "Chinese society has been affected more by food-safety scares than has any other on earth" (p. 706). Many scholars, researchers, journalists and popular authors are also in agreement that food safety is of utmost concern for Chinese residents, and current systems of food regulation and monitoring lack structure and reliability (Gale, 2011; Garnett & Wilkes, 2014; Lam, Remais, Fung, Xu, & Sun, 2013; Kriflik & Yeatman, 2005; Yan, 2012; Zhang, 2005).

In the past 25 years, China's food system has changed significantly from a predominantly state regulated system "bounded by season, location and traditional choice", to an expanded food supply that "offers larger quantity and variety year round", and that is "increasingly exposed to market forces" (Veeck, Yu, & Burns, 2010, p. 222). The changing political economy of China's food system has had astounding implications for the health of China's environment and people, and has contributed greatly to the ongoing food safety scandal seen in China. Today, food safety anxiety is an element of food insecurity in China. To illustrate the current state of food safety in China, this section reviews some of the key contributors to the food safety scandal, including the decentralized system food safety regulation, the ineffective system of food safety monitoring, as well as environmental degradation and industrial pollution on the food system.

¹ Though interconnected, food safety and food security are two distinct terms that are conceptually different. As cited by the World Health Organization, food safety "encompasses actions aimed at ensuring that all food is as safe as possible" and require "policies and actions that cover the entire food chain, from production to consumption" (WHO, 2015). Though food safety is a significant aspect of the utility of food (a pillar of food security), having adequate food safety does not equate food security. A food system may have adequate food safety policies and measurements, yet remain insufficient in terms of food availability, access and other aspects of utility (such as food preference).

3.1.1 Decentralized system of food safety regulation

Though many governmental shifts have transpired in recent years to address the widespread food safety issues, the regulatory system remains highly decentralized, causing significant gaps in regulation practices between urban and rural regions and between regions of varying economic development (Liu & McGuire, 2015). The process of urbanization and industrialization in China has led to many socio-economic issues for rural regions—food safety being a prominent one (Liu & McGuire, 2015). With rapid economic growth, policy has not kept pace in many rural regions in regards to food safety regulation. As cited by Liu & McGuire (2015), a 2012 study indicated that over “80% of food safety incidents and 90% of food-borne disease” in China originate in rural regions (p.121).

A legacy of the socialist system has been a dual regulatory regime, where urban areas often have strong regulatory mechanisms in place, and where the rural systems are frequently very weak (Liu & McGuire, 2015). This is partly because urban fiscal budgets typically allow for a much greater proportion of funding to be used for quality control, while rural regions rely to a significant degree on extra-budgeting resources, which are attained through fines, confiscations, fees, and illegal bribes (Liu & McGuire, 2015). The system of profit-oriented regulation in rural regions is significantly less stable than the well-funded and independent systems of regulation found in urban regions. In addition to lack of fiscal support, regulatory bodies in rural regions are also mostly formed with staff that have less education, earn lower wages, and often are only employed on a part-time basis (Liu & McGuire, 2015). This imbalanced system of food safety regulation means that even well regulated urban regions are still experiencing food safety crisis because poorly regulated foods from rural regions generally sustain the urban food supply (Liu & McGuire, 2015).

3.1.2 Food safety monitoring

Through the expansion of food processing and production in China in recent years, an increasing number of stakeholders—such as small and medium sized enterprises—have become involved in food system activities (Lam, Remais, Fung, Xu, & Sun, 2013). Yet, regulatory bodies have not effectively monitored these activities, and mandatory training and licensing has been difficult to enforce (Lam, Remais, Fung, Xu, & Sun, 2013). As a result, new opportunities exist for producers and processors to “deviate from safe production practices” (Wang, Zhang, & Ortega, 2013, p. 115). The sheer number of people involved in the food system is reason enough for complications in controlling and regulating food safety measures. In a 2013 publication, it was noted that “more than 450,000 food production and processing companies” were active in China, and 350,000 of those companies were small-scale enterprises, employing fewer than 10 people (Lam, Remais, Fung, Xu, & Sun, 2013, p. 2050). These small and medium-sized enterprises often engage in food processing without adequate licensing, and often utilize unsafe practices below the radar of regulating bodies (Wang, Zhang, & Ortega, 2013).

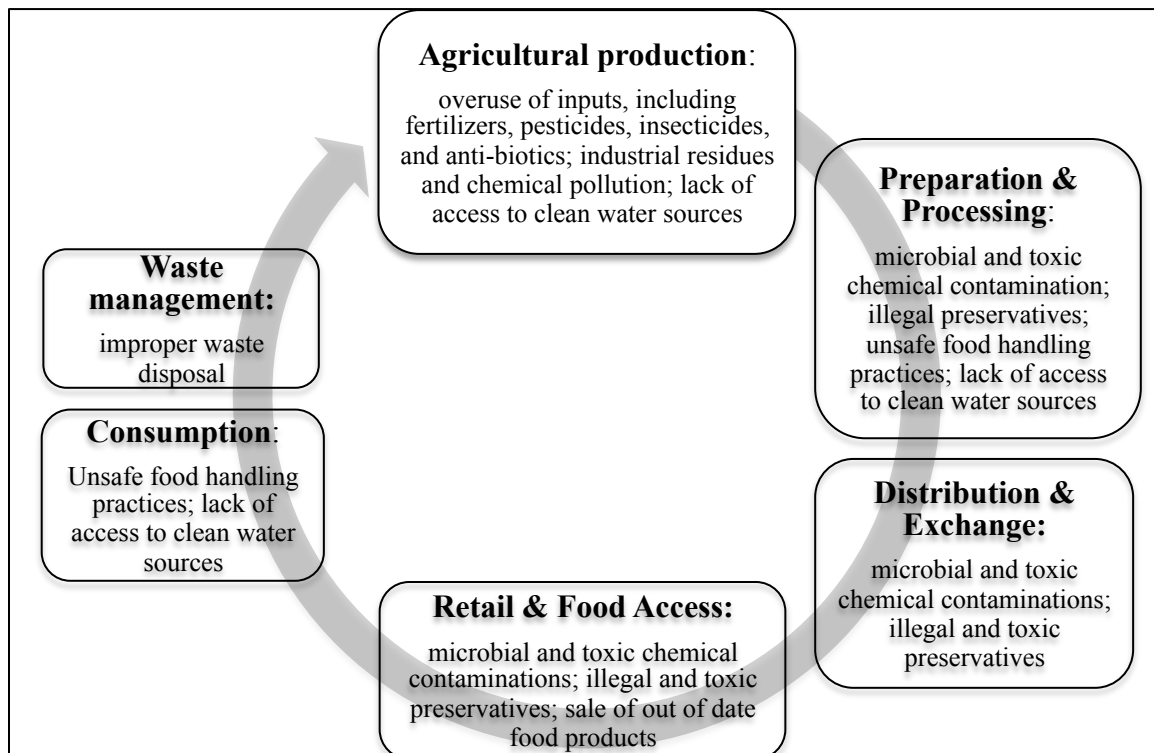
However, though food processing in China frequently takes place in informal spaces that are difficult to regulate or monitor, food contamination has also occurred widely in formal food production and government-regulated facilities. In 2008, several large dairy firms purposefully adulterated and contaminated milk and milk product with

melamine, a toxic chemical used to give watered down milk the appearance of a higher protein (Yan, 2012). From this, approximately 300,000 people (mostly children) were negatively affected, and the result for many was hospitalization for kidney stones or other health issues, and in extreme cases death (Zhang, 2005; Wang, Zhang, & Ortega, 2013). The melamine scandal has been by far one of the most serious cases of food contamination in China in recent years; however, it is indicative of the need for improved food safety regulation and monitoring across the country. This reality of risk in China has created widespread distrust of not only food and the food system, but also of state leaders and regulators (Lam, Remais, Fung, Xu, & Sun, 2013; Yan, 2012; Zhang, 2005).

3.1.3 Environmental degradation and industrial pollution

Rapid urbanization and industrialization and the consequential environmental pollution have led to contamination of agricultural lands, causing significant threats to food safety (FORHEAD, 2014). Figure 2 illustrates the many instances within the food supply chain in which food contamination can occur in China. In the most prominent stage, food production, extensive pressure is placed on small-scale farmers to produce greater amounts of food with limited resources and labour, which compels farmers to use chemical inputs to increase yields, with little information or education on the proper methods of application (Lam, Remais, Fung, Xu, & Sun, 2013). However, ill-equipped small-scale farmers are not the only cause for food contamination at the production level, nor are they the only responsible stakeholders.

Figure 2: Sources of possible contamination in the food supply chain



Source: Adapted from Lam H., Remais, Fung, Xu, & Sun, 2013.

The Forum on Health, Environment and Development (2014) states that pollution from industrialization and agro-industrial practices contribute significantly to environmental pollution in China, which has led to widespread food safety concern. Water and soil contamination transpires through industrial waste, overuse of agrichemicals, and heavy metal pollution from mining and industrial-related industries (FORHEAD, 2014). A 2012 report on water quality estimated that 39% of the water from river systems, 57.5% of water from lakes, and 55% of ground water sources in China are considered to be “bad” or of “extremely bad” quality, not suitable for human consumption (FORHEAD, 2014; MEP, 2012). Water is essential in many aspects of the food supply chain, including production, preparation & processing, and can be a major source of food contamination and food-borne illness (Lam, Remais, Fung, Xu, & Sun, 2013). In rural regions, where a substantial amount of food production takes place, it is estimated that less than one-third of the population has access to clean sources of water (Lam, Remais, Fung, Xu, & Sun, 2013).

3.2 Contextualizing Nanjing

This study took place in the urban region of Nanjing, of Jiangsu province in China. The city is located in the lower basin area of the Yangze River Delta, near the eastern coast of China. Nanjing is considered a “second tier city” due to several factors: its rapidly growing economy; its cultural significance, and its growing population. The city is known historically as being a capital city during ten different dynasties (Liu & Wu, 2005), but today is recognized more as a rapidly growing region that has undergone major transformations in recent years (Wu, 2007). The city is the second-largest commercial region in East China, following Shanghai (The Canadian Trade Commissioner Service, 2015), and is a prominent competitor in both petrochemical and textile industries (Wu, 2007). The total population of Nanjing’s 6 core districts, 5 suburban districts and 2 counties is over 8.1 million people (Nanjing Daily, 2012), though populations are concentrated within the 6 central districts (which is home to approximately 6.5 million residents) (Lui, 2013). Nanjing has not grown in size or population to the same degree as Beijing or Shanghai, but has undergone economic restructuring that has led to social polarity similar to other large urban regions in China.

Through era of Socialist industrialization (1949-1979), it was necessary for cities to be adequately supplied with food in order to ensure accelerated industrial growth (Shieh, 2011). Nanjing, like many other large Chinese cities, has a peri-urban zone that has traditionally produced the majority of the food to supply the city (Shieh, 2011). However, following the 1980s, systems of collectivized agriculture were disbanded and land-use rights were allocated to households (the Household Responsibility System)—giving rural people autonomy over the use of the land (Zhang & Pan, 2013). Many households decided either to pursue more rewarding non-agricultural work (often venturing to the city for new opportunities), or to engaged in crop specialization (Zhang & Pan, 2013). As China shifted to a market driven economy, the peri-urban agricultural lands of the past largely became sites for urban and/or industrial development (Shieh, 2011).

However, despite these shifts in urban food systems in China, Nanjing still maintains a significant amount of food production within its administrative boundaries.

As highlighted by Lang & Miao (2013), in 2007 Nanjing managed to produce 44% of its own grain; 40% of its own produce (fruits and vegetables); 20% of its own pork; 10% of its own fish; 30% of its poultry and 15% of its own eggs (p. 13). By comparison, a 2010 study in Toronto (Canada's largest metropolis) indicated that the city could only produce approximately 10 percent of its own fruits and vegetables (MacRae et al, 2010), a significantly lower capacity than what has been recently possible in Nanjing.

Nonetheless, Lang & Miao (2013) argue that processes of urbanization and shifts under the market economy impede the urban region's ability to be food self-sufficient over the long-term. Environmental degradation and pollution due to industrial development, and overuse of agricultural chemical inputs, are increasingly a cause for food safety and food security concern (Wu, Xu, & Gao, 2011; Ortega, Wang, Wu, & Olynk, 2011).

Zhang et al. (2015) highlight that economic development in the Yangtze River Delta (YRD) region has created a tradeoff between gains in agriculture productivity and losses of ecosystem services (Zhang, et al., 2015). The authors found that this region has experienced an ecological "tipping point" in the 1970s, when reforms to the agricultural system allowed for farmers to use more chemical fertilizers and pesticides (Zhang, et al., 2015). The expansion of agricultural systems in the YRD has meant extreme losses in water and soil quality, and a significant decline of biodiversity (Zhang, et al., 2015). Though the transition allowed for rural communities to lift themselves out of extreme poverty, it has meant ecological damage that has wide ranging implications (Zhang, et al., 2015).

Agricultural inputs (such as chemical fertilizers and pesticides) and industrial pollution are both common sources of food contamination in Nanjing (Liu, Pieniak, & Verbeke, 2013). A 2006 study found high levels of lead in vegetables in Nanjing markets, and alarmingly high levels of nitrogen and phosphorous in waterways due to agricultural runoff (Huang, et al., 2006). Another study found detections of organochlorine pesticides (OCPs), such as DDT, in air, water, soil and food in Nanjing, despite being banned for more than two decades (Gao, et al., 2005).

A major consequence of this environmental degradation and food contamination has been widespread distrust for food and food products among Nanjing residents. Several studies centered on measuring the consumer perspective on food safety found that urban consumers in Nanjing often resort to "safe food" labels (including hazard free, green and organic foods) in order to ensure their food is safe from industrial contaminants (Wang, Xiao, Zhang, & You, 2009; Liu, Pieniak, & Verbeke, 2013). A significant proportion of Nanjing residents are willing to pay premiums for foods that have traceability and quality assurance labeling (Zhang, Bai, & Wahl, 2012; Wu, Xu, & Gao, 2011).

"Safe food" and quality assurance labelling became more prominent in Nanjing markets and grocery stores following the early 1990s (Chen, 2014; Wu, Xu, & Gao, 2011). Quality assurance standards have led to various classifications of food, namely, "green food", "hazard-free food" and "organic food" (Scott, Si, Shumilas, & Chen, 2014; Wu, Xu, & Gao, 2011). Green labelling refers to food grown with limited use of synthetic chemical substances, and is comparably much safer than conventional foods that allow a greater use of synthetic chemical fertilizers and pesticides (Scott, Si, Shumilas, & Chen, 2014; Wu, Xu, & Gao, 2011). Hazard-free labelling was developed to address agricultural contamination and the interconnected food safety crisis (Scott, Si, Shumilas,

& Chen, 2014). Hazard-free labelling is supposed to indicate ‘pollution free’ food, though it does allow for a greater amount of synthetic chemical inputs than green food labelling (Scott, Si, Shumilas, & Chen, 2014). Organic food, the most stringent labelling standard, allows no use of synthetic chemical fertilizers, and has a much stricter regulation process than both green and hazard-free labelling. Though the availability of “safe food” is important for garnering consumer trust, foods with quality assurance labelling can be very costly for consumers. For example, organic vegetables could cost up to five times more than conventionally grown produce (Scott, Si, Shumilas, & Chen, 2014; Wu, Xu, & Gao, 2011). Thus, cost is a significant barrier for low income residents in the city, which means unequal opportunity for people in Nanjing to protect themselves from agro-industrial food contamination.

As this chapter stresses, food security cannot be attained in China while it still experiences such severe and widespread food safety issues. The chapter illustrates the prominent food safety issues through a depiction of how food safety regulation and monitoring is problematic in China. Lastly, this chapter described the prominent food system issues within Nanjing, contextualizing how food access and utility may be compromised in the urban region.

4. Methods

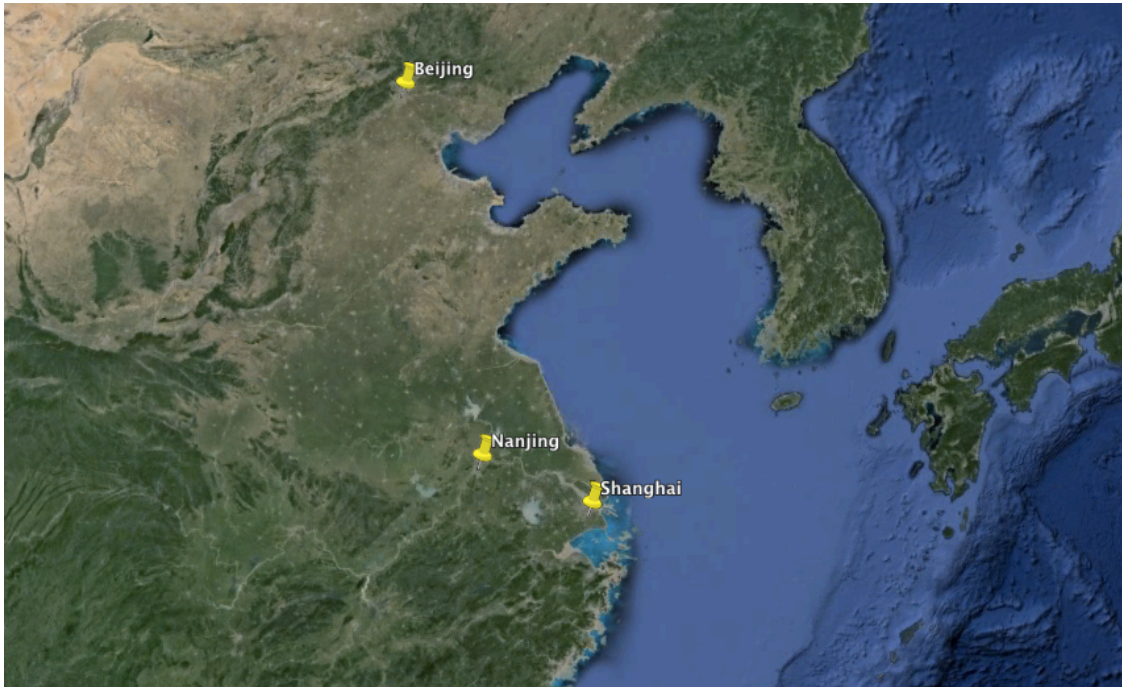
Through the process of developing this study, I aligned my perspective with feminist geographers Staeheli and Lawson (1994) in that I believe research should uncover the “knowledge that ‘mere folks’ produce”, and that it should “involve methods that connect everyday experiences with higher level patriarchal and [/or] political-economic forces” (p. 100). In line also with sentiments of Haraway (1991), this research intends to bring recognition to the unseen power relations and negotiations in society, and is intentionally inclusive of the perspectives and voices of people that are typically overlooked. This research aims to legitimize the value of ‘other’s’ knowledge, through the illumination of various ways of knowing and being, and to shed light on processes that can be considered exploitative or oppressive (Howitt & Stevens, 2005).

Considering the current climate of rapid economic growth and changing socio-political landscape and physical environment in China, an assessment of urban household food security with an inclusion of the urban residents’ experience is becoming increasingly important. Though this research does not aim to engage in a full assessment of urban food security, it seeks to highlight *perceptions* of vulnerability to food insecurity. This chapter reviews the procedures undertaken in development of the research, and describes the study sites in the city of Nanjing. The chapter also reviews the main limitations and the significant boundaries experienced during the research process.

4.1 Data Collection and Analysis

Field research was completed in Nanjing, Jiangsu province (see Figure 3), over the course of 12 weeks in the summer of 2014. Data were collected primarily in three neighborhoods of Nanjing: Chengxianjie in the central district of Xuanwu; Shudeli in the central district of Qinhuai; and Wen Kang Yuan in the inner suburban district of Qixia (see Figure 4). In the ‘wet markets’ (open air markets where fish, shellfish, meats, produce, and dry goods are sold by vendors) nearest these three neighbourhoods, a total of 214 surveys and 36 structured interviews were conducted with market shoppers (and occasionally vendors) collectively at the three market locations. At each market, structured interviews were also conducted with market managers to gain an understanding of the system of market management, the general distribution mechanisms and practices in Nanjing, and the methods for monitoring issues of food safety. Within the neighbourhoods, semi-structured interviews were conducted with employees and managers of the ‘Neighbourhood Committees’ (government structure on the most local or “grassroots” level). Lastly, two semi-structured interviews were conducted at Zhongcai Agricultural Distribution Centre in order to develop a broader understanding of the citywide system of food distribution and food safety management. All surveys and interviews were conducted with the support of research assistants and interpreters.

Figure 3: Nanjing in eastern China



Source: Google Earth, 2015

Figure 4: Neighbourhoods of study in the urban region of Nanjing.



Source: Google Earth, 2015

4.2 Research Methods

Hay (2005) suggests “the triangulation of methods and use of multiple methods...[can] offer a cross-checking of results, by approaching a problem from different angles and using different techniques” (p.12). This study utilized surveys, structured interviews and semi-structured interviews to examine urban residents’ perception of food security vulnerability. Surveys were initially used to determine the main concerns of urban residents in regards to food access and utility. As detailed above, this research intends to identify perceived sources of vulnerability (exposure or sensitivity) and methods of mitigation (coping strategies or adaptive capacities) to maintain household food security. A mixed method approach, or triangulation, of structured surveys, structured interviews, and semi-structured interviews was used to cross-check results.

4.2.1 Surveys

The surveys were structured to cover a wide range of topics in an attempt to gain an understanding of the issues considered important to urban residents. The survey topics ranged from food cost; food safety issues; trust in food sources; food access; food skills and literacy; the influence of imported or foreign foods on food safety regulation; and the impacts of environmental degradation on food quality (see Appendix 1). Two sessions of conducting surveys were undertaken on different days at each market, comprising six sessions in total. The three markets where surveys took place were Jinxianghe Trade Market near Chengxianjie; Kexiang Vegetable Market near Shudeli; and Nanwanying Trade Market near Wen Kang Yuan (See Figure 4). To pique the interest of market shoppers to participate in surveys, and to rely as little as possible on research assistants, a stand was set up with a poster outlining the research project, the purpose, and contact information to ensure adequate informed consent, and to inform participants about the intentions of the research. Participants were given a small deck of 16 cards, each containing one question (see Appendix 5 for a full list of the survey questions). At the booth, participants were asked to put the cards in the box that best represented their opinion. Each box was labeled: *strongly agree*, *agree*, *neutral feelings*, *disagree*, and *strongly disagree*. Plate 1 and Plate 2 (below) demonstrate the survey booth set up in market areas. All participants were offered a packet of facial tissues as a token of appreciation upon completion of their survey.

Surveys and interview questions were translated through the process of ‘back translation’, which involved the English version of the documents being translated into Mandarin by a translator (student research assistant), then translated once again into English (by another translator) to ensure the meaning was accurate. In instances where translations were not accurate, a third translator was asked to assist with the translation process until accuracy was achieved.

4.2.2 Structured interviews

Structured interviews were used in conjunction with surveys in all three market areas. Survey respondents that were willing to discuss the issues further were invited to participate in a structured interview, as were the onsite market managers. Participants

Plate 1: Survey booth at a wet market in Nanjing, July 2014



Plate 2: Research participants completing surveys in Nanjing wet market, July 2014



were offered an additional small gift as a token of appreciation (a travel mug or water bottle) for their participation in the interviews. Depending on the results from the surveys and structured interviews, the interview questions evolved from one session to the next to eliminate topics that were not of great concern to residents. For example, since many people did not think that the issue of declining food skills was a significant issue in the first few sessions, questions on this were left out of the subsequent set of interview questions.

Research questions for structured interviews were also translated through ‘back translation’ and printed preceding market visits. Research assistants performed the structured interviews on my behalf, scribing the responses in Mandarin, and later verbally translating the responses. Structured interviews were not audio recorded, as most participants did not approve when asked permission to record the interview. In writing up the results, pseudonyms were used in cases where research participants asked for their identity to be protected. The majority of research participants doing structured interviews requested anonymity, though market managers, neighbourhood committee members, and employees at Zhongcai Agricultural distribution center did not.

4.2.3 Semi-structured interviews

In addition to the above structured interviews, five semi-structured interviews were conducted, three with representatives of the neighbourhood committees near the market areas, and two with representatives from Zhongcai Agricultural Distribution Centre. The interviews were conducted in Mandarin, and were simultaneously translated into English by a translator. Respondents were also encouraged to share information they thought might be valid to the study, and the translator actively pursued additional information. The semi-structured interview allowed for more fluid conversation compared to the structured interview, and allowed for more rapport and trust to be developed.

4.3 Study sites

Since socio-economic status can vary from one neighbourhood to the next, the research originally intended to identify three neighbourhoods of varying socio-economic status in order to determine the various limitations and/or risks involved in attaining or maintaining food security. However, with the limited amount of socio-economic data available on the various neighbourhoods of the city, and the rapidly changing landscape of Nanjing, this type of assessment proved to be difficult. Instead, three areas of research were chosen based on their accessibility and their distance from the city center. The three vibrant neighbourhoods were found with a presence of a wet market, and an adjacent “neighbourhood committee” office. The following sections detail the three neighbourhoods based on information attained through semi-structured interviews with the neighbourhood committees at each site.

4.3.1 Chengxianjie Neighbourhood

Chengxianjie is located in Xuanwu, a central district in Nanjing. It is 0.8 km² in size, and is situated south of Beijing East Road, north of Zhujiang Road, east of

Jinxianghe Road and west of Taiping North Road (see Figure 5)². Over 18,000 people reside in the neighbourhood, which contains approximately 6400 apartments/living units. Housing in this neighbourhood is comprised of both private and publicly owned buildings. Private companies (such as electric companies) own many buildings and sell units for private ownership, mostly to workers of the companies. The government built many of the buildings also to house rural migrants, which are offered in compensation as part of a migrant placement program. The majority of development happened in this neighbourhood between 1980 and 1990, and only one building was erected since 2000. Housing is quite expensive in this area of the city. The university campus and a nearby high school (well-known for its high quality) have contributed to high property values. Units cost approximately 27,000 RMB (approx. \$4,500 CAD) per square metre, and range in size from 40m²-100m². Larger units are available, though more difficult to find. Generally, there are three types of homeowners in this neighbourhood: workers of international companies (high income earners); businessmen that sell digital products on Zhujiang Road (famous for electronics stores), and successful vendors from the nearby Jinxianghe Trade Market. Those that rent are mostly migrants. Rent ranges quite a lot depending on the size of the unit, though generally costs 2000-6000 RMB (approx. \$350-1000) per month.

Figure 5: Chengxianjie neighbourhood in Nanjing, near Jinxianghe Trade Market



Source: Google maps, 2015.

² Interview with Mrs. Huang, Neighbourhood Committee Employee, July 24, 2014.

The average income for this community is said to be approximately 2000 RMB per month (\$350 CAD/month), or 24,000 RMB per year (\$4000 CAD/year), which is quite low by Nanjing standards. In comparison, according to the Nanjing Government, the average disposable income (DPI) for Nanjing residents in 2012 was 36,300 RMB (Government of Nanjing, 2009). However, the Chengxianjie Neighbourhood Committee reported that only about 200 households have applied for MLS (must earn less than 1000RMB/month to qualify), which is only about 3 percent of the total households in the community.

4.3.2 Shudeli Neighbourhood

Shudeli is located in Qinhuai, a central district of Nanjing. The neighbourhood is approximately 0.16 km² in size, and is situated south of Zhongshan East Road, north of Chongfu Road, west of the Qinhuai River, and east of Changbai Street (see Figure 6)³. The neighbourhood is over 30 years old, and was part of a revitalization project during the 1980s when the area was completely torn down and rebuilt. Today, it has undergone few changes, mostly to address issues of cleanliness and traffic congestion. With many people living in the area, these two issues are highly problematic.

Figure 6: Shudeli neighbourhood in Nanjing, near Kexiang Vegetable Market



Source: Google Maps, 2015.

Over 8000 people live in the community, and roughly ¼ of the population are retired. Households can range from 2 to 10 people in one unit, and many families divide up their space to rent to migrants. Many young people from rural areas or other provinces

³ Interview with Ms. Yun and Mrs. Wang, Neighbourhood Committee Employees, July 23, 2014

go to Nanjing to look for professional work and rent in these spaces. Vendors from the nearby Kexiang Vegetable Market also rent in this area.

There are typically two tiers of homeownership or rental units in the city center: buildings owned and managed by the government are lower in quality and rented to people of lower income; and buildings owned and managed by private companies, are of higher quality and more expensive to rent. However, in general, rental units average at about 60m² in size, and can range in cost from 1000 to 2000RMB/month (approx. \$170-\$350 CAD). Homes can be purchased for approximately 20,000RMB/m² (\$3500/m²), and can range in size from 40m²-100m². The average income in this community is 3000-4000RMB/month (\$500-\$670 CAD/month) or 36000-48000RMB/year (\$6000-\$8000 CAD/year), which is an average to good income by Nanjing standards (Government of Nanjing, 2009).

4.3.3. Wen Kang Yuan Neighbourhood

The community of Wen Kang Yuan is located in Qixia. It is located south of the Baishui river, and is divided into two sections: one north of the Nanwanying Vegetable Market, and one south of the market (see Fig. 7)⁴. In total, the community is 0.22km² in size. Wen Kang Yuan is a new neighbourhood; it was built in 2008 to house relocated rural people displaced by rural development projects⁵. This community is considered the largest migrant “placement” community in Nanjing; 80 percent of the populations are rural migrants, while only 20 percent are from Nanjing originally.

The population of the community is approximately 4300 people. There are a total of 2300 apartments, with 2-3 individuals living in each unit. Though the majority of the population are “beneficiaries” of the placement program, only 55 percent of the population currently live in their own home, and the rest rent their units. Rental fees are approximately 700-2000RMB/month (\$120-\$350 CAD/month), and the units range in size from 45m²-102m². To purchase a home, it costs approximately 8500RMB/m² (\$1420 CAD/m²). The average income is approximately 2000RMB/month (\$350 CAD/month), or 24000RMB per year (\$4000 CAD/year), though the unemployment rate is very high. Most of the people that are unemployed in this community are middle-aged (40 years or older), and are looking for ways to become part of the workforce. The neighbourhood committee offers training to help migrants become more employable in the city. Table 3 outlines several key attributes about these neighbourhoods for easy comparison. The population size of each differs greatly from one area to the next. For example, the very central neighbourhoods (Chenxianjie and Shudeli) have a significantly greater population than Wen Kang Yuan. The rental cost is much greater in the very central neighbourhoods, though the income is quite similar among all three. However, the population density of Shudeli and Chengxianjie is questionable. It is curious how two neighbourhoods in such close proximity could differ so greatly in terms of population density. If accurate, a

⁴ Interview with Mrs. Wi, Neighbourhood Committee Employee, July 23, 2014

⁵ Though the interviewee described the beneficiaries of the placement program as ‘rural migrants’, it is likely that the beneficiaries are rural in the sense that they are from a rural area, yet they are still considered residents of the urban region of Nanjing. Migrants from outside Nanjing would not be supported economically and they would not be able to obtain property without a local Nanjing *hukou*.

population density of Shudeli would be 50,000 people per km²—over double the population density of Chengxianjie. Another key difference is that Wen Kang Yuan is an area built for migrant placement, and a significant percentage of the population in are unemployed, despite being beneficiaries of a placement program. As the Neighbourhood Committee employees commented, they are not seen as “poor” (even though they are unemployed and have limited job prospects) because of the compensation they received with their placement. Some families are said to own more than one home.

Figure 7: Wen Kang Yuan Neighbourhood, near Nanwanying Vegetable Market



Source: Google Maps, 2015.

Table 3: Key attributes of the three research locations⁶

Neighbourhood	Population	Population density (per km ²)	Size of neighbourhood (km ²)	Average household income (RMB/month)	Average rental cost (RMB/month)
Chengxianjie	18,000	22,500	0.8	2000	2000-6000
Shudeli	8,000	50,000	0.16	3000-4000	1000-2000
Wen Kang Yuan	4,300	19,545	0.22	2000	700-2000

⁶ The data represented in Table 3 are results from structured interviews with Neighbourhood Committee workers. They are not based on any written reports or official government documents.

4.4 Ethics and informed consent

Through the research process, this research abided by the ethical procedures of the University of Waterloo. For surveys, the information letter (that outlined the purpose of the study, the issues being studied, the expectations involved, and contact information) was translated into Mandarin and was presented to participants before they orally consented to participate. Participants were not asked for contact details, and were assured anonymity in the study if requested. Participants were, however, also given the opportunity to share contact details (such as an email address) if they were interested in learning about the results of the study. Only a small number of people left their email addresses.

For structured and semi-structured interviews, participants were also informed about the purpose of the study and the research objectives. Market managers were approached in person to participate in a structured interview, following their approval of conducting surveys with market customers. It was necessary to contact managers in person, as it was difficult to connect with them via telephone or email. In the case of the Neighbourhood Committee interviews, participants were contacted by email, phone, or in some cases, in person. In all cases, participants were given the introductory information letter and were asked to sign a consent form. The majority of participants verbally agreed to participate, but almost all participants declined to sign their name on forms.

Neighbourhood Committee workers were apprehensive about participating in the research when they were first contacted by telephone or email. They often expressed concern that the matters of their neighbourhood should be of no interest to foreigners, and that information would be withheld from foreign researchers. However, in cases where they were visited in person, and (through an interpreter) explained the nature of the research verbally, while also giving them a hard copy of the information letter, they were much more accepting of the purpose of the research and more willing to meet for an interview. Building rapport was a necessary step in gaining acceptance as a researcher. The formality of the introductory letter was seen as intimidating to participants, and the anxiety that people in Nanjing seemed to have towards foreigners was a significant obstacle when trying to build connection with potential research participants.

4.5 Coding and analysis

Data from the structured and semi-structured interviews were evaluated using thematic analysis, and survey data were analyzed with descriptive statistics. Upon returning to Canada, the results and transcribed interviews were coded using HyperRESEARCH, a qualitative analysis tool. Codes were developed and clustered based on themes informed by the literature review, as well as themes that emerged through the data. See Appendix 7 for a list of codes from HyperRESEARCH.

4.6 Ensuring Research Quality

Fieldwork comes with the ethical obligation of interpreting information responsibly, and to develop cross-cultural understandings that do not cause harm or

impose preconceived ideas on research participants (Howitt & Stevens, 2005). Many limitations and barriers were presented through the research process. Below is an outline of some of the cross-cultural challenges and limitations that were experienced.

4.6.1 Translation and transcription

As highlighted by Turner (2010), the work of interpreters and research assistants in human geography often remain unseen or silent, despite their significant contributions to the ways information is conceived. Temple and Young (2004) comment that “the translator makes her mark on the research, whether it is acknowledged or not, and in effect some kind of ‘hybrid’ role emerges in that the translator makes assumptions about meaning equivalence that makes her an analyst and cultural broker as much as translator” (p. 171). This research is a reflection of the interpretations, experiences and knowledge of the research assistants that offered their support. This section intends to recognize the contributions of translators to the research, and recognize their influence how the issues were understood.

This study relied upon structured interviews to a significant degree. Semi-structured interviews could only be utilized when the interpreter or research assistant was very confident in their ability to provide simultaneous translation. In many cases, research assistants needed time, privacy, and a relaxed atmosphere to effectively translate their written notes into English. Therefore, research assistants took rigorous notes as they engaged in interviews, and then translated the material following the interviews. When possible, photos were also taken of materials at markets that could be later translated and explained to support the transcribed information.

Working with student researchers in the field was both rewarding and challenging. Though some students were comfortable working with a foreign student and enjoyed the opportunity to practice their English, several were seemingly intimidated and nervous to work with a foreigner. Students had expressed that they felt pressured by their supervisors to assist in the research, and could not refuse despite their own discomfort. One student research assistant expressed her anxiety about speaking to ‘native English speakers’ and was visibly physically distressed by our interactions. This dynamic made the fieldwork very challenging, and created a significant barrier when attempting to build good relationships with student researchers.

In the later stages of the fieldwork, a student researcher who worked as a professional translator was hired. She assisted in semi-structured interviews at the Zhongcai Agricultural Distribution Centre, as well as the Neighbourhood Committee interviews. Through these semi-structured interviews, both the research assistant and I took notes, while she also simultaneously translated the responses of the interviewee. Following the interviews and field observations, we compared field notes and reviewed the discussion to ensure there was a common and clear understanding between us. Finding research assistants who are capable, willing, and interested in the research is an enormously important aspect of the research process, and crucial for ensuring good research results.

4.6.2 Limitations and Cross-Cultural Challenges

In *Doing Fieldwork in China*, Heimer & Thøgersen (2006) note that details of researchers' difficulties in a foreign space are regularly left out of publications that involve cross-cultural research. In many cases, research is presented as seamless and systematic, for fear that the validity or quality of the research might be questioned if issues or difficulties are more openly discussed (Heimer & Thøgersen, 2006; Wesche, Huynh, Nelson, & Ramachandran, 2010). The most prominent limitation of this research has been my limited fluency in Mandarin, the primary language spoken in this region of China. This proved to be a significant barrier through every stage of the research process, from the preliminary exploration stage, to the development of the literature review, research 'in the field', to the assessment of the data and the analysis of the results. The reliance on structured interviews (due to the significant language barrier) meant that discussion did not go further than the questions outlined. This limitation led to controlled dialogue, leaving little room for the exploration of new ideas. The language barrier also proved to be an issue when trying to ensure the research assistants understood the goals of the research, and that they could transliterate the specific terms of the research. For example, it was difficult to convey the multiple dimensions of the FAO definition of food security, as the term departs so greatly from notions of food security in Chinese language sources. Students often referred to concerns about food security, but when discussed further it was clear they were talking specifically about food safety. Further, in the field, it was difficult for student researchers to translate specific cooking methods mentioned by interviewees, or to express words that described everyday cooking methods.

The culture of research in China is also noticeably different from North America. In Canada, qualitative, constructivist or non-positivist research is considered a legitimate mode of research inquiry. Yet in China its value is not well recognized, and its use in social research is very limited (Heimer & Thøgersen, 2006). It seems as though researchers in China have little interest in exploring the ideas and thoughts of people, or examining subjects that cannot be quantified in a very specific way. After presenting the research outline at a workshop for geography graduate students at Nanjing University, both students and faculty seemed less interested in the work, and little support was gained. One faculty member explained that they did not see how our work would align, despite their extensive research on urban land use planning and urban development where food security was a significant aspect of their ongoing research. This was a reminder that there are differing understandings of the term food security between China and countries like Canada, and that it is framed much differently in scholarly discourse.

In many instances during the fieldwork in Nanjing the discomfort people felt with foreigners was palpable. China was largely closed off from the West prior to 1978, which meant that the general population did not interact with foreign people. This isolation from the West seems to have had a residual effect even today in Nanjing, where foreigners seem to be both vilified and celebrated. People in the field either expressed interest in me as a foreigner, or expressed distrust and discomfort with my presence. As mentioned above, Neighbourhood Committee managers often said that their work was of no concern to outsiders, and several refused to engage in an interview because of my foreignness. At times during the fieldwork, I was often referred to specifically as a *lao wai* in passing, which means 'foreigner' in Mandarin. However, my foreignness also made me a spectacle at times, which also enabled me to survey a substantial amount of people in the market areas, based on their curiosity to interact with me.

Lastly, a significant limitation in this study was the limited amount of research that currently exists on the subject matter. This research project was largely exploratory, which resulted in some survey and interview questions that in retrospect seem insignificant or misguided. The exploratory nature of this research meant that a lot of extraneous information was collected that did not end up directly informing the main arguments of this study. Therefore, not all of the data obtained through the surveys were included in the thesis. See Appendix 2 for a full outline of the survey questions.

4.6.3 Positionality and Reflexivity

I am aware of power relations and dynamics that exist in the research process. However, through the course of my fieldwork in China, being reflexive and understanding my own positionality became much more difficult and perplexing. On the one hand, the privilege I hold as a “white” westerner has allowed me the mobility and freedom to move from one country to another with relative ease; and the privilege I hold as a student researcher has allowed me to study and engage in research in this foreign place. Having been influenced by feminist geographers, I am mindful of my western bias, difference, and privilege—and I sought to engage in research with as much reflexivity as possible. Yet, being a woman in a patriarchal cultural environment, and where foreign bodies are often made a spectacle, I felt my position of privilege was interspersed with feelings of vulnerability. My perspectives on positionality in this context were very much conflicted. However, as I present my research today, I understand that my knowledge is “socially situated” and remains a reflection of my gender, background, education, experience, and other constructions of identity (Haraway, 1991). I do not claim that what I have observed and portray in this thesis fully represents the experiences of urban residents of Nanjing; rather, it is my interpretation of these perspectives.

4.6.4 Research Variables

In the development of this research plan, it was important to find a research location that was easily accessible and freely available, and where we could attract the attention of many potential research participants. Wet markets proved to be good locations for surveys and structured interviews, as many people visit them at all times of the day, and the majority of people had either recently engaged in a food-related transaction, or were en route to do so. Though the wet market as a location offered many benefits in terms of a high number of survey responses, the range of demographics of research participants may be more limited than if the research was conducted in a variety of locations. In a conversation with a research assistant, he mentioned that there are some negative impressions of wet markets in Nanjing, as they are considered to be a shopping destination for mostly low-income people. He felt that by surveying in only wet markets the study would only reflect the concerns of a certain socio-economic group, and the study would be overlooking the views of people of other classes. Further, wet markets in Nanjing are being overshadowed by grocery stores and supermarkets that offer more imported foods, which some deem safer or more desirable. If the research had included surveys in supermarkets and grocery stores, it is likely that the research would have been inclusive of a more diverse demographic than surveying at wet markets alone. However, there is already a significant amount of literature examining the perspectives of

supermarket consumers in China, and little research engaging wet market shoppers. Further, as mentioned earlier, the goal was to capture the experiences of more marginalized people, and to give an opportunity for excluded voices to be heard. The research continued in these locations, as they were considered valuable sites for accessing opinions of urban residents, and likely reflected the practices and experiences of the people that endure proportionally higher levels of vulnerability.

The time of day the surveys were conducted was also a significant variable in terms of research participant demographics. People who shopped in markets during the day were more likely to be retired, unemployed, stay at home caregivers, or students who were off for the summer break. Though surveys were often conducted until 7 pm in order to gain access to workers who were shopping on their way home, the majority of the time spent in the wet markets was during regular working hours.

There were few challenges in gaining interest of the public to participate in the survey and structured interviews. Though the attention of survey participants gradually waned over the course of the survey, it did not significantly impact the results overall. As demonstrated in Table 4, the survey was completed by a large majority of all participants. Once participants completed the survey, many people were interested to discuss more about food issues, and were willing to participate in interviews. However, interviews required a significant amount of time, and were very labour intensive for translators. After only a few interviews, research assistants were fatigued, mostly due to the extreme weather conditions in Nanjing during the summer months. Temperatures in July in Nanjing exceed temperatures of 40 degree Celsius, with a humidity of 80 percent. With these severe weather conditions, working in hot outdoor markets, with little airflow, was an added stress for the research team.

Table 4: Survey participation

Question	Total # people asked	Total # people answered	Answered (%)	Question	Total # people asked	Total # people answered	Answered (%)
1	214	213	99.5	9	214	202	94.4
2	214	207	96.7	10	214	198	92.5
3	214	207	96.7	11	214	201	93.9
4	214	206	96.3	12	214	200	93.5
5	214	203	94.9	13	214	200	93.5
6	214	206	96.3	14	214	199	93.0
7	214	201	93.9	15	214	198	92.5
8	214	203	94.9	16	214	198	92.5

5. Results & Discussion

This chapter is a review of the results from surveys, structured interviews and semi-structured interviews. First, this section assesses significant findings that emerged from the surveys, and are organized using ‘Sen’s entitlement types’ table (Table 1). Secondly, this section reviews the results of the structured interviews with urban residents, which are classified based on the ‘Framework for understanding household vulnerability’ table (Table 2). Lastly, this chapter assesses the city government’s efforts to address food safety issues—such as the shifts in food system monitoring, distribution, and regulatory practices in Nanjing—highlighting findings from both the structured and semi-structured interviews with market managers and managers at the Zhongcai Food Distribution site.

5.1 Examining Nanjing residents’ perceptions on access and utility

Using the ‘entitlement’ categories, the results of the surveys were categorized as being an issue of either *access* or *utility*. Table 5 outlines the categorization of the survey questions, among the two entitlement types. This section first reviews the survey results by first examining perception of *access*, followed by an examination of the perceptions of *utility*. Questions on *availability* were largely left out of the survey, as it may be considered an issue dealt with more on the macro level than on the micro. As detailed in the “Four Pillars of Food Security”, availability is referred to as the supply side of food production (FAO, 2009), which is discussed further in section 5.3.

Table 5: Survey questions that address access and utility of food

Access	Utility
<ul style="list-style-type: none"> • The cost of food is of growing concern to me. • In the last 12 months I worried whether our food would run out before we could purchase more. • I think most people in Nanjing can afford or have access to enough food to have a healthy life. • I feel the food available to me and my family is good both in quality and quantity • My home shares food with my extended family and other close friends on a regular basis 	<p><i>Food safety and trust:</i></p> <ul style="list-style-type: none"> • I feel the food at wet markets is safe and healthy. • I often felt in the last 12 months that the food I had purchased was not fully safe to eat. • Recently, a household/family member got sick because of food contamination. <p><i>Environmental concerns and food safety:</i></p> <ul style="list-style-type: none"> • I am concerned about the decline of the environment, and feel it is having an impact on the food we eat. • I am concerned about the possibility of genetically modified organisms (GMO) in the food that I purchase.

In this assessment, I have included only the result of ten of the sixteen questions asked. As mentioned, the survey was used to gauge what issues were of significant

importance to urban residents in Nanjing. Several of the questions asked did not inform the study in a significant way, and therefore were left out of the results section. Survey questions were left out that did not directly speak to food cost, food safety, or environmental concerns. Table 6 outlines the survey questions that were left out of the assessment. Appendix 2 includes an outline of the survey, and Appendix 3 includes a tabulation of the survey results.

Table 6: Survey questions left out of assessment

I know a lot about cooking and how food relates to health because my parents or other relatives taught me.
In general, I think the younger generation is becoming less skilled in cooking and food preparation than earlier generations.
I often learn about food and how it relates to health through the internet or television (or social media).
I feel that foreign restaurants and fast food chains are infringing on Chinese cultural cuisine.
I think foreign food in stores improves the quality of the food in Nanjing, and creates a higher standard of food.
I feel concerned that the future generations will have poor health because of the changes in diet.

5.1.1 Food Access

In determining the degree to which urban residents deemed food accessible in Nanjing, several questions focused on the perceived impacts of food cost on individuals and households. The USDA’s “Guide to Measuring Household Food Security” outlines that there is a range of severity in which households experience food insecurity (Bickel, Nord, Price, Hamilton, & Cook, 2000). For this reason, the survey attempts to gauge the degree to which urban resident perceived food to be inaccessible (based on cost). The key questions/statements were: “The cost of food is of growing concern to me”; “In the last 12 months I worried whether our food would run out before we could purchase more”; “I think most people in Nanjing can afford or have access to enough food to have a healthy life”; “I feel the food available to me and my family is good both in quality and quantity”; and “My home shares food with my extended family and other close friends on a regular basis” (Table 6).

Interestingly, as outlined in Table 7, 80.8 percent of respondents indicated that they were concerned about food cost in Nanjing, but only 27.1 percent of respondents felt worried their household would run out of food before they could purchase more. This gap between having concerns about food cost, and worrying about running out of food could indicate the degree to which food insecurity (in terms of accessibility or affordability) may be considered severe in these neighbourhoods. However, 27.1 percent is a very significant number of people to feel insecure about food lasting between food purchases.

With this, I speculate that some level of hunger may be experienced, and that fluctuating food costs likely impedes household food security.

Despite the clear concern over fluctuating and rising food cost, over 56 percent of respondents felt that people in Nanjing could generally afford and have access to enough food for a healthy life, and 57.1 percent said they felt the food available to them was good in both quality and quantity. Lastly, 64.5 percent of respondents indicated that they share food with other families on a regular basis. Though food sharing is a common social and cultural practice all over the world, these results might also indicate that social networks are an important coping mechanism for maintaining food security. Though the survey questions do not delve deeper into the reasons for food sharing, it offers a platform for further investigation in the structured interviews.

Table 7: Perceptions of food cost and accessibility in Nanjing (N=214)

Questions	% Agree	% Neutral	% Disagree	% Non- response
• “The cost of food is of growing concern to me”	80.8	10.7	4.7	3.7
• “In the last 12 months I worried whether our food would run out before we could purchase more”	27.1	12.6	54.2	6.1
• “I think most people in Nanjing can afford or have access to enough food to have a healthy life”	56.5	16.8	21.5	5.1
• I feel the food available to me and my family is good both in quality and quantity	57.1	22.4	15.4	5.1
• My household shares food with my extended family and other close friends on a regular basis	64.5	12.6	17.3	5.6

5.1.2 Utility

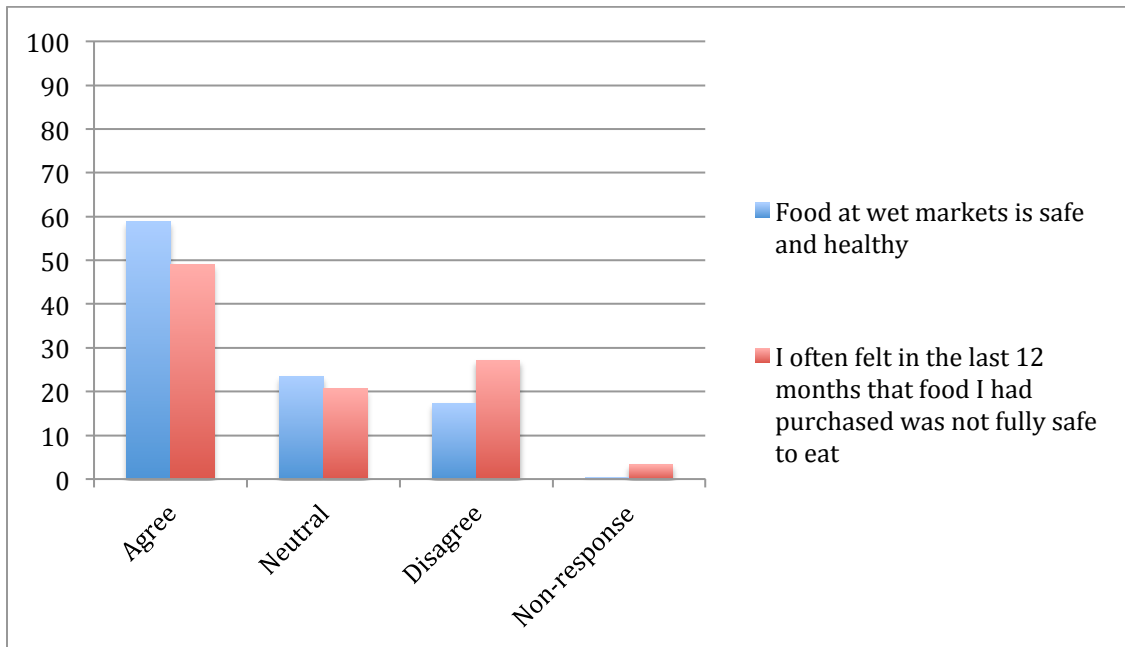
In determining the degree to which urban residents deemed the utility of food adequate in Nanjing, several questions focused on the perceived impacts of food safety on individuals and households. Questions here cover the general perceptions of the safety of food, as well as environmental concerns related to food safety. Since genetically modified organisms (GMOs) were a significant story in the news in China at the time of

my fieldwork, I included a question about them in the survey to gauge people's concern over the possible presence of them in the food system. The questions linked to the utility of food are: "I feel the food at wet markets is safe and healthy"; "I often felt in the last 12 months that the food I had purchased was not fully safe to eat"; "I am concerned about the decline of the environment, and feel it is having an impact on the food we eat"; "I am concerned about the possibility of genetically modified organisms (GMO) in the food that I purchase". I then graphed survey results, comparing the themes that are inter-related. For example, I assessed the amount of people that were in agreement or disagreement with "I feel the food at wet markets is safe and healthy", and "I often felt in the last 12 months that the food I had purchased was not fully safe to eat". I also compared how many people were concerned about the impacts of environmental degradation on food, and how many people were concerned about the presence of GMOs.

Interestingly, Fig. 8 demonstrates that 58.9 percent of 214 respondents felt the food at the wet markets was "safe and healthy", while 49.1 percent stated that they felt (in the last 12 months) that food they had purchased was not safe for consumption. These conflicting results offer an interesting platform for further analysis. It is curious that a substantial amount of people generally considers the food at wet market safe, even though they may have experienced suspicion in the past about its safety. Here we might consider the transition that has occurred in recent years in many urban Chinese wet markets. As explained by Zhang & Pan (2013) in "The Transformation of Urban Vegetable Retail in China", wet markets have become increasingly privatized following the transition to a market economy, shifting from a state-operated system to more privately owned and operated systems (Zhang & Pan, 2013). Through this, wet markets in many large cities were renovated and given improved ventilation, plumbing, access to water, and enforced clearer labeling of foods and their origins (and in some cases refrigeration), to ensure a safer and more hygienic atmosphere (Zhang & Pan, 2013). The results demonstrated in Fig. 8 may conflict because consumers may feel that the wet markets have become safer in recent years, though generally they feel distrust for food safety because of environmentally devastating agricultural practices and the related food safety crisis that has been prevalent in recent years.

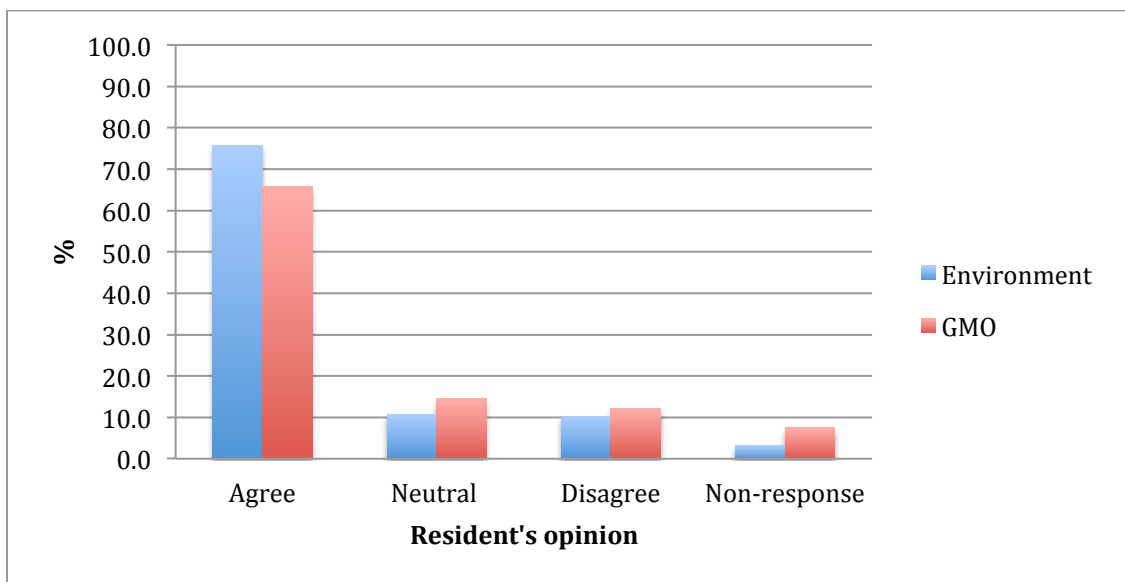
However, the questions themselves are quite vague, which could also be another reason for conflicting results. They do not specify what consumers may deem "safe and healthy", nor do they specify the reasons or causes for the distrust they feel about the food they have purchased. The second question also does not specify what types of food they may have purchased that they felt discomfort with, or where those foods might have been purchased. This may indicate that distrust may not be held for the wet markets or their management structures, but rather they may feel distrust for vendors or food sources outside of the wet market, or the wider food system in general. It is also possible that consumers have trust in the vendors they regularly come in contact with at the market, or have trust in their own food purchasing choices, but have little trust for the food system generally. Though these questions may not adequately capture the actual concerns consumers have over the safety of the food they are purchasing at wet markets, they do offer some interesting insights into perceptions on food safety, and did help in the development of questions for structured interviews, which are further discussed in section 4.2.

Figure 8: Conflicting perceptions on food safety in Nanjing (N=214)



Several questions were asked to determine the degree to which urban residents perceived environmental decline a problem for food safety. Questions asked were “I am concerned about the decline of the environment, and feel it is having an impact on the food we eat” and “I am concerned about the possibility of genetically modified organisms (GMO) in the food that I purchase”. As detailed in Fig. 9, 75.7 percent of respondents felt concerned about environmental degradation and its impacts on the food, and 65.9 percent felt concerned about the possible presence of GMOs in the food system.

Figure 9: Residents’ concern over environmental degeneration and GMOs in the food system (N=214)



The significantly high numbers indicate that people generally feel insecure about the environmental degradation that is prominent in and surrounding Nanjing (and perhaps China more generally), and that they feel that environmental issues are having an impact on the food they eat. Though the questions are slightly vague (as they do not specify what types of impacts they may perceive to be connected with food, or what kinds of foods are being affected by environmental degradation), the results are valuable as they demonstrate that general feelings of insecurity are being experienced.

5.2 Sources of vulnerability

Similar to the Moser framework discussed in section 2.3.1, the results of the structured interviews were coded and classified into two main categories: source of vulnerability and response to vulnerability (see Table 2). This section is an examination of the primary perceived sources of vulnerability held by urban residents in Nanjing. Through an assessment of the structured interviews, several key themes emerged when discussing sources of vulnerability to food security, such as: ineffective regulation, poor hygiene/food handling, poor farming practices, overuse of chemicals (fertilizers and pesticides), environmental degradation, GMOs, untrustworthy food imports, food adulteration, false or fake foods, contaminated foods, spoiled foods, spoiled or fake meats, and rising or fluctuating food cost. In order to clearly organize the results, food safety is discussed in this section as part of either the ‘production stage food safety concerns’, or ‘food processing, preparation and retail stage food safety concerns’. Food cost was another key source of vulnerability further discussed in this section.

5.2.1 Concerns over food safety

Food contamination at the production stage was by far the biggest concern for urban residents in Nanjing. Through structured interviews I found that respondents were anxious about pollution (water, soil, air), and the health impacts of eating fruits and vegetables grown in heavily contaminated areas. They were also particularly concerned about the overuse of pesticides, herbicides, and chemical fertilizers in growing fruits and vegetables, as well as poor farming practices that result in unhealthy animals. The presence of GMOs in the food system was also a significant part of the discussions throughout the structured interviews.

Generally, many urban residents in Nanjing mentioned concerns over air, soil and water pollution (referred to as environmental pollutants hereafter), but no one specifically discussed how they saw it to be interrelated with food quality or safety. Several respondents mentioned the issue of environmental pollutants when justifying their purchases of foods with certain labels (such as green, hazard free or organic foods), or when discussing the many methods they used to protect themselves from environmental pollutants (discussed further in section 5.2.2). In general, residents were mainly concerned about the impacts on health, and were frustrated by the government’s inability to limit agricultural chemicals in the food system. Many interviewees discussed the failed system of regulation and monitoring, which was a source of frustration for many people. One respondent stated,

“Agrochemicals are my biggest concern. I work at a chemical company here [in Nanjing], and I know that depending on the county,

different labels are used on the same product. No one knows what is being used out there, and farmers are using the chemicals without proper instruction (Mr. Lee, July 6, 2014).

Poor government regulation is a source of blame for many. Residents feel that with stricter enforcement and regulation, food would be much safer for consumption. Though blame is also placed on farmers for using chemicals, the expectation is that government is responsible for ensuring proper practices in agriculture. One resident voiced,

“Government should pay more attention to the drivers of food contamination, for example the overuse of chemicals and pesticides. The farmers are using too many chemicals” (Mr. Zheng, July 10, 2014).

However, many residents feel that the problem cannot be solved with any system of regulation or monitoring. Another interviewee expressed,

“Both farmers and the government are responsible for the food safety issues we see today. The system is so broken that there is not one area for regulation, but a mess of problems that there are no solutions for” (Mrs. Leung, July 10, 2014).

Despite significant shifts in food distribution, monitoring and regulation in Nanjing in recent years (discussed further in section 5.3), residents remain pessimistic about improvements. The efforts of government to improve food quality and safety are seen by many as ‘superficial’, and put in place simply for appearances. An interviewee at Kexiang Vegetable Market argued,

“the regulations are superficial...the food looks good on the shelves, but likely are not very safe because of chemicals, which are unseen” (Ms. Li, July 8, 2014).

However, some residents also feel optimistic that with improved information sharing (through social media and television for example), that people are becoming more aware about food system issues, and can therefore place more pressure on governmental structures to improve food quality. In many ways, this shift is already taking place in Nanjing. One resident supports this sentiment,

“I think government regulation is [the] most effective [way] to increase the food quality in Nanjing. People are more educated because of the media—they know more about health and have higher standards. Sanitation has improved a lot in wet markets” (Mrs. Jiang, July 8, 2014).

Further, the presence of GMOs is also a significant concern to residents in Nanjing. At the time of the fieldwork, GMOs were a prominent story in the news and social media. Research and development of GMOs had taken place in Chinese universities for several years, and debate over their mainstream use in China’s food system was heavy at this

time. Surprisingly, there were many expressions of ambivalence about GMOs in the interviews, and some even expressed that they felt GMOs were a symbol of progress or high status. However, despite prominent discussions of GMOs in the media, the public did not seem adequately informed about the implications of their presence in the food system. One market customer stated,

“I have heard of GMOs, and know of a famous journalist that writes about it. I feel like they might not be necessarily bad... if everyone eats them, then I will eat them. They are more expensive to produce, so only wealthy people really care about eating them. Though I have no strong feelings or opinion about their safety” (Ms. Zhang, July 8, 2014).

This comment is intriguing as it suggests a perspective that GMOs are associated with wealth and social status, a view uncommon in the Canadian discussion. However, through Green Revolution era, GMO propaganda often framed its research and development as progress for the developing world. It is not clear if this is a common sentiment in China.

Lastly, poor farming practices were also a concern of several residents interviewed. Before my fieldwork began, a prominent news story involved the appearance of (possibly diseased) dead pigs in the Huangpu River, a Yangtze River tributary near Shanghai (Duggan, 2014). The scandal, occurring for a few years in several regions in China, reinforced distrust of large-scale livestock farming practices. Urban residents felt skepticism that monitoring mechanisms were effective in ensuring meat in the market is safe or free from disease. Residents are left to use their own best practices at home to try and make the food safer for their families. One resident expressed,

“I think pork is unsafe because many pigs are said to be sick in China, and we don’t know if it was healthy before they were slaughtered. I eat less meat. If my husband or daughter wants meat, I will boil it to try and make it safer” (Mrs. Au, July 10, 2014).

Aside from the production stage, urban residents in Nanjing are concerned primarily about food contamination that takes place during food processing & preparation, as well as retail. As highlighted in an earlier chapter, safety concerns in food processing became a prominent news story in China following the Melamine scandal of 2008, where thousands of people were affected by contaminated milk. Since then, food safety scandals have multiplied—fake meats (BBC News, 2014), fake eggs (Rice, 2015), and “gutter oil” (The Economist, 2011) are just a few examples of stories that reached international headlines in recent years. Anxiety over food safety is a massive issue for urban residents in Nanjing. One urban resident stated,

“I don’t trust any of the food I eat, but I just eat it and hope for the best. I worry for my children, but it is what there is here in this country [China]. (Mr. Fung, July 6, 2014).

The distrust of food is not confined to major food production companies. Rather it extends to many aspects of the food supply chain from small-scale food processors (such as street and market vendors), to restaurant owners, food retailers, as well as the market

regulators that implement laws to protect residents from threats of food safety. Many research participants commented their distrust for places that they regularly buy food. One participant discussed this issue:

“Safety is definitely a problem. My husband and I ate bad ham and had to go to the hospital. We bought out of date ham from a suguo (chain grocery store). The store did not take responsibility for our sickness. Also, I feel uncomfortable buying food at this wet-market actually, because another time I bought a cake that was out of date. I don’t trust the vendors anymore” (Mrs. Chan, July 25, 2014).

Meats and prepared foods were the most commonly mentioned foods that residents felt anxiety about from markets and street food vendors. Several people interviewed in the markets expressed their discomfort with prepared foods because it is not clear what ingredients were used in the preparation of those foods; they cannot tell the freshness of the foods; or they simply assume the vendor is trying to make up lost costs of unsold products. For this reason, consumers generally have more trust for product that are packaged and that have quality assurance labeling, a best-before date, and a list of ingredients. An interviewee at Kexiang Market expressed,

“I think cooked food in the market is unsafe, and [I] avoid it... same with fried foods. I also feel that salt and fat sold in bulk at the market is of lower quality, which makes it questionable. If it doesn’t have a package, I don’t trust it. I will also cook meat for a very long time to make it safe from bacteria, and soak vegetables to try and make them clean” (Mrs. Xu, July 17, 2014).

After speaking to a pork vendor at Jinxianghe Trade Market, I found that many vendors purchase meat from an abattoir at 3:00 or 4:00 A.M, and hold it in coolers or on the counter until 6:00 or 7:00 P.M (Mrs. Lo, July 10, 2014). Not all vendors at the market have access to refrigeration space, which means that cuts could potentially be held at “danger zone” (above 5 degrees Celsius) temperatures for fifteen to sixteen hours. Many meat vendors keep cuts on display on counters without barriers or sneeze guards, and simply fan cuts of meat to prevent flies from settling on them. In some cases, if cuts are not sold, vendors may attempt to sell them again the following day (Mrs. Lo, July 10, 2014). This issue of bacterial meat contamination is a prevalent issue in Nanjing markets. A woman interviewed in Nanwanying Vegetable Market commented,

“I feel uncomfortable with the food from the market. I worry that the vendors may sell old meat from previous days, and sell it claiming it to be fresh” (Mrs. Wang, July 25, 2014).

Similarly, another market shopper at Nanwanying Vegetable Market expressed:

“I feel the meat is unsafe in the summer when there are many flies. If I buy meat, I will only buy frozen meat” (Mr. Chiang, July 25, 2014).

Further, not all markets or market vendors abide by the rules of proper labeling for quality assurance, nor do they all properly monitor the origins of the food sold in the market. Though many wet markets in Nanjing have implemented the IC Card System

(the system of monitoring in food distribution in Nanjing, discussed further in section 5.3) and are required to display quality assurance labeling, this system of regulation is not uniformly implemented or regulated citywide. This lack of homogeneity in food regulation in Nanjing is a source of anxiety for urban residents, as it means a lack of reliability for consumers. A woman interviewed in Kexiang Vegetable Market stated,

Safety is really important to me. I am most afraid of spoiled meat. I am also really concerned about where the food comes from. The vendors are not required to have labels at stalls showing where it is from [at this market], so I feel there is no guarantee for food safety. Also, I have no idea how old the meat is, so prefer not to buy it from the market (Ms. Cheung, July 17, 2014).

However, despite these wide ranging issues and concerns over food safety, wet markets in Nanjing have undergone massive restructuring and have improved food-handling practices in recent years. As mentioned earlier, many Nanjing wet markets have been privatized and revitalized, improving access to water and refrigeration. One interviewee recalls the transition, though still has reservations about food safety issues in Nanjing markets. He explained,

“Before 1958, the selection of food was limited, and food was rationed. After 1990, the government stopped regulating the vendors [and the vendors] are now hired by a private agency. The market has become cleaner and nicer, but food safety is still worrisome. But, I have been worried about the safety of food since 1949” (Mr. He, July 6, 2014).

Though a higher percentage of respondents indicated that food cost (80.5 percent) was a more prominent issue than food safety (27.1 percent of respondents felt food was unsafe in markets) in the surveys, I found that there was more in-depth discussion about concerns over food safety than food cost in the structured interviews. This could possibly be due to the amount of media attention food safety scandals have created in recent years, or possibly because the impacts of food cost is inherently related to status and income, and therefore a more sensitive issue. However, though there was less discussion about the impacts of food cost, I did find through this study that there were two prominent groups that may be more vulnerable to fluctuating food cost: those who are retired and relying on social assistance, and market vendors or small food business owners. Rural migrants are also potentially vulnerable to fluctuating food costs; however, limited information was collected to support this assumption.

5.2.2 Food cost

In general, most respondents recognized that living standards in Nanjing are improving. Many people commented that wages are increasing, and the middle class is expanding. However, as noted in an earlier chapter, not all people in the city are experiencing this increasing wealth equally. Those that live on the fringes, namely the elderly and rural migrants, are some of the most marginalized groups in the city. Through my interviews, I spoke with many retirees who openly addressed financial issues they faced on a daily basis. Further, market vendors and small food business owners were significantly affected by fluctuating food prices.

One elderly woman who spoke to me at Kexiang Vegetable Market mentioned that the cost of food is rising and is putting pressure on her budget (Mrs. Yu, July 17, 2014). Since she is retired, her ability to earn more money is limited, and food costs continue to rise (Mrs. Yu, July 17, 2014). Other retirees mentioned that rising food cost has meant delegating money to food that was meant for other things—such as utilities or clothing. Some also stated that they have had to eat less because of the burden of rising food costs. One woman expressed,

“The cost of food is rising. I notice in particular the rising cost of eggs, which I eat a lot of. Both my husband and I are retired, so the rising cost of food places a large strain on our household budget, often limiting what we can afford” (Mrs. Suen, July 17, 2014).

Another retired woman interviewed at Nanwanying Vegetable Market indicated that:

“With the rising cost of food, I am forced to change my purchasing habits, which means buying less clothes or other goods in order to buy food” (Mrs. Fong, July 22, 2014).

Though food cost seemed to affect retirees to a greater degree, several middle aged people also commented that the rising cost of food is concerning to them as well. The main concern is that food cost seems to be rising faster than increases in wages and salaries. One middle-aged woman at Nanwanying Vegetable Market commented,

“The rising cost of food causes me stress. The prices change very quickly, and it is different in different seasons. My family eats food in the house very fast, and it causes me stress” (Mrs. Tse, July 22, 2014).

Another woman at the market also mentioned:

“Rising food cost is concerning, as it is happening faster than increases in wages. I have less money these days, and I feel the stress of rising food costs” (Ms. Tam, July 22, 2014).

During my fieldwork in wet markets in Nanjing, market managers had underscored that I was not to speak to market vendors or pursue interviews with them, as vendors were very busy and I was not to impose upon them. However, through the six survey sessions I conducted at the various wet markets, vendors often approached me out of curiosity or to comment on the research project. In one instance, I was able to interview a meat vendor and discuss a few topics with her. The most intriguing aspect of this was learning more about the daily routine, and how vulnerable vendors are to market price fluctuations. When I asked her about the price of pork, and whether she had been affected by price fluctuations, she answered,

“[Pork] just recently it rose by 1 RMB [per kg], but I can't change the price of it right away. I have to change it gradually, so that I remain competitive. There are ten other pork vendors here, so we can't have a different price from the competition. I think the situation is different for vegetable vendors though. If the price changes, I don't think it affects the shoppers too much. For meat it is different. The product [meat] is more expensive than vegetables” (Mrs. Zheng, July 10, 2014).

The intriguing aspect of this interview was learning that wet market vendors work as independent retailers, and that food cost fluctuations place significant additional economic pressure on vendors. Through discussion with market managers, I found that vendors are responsible to pay for their product purchase, in addition to water access fees, the cost of electricity, air conditioning as well as parking and vehicle operation (Mr. Wong, July 17, 2014). At the wet markets, vendors have to pay anywhere from 17000 to 27000 RMB/year (\$2,850-\$4,500CAD/year) in rental fees for their stalls (Mr. Wong, July 17, 2014). With fluctuating food costs vendors strive to remain competitive, though they may not be able to adjust the price of the items to ensure an adequate income. Previously, under the publicly owned and operated structure, vendors were state employees and received a wage for their labour (Zhang & Pan, 2013). In the privately owned system in Nanjing, it is most often migrant families operating the market stalls (Zhang & Pan, 2013). In my observations in the markets, I also noted many school-aged children working behind the counter with their parents, even during school hours.

The fluctuating food cost also affects restaurant owners and small food enterprises to a significant degree. Several of my interviewees were business owners, and they commented that the fluctuating food costs are affecting their business. One restaurant owner commented,

“Food prices rise quickly and go down slowly. I have no method to protect myself from this price instability. I make less money in the end because I cannot raise the price of dishes at my restaurant. I am concerned about keeping my customers, and remaining competitive”
(Mr. Fang, July 10, 2014).

The issue of food cost is an issue inherently connected with food safety as well. For food businesses or vendors to remain competitive, there is a possibility that they may resort to unsafe food practices to cover their costs. For example, it was often a concern of urban residents that prepared foods sold on the street were old, or could contain unsafe cheap ingredients such as gutter oil or fabricated meats. The issue of food cost is not only a threat to food security in terms of *access*, but also *utility*.

5.3 Responses to vulnerability

In discussing with urban residents how they navigate the food issues they face on a daily basis, many referred to how they choose foods in the market, or how they prepare foods in order to ensure it is safe for consumption. When assessing the interview results on responses to vulnerability, several key themes emerged, such as: finding signs of agrochemicals on produce; using various food preparation techniques to ensure safety; determining high quality produce; determining high quality animal proteins; purchasing only trusted brands; building relationships with farmers; and sharing food with family and friends. This section organizes these key themes, and presents them here as either a short term coping strategy, or a long term adaptive capacity. See Table 9 for a summary of both sections 5.2 and 5.3.

Environmental pollutants were some of the most prominent sources of vulnerability discussed by urban residents. Many people were unsure of how environmental pollution affected the food supply, yet several interviewees had indicated

various methods of how to navigate the presence of agrochemicals in their food. Interestingly, many people discussed the methods they used to navigate the perceived vulnerabilities, but most could not explain or justify the reasons for these practices. For example, one resident indicated that when purchasing tomatoes, she looked for rings on the ‘blossom end’ of the fruit (Mrs. Au, July 10, 2014). She believed that if it had rings, it mean chemical fertilizers were used to grow the fruit, and that it should be avoided (Mrs. Au, July 10, 2014). Many people also commented that it was important to soak vegetables for at least 30 minutes with water before cooking, to ensure it was free from chemicals or ‘poisons’ (as pesticides and chemical fertilizers were often referred to as). Residents also claimed that it was important to look for small green cabbage worms in brassicas (greens like cabbage and broccoli) in the market, to ensure that pesticides were not used on them. Worms are said to be an indicator that the foods are safe from agrochemicals. However, a few respondents also expressed their suspicions that vendors purposely placed worms on vegetables to give it the appearance of safety.

Interviewees often discussed that there was a large presence of poor quality food in the market. Residents utilized methods to ensure they purchased foods of the highest quality, and to ensure a healthful and nutritionally rich selection of foods for their families. For example, residents claimed that by choosing the brightest coloured fruits and vegetables, or by choosing only those in season, that they are able to ensure a high quality selection. Further, many people found it very important to purchase only foods that are still caked in mud—and that are not sprayed with water—to ensure freshness and high nutrient content. This is because vegetables that are completely clean and sprayed with water are thought to be older than they appear, and could have been sitting on the shelf for several days before being purchased. Lastly, some interviewees also claim that they can simply look at the stem of the fruit or vegetable to tell its freshness—if the stem is dry, then they know it is not fresh.

Generally, the quality and safety of meat was of greater concern to residents than the quality and safety of vegetables. In order to protect themselves from contaminated meat, people stated that they would only purchase frozen meats that were not sitting on the counter for long periods of time. Conversely, many residents also commented that they did not trust frozen meats, as it was impossible to tell its freshness. Therefore, some preferred to purchase live animals, and butcher it themselves at home. However, since the bird-flu epidemic in China in recent years, it is no longer legal to purchase live poultry, and only fish and shellfish are available live at the market. Conversely, many people have commented that they simply avoid meat altogether since the news of ‘fake meat’ on the market. Several large enterprises were found to sell pork and disguise it as beef with chemical additives, wax, and pumping it with water. Others were found to be fabricating ‘mutton’ out of rat, mink, and fox meat. Several residents commented that they simply look for a stamp of quality on the meat, or for a sign at the vendor stall which indicates it is a regulated product. However, many others also commented they have little faith in monitoring practices, and just accept poor quality foods in both markets and stores. These residents stated that they simply cook meat on very high heat to kill any bacteria or remove any contaminants that might be in them.

There is a general consensus that processed foods may be questionable in terms of safety. Since the recent food safety scandals involving several famous food processing companies, residents are committing themselves to “trusted brands” that have good

reputations. For example, many people remarked that famous brands of processed meat, such as Yuyun or Jinluo Foods are more reputable brands than Shanghui Foods, which is rumored to use chemicals during processing. Residents also claimed that they preferred to purchase foods from larger stores, like supermarkets, rather than wet markets because they are better regulated and are better capable of ensuring safety of foods. However, some residents expressed conflicting opinions about the bigger companies that are not Chinese, and are suspicious of foreign enterprises. Some felt strongly opposed to Taiwanese or Japanese brands in Chinese shops and markets (though possibly more because of historical political tension than food safety threat). However, since the melamine scandal, imported foods like milk powder are highly sought after, and are more trusted than national Chinese brands.

Apart from the strategies to deal with food safety concerns, residents also discussed various methods to navigate the impacts of food cost. For example, many people suggested the importance of shopping around in different locations for the best prices, while others only purchased foods that were in season locally. Several elderly people commented that they have had to resort to buying less food, or have compromised other household purchases to ensure adequate money is allocated for food purchases. Some have also commented that fluctuating food cost has impeded their ability to have people over for holidays or big events, because the expense of preparing food for large groups is far too great.

However, many also indicated that though food cost can be very high, they would always be willing to purchase food for social gatherings. Social networks, such as circles of friends, family members, and relationships with work colleagues, are important connections for ensuring ongoing access to food, which is deeply connected to building healthy social relationships⁷. Though there was little discussion of the long term adaptive capacities of residents to ensure ongoing food security, many interviewees mentioned the importance of social networks. Beyond direct social circles, residents also underscored the importance of building relationships with people they regularly come in contact with through their daily transactions. For example, building relationships with farmers or market vendors was a method used to ensure access to good quality foods, as well as fair prices. One interviewee commented,

“I think all types of food are unsafe. The vegetables may have some poison on them, and the meat might be unsafe because the vendors are not clean. I am not sure how to cook the food to make it is safe. However, I prefer to buy food directly from the farmer, because I think the food from them is safer (Mr. Li, July 25, 2014).

In summary, the urban residents in Nanjing perceive food safety and food cost to be the main sources of vulnerability for their household’s food security. Residents generally feel a lack of trust of regulation and monitoring that are designed to ensure adequate food safety, and they rely to a significant degree on their own practices and

⁷ Food sharing is an important cultural and social practice worldwide, and is not necessarily used as a means of long-term food security. However, household expenditures may be lessened with inter-household resource sharing. More research is needed to adequately connect this with household food security in China.

abilities to ensure food is safe for consumption. Key coping strategies include assessing produce in stores to ensure it is of high quality and safety; purchasing only trusted brands of meat from trusted sources; using food preparation techniques to ensure safety; and lastly, building on trusting relationship and developing social networks for ongoing food security. See Table 8 for a summary of points.

Table 8: Sources of and responses to food security vulnerability among urban residents

Source of vulnerability	Response to vulnerability
<i>Exposure/Sensitivity</i>	<i>Coping strategy/adaptive capacity</i>
<p><i>Exposure</i></p> <ul style="list-style-type: none"> • Food safety issues during the production stage of the food supply chain: environmental pollutants (air, water, soil pollution from industry); overuse of agrochemicals in the food system (pesticides, chemical fertilizers); and poor farming practices resulting in unhealthy or diseased animals • Food safety issues during the food processing, preparation, and food retail stage of the food supply chain (the sale of out of date food; poor refrigeration; poor hygienic practices at markets; inadequate labelling; fake meats and fake foods; inadequate food safety regulation and monitoring throughout the city of Nanjing); • Fluctuating food cost <p><i>Sensitivity</i></p> <ul style="list-style-type: none"> • Retired or the elderly with limited social security supports are most vulnerable to fluctuating food costs; • Low income people may have less access to foods with safe food labelling, such as hazard free, green or organic • Small business owners, and market vendors (many who are migrant families) are vulnerable to fluctuating food cost 	<p><i>Coping strategy</i></p> <ul style="list-style-type: none"> • Determine indicators for the presence of agrochemicals (rings on tomatoes, lack of worms on greens); • Using food preparation techniques to ensure safety (soak in water, cook on high heat); • Determine quality produce (look for brightly coloured fruits, presence of mud, produce unwashed/ unsprayed with water, seek ‘fresh’ stems); • Determine quality animal protein (purchase frozen meat, butcher live animals, avoid meat, look for quality stamp, cook on very high heat); • Commit to only trusted brands and stores (purchase only trusted brands, shop at larger retail stores, avoid or seek foreign brands and stores) <p><i>Adaptive capacity</i></p> <ul style="list-style-type: none"> • Build strong social networks for ongoing food security • Build on relationships with family, friends, work relationships, and build relationships with farmers and vendors to maintain access to high quality, affordable foods

5.4 Systems of food distribution, regulation and monitoring in Nanjing

Despite the lack of trust urban residents have for food regulation and monitoring in Nanjing, the local city government has implemented several procedures to curb food safety issues at the production stage of the food system. The shift towards creating a more centralized system of food distribution has improved food safety standards of agricultural products in recent years. A primary source of improvement has been the consolidation of eight food distribution sites in Nanjing, to one large center, the Zhongcai Agricultural Distribution Centre⁸. With the construction of Zhongcai in 2009, the city government has also implemented the Integrated Circuit (IC) Card System, which was designed to improve traceability, and to determine the main sources of food contamination in the production stage of the agricultural supply chain in the region. Further, the system aims to improve consumer trust by giving consumers the ability to check that a product has been tested, and that it is free from contamination. See Plate 3 through 8 following the text for images of Zhongcai Agricultural Distribution Centre.

Zhongcai Agricultural Distribution Center is a wholesale distribution center located east of Nanjing's central districts. Fruit, vegetables, seafood, meat, wine and processed snack foods are distributed through the center, to hundreds of locations throughout the city⁹. Eighty percent of the food that is sold in Nanjing first comes through Zhongcai Agricultural Distribution Centre. However, in its vast supply, only 30 percent of the food that moves through Zhongcai is local to Nanjing and its peri-urban regions. The rest of the produce is brought in from other areas in Jiangsu province, or is imported from other distant provinces or imported internationally.

The purpose of Zhongcai is to effectively distribute food throughout the urban region, and to monitor and regulate food safety. Produce is brought to the Center from independent food suppliers, small or medium sized enterprises, commercial farms, or food production companies. Before they are allowed to sell at their product through Zhongcai, suppliers must go through an approval process, which is called the "permission system". For vegetable suppliers, they must bring their produce to Zhongcai for "rapid testing", which determines quickly if there are any banned contaminants present in any of the produce. Suppliers must register their name; state the origins of the food they are selling (though there is no official follow up to this question); register their vehicle license number, and state the location where they intend to sell the food. This system is in place to keep track of the food and where it is sold, in case food safety issues do arise. Suppliers can sell foods at various areas of the Zhongcai site, or sell food at other distribution sites in the city. Wet market vendors come to Zhongcai in the morning to pick up a variety of foods from the Zhongcai suppliers, and sell the goods at their respective sites.

To ensure all food is safe for consumption, samples go through a series of tests to ensure they are free from a specific list of agrichemicals and/or contaminants. As mentioned, the first stage is called "rapid testing", which is a simple reactant test to ensure that there are no contaminants in the product. Contaminants that are tested for

⁸ Interview with Wang Ling Director of Food Safety Zhongcai Agricultural Distribution Center, July 27, 2014

⁹ Interview with Xunping Ma Depute Director Zhongcai Agricultural Distribution Center, July 27, 2014

include heavy metals, agrichemicals, and other industrial pollutants. If the food sample tests positive for any contaminants, 'second level' testing is needed, which monitors the types and amounts of contaminants in the product. Onsite, there are five sites for testing for different types of food, including seafood, meats, grains, vegetables, and a test for heavy metals specifically.

The most common types of contaminants found in foods are organophosphorus compounds, which are pesticides used in agricultural production. Three common compounds found are methamidophos, omethoate, isocarbophos, which are controversial pesticides that are banned in most countries for their negative impacts on health. If illegal contaminants are found on any foods, the authorities and the Bureau for Industry and Commerce are contacted. The supplier responsible for the food is then held accountable for the food contamination, and must inform the authorities of its origins.

Once the food leaves Zhongcai, it is distributed to various locations such as hospitals, schools, hotels and restaurants. Wet market vendors also purchase produce at the Zhongcai site to ensure safe, tested produce for urban shoppers. At the market, managers are also instructed to perform random rapid testing daily to ensure the food is safe for consumption¹⁰. Though not implemented fully across the city, vendors at wet markets are required to use the IC Card System, which is designed to relay to the consumer that the products in the market have gone through rigorous monitoring and testing at Zhongcai. Upon purchase, consumers are given a receipt with a SKU code, to which they can scan at an IC Card reader within the market area.

However, despite having implemented this progressive system of food monitoring and regulation in Nanjing, there is still legitimate reason for urban residents to be concerned. It is likely that unregulated foods make their way into the food system in Nanjing, despite the government's best efforts. Moreover, consumers' ability to adequately determine the safety of the food through this system remains arduous. Through my field observations, I found that although vendors are instructed to use the IC Card system, many do not offer IC Card receipts, and would take money and make change for customers using calculators. In some of the markets we visited, IC Card readers were also not in working order. When I asked one market manager where the card reader was, he pulled the large machine out of a storage room, and removed a fabric cover it had been stored under. When the machine was plugged in, it did not effectively read the card, and was not able to indicate the food purchased had gone through the Zhongcai system.

Though I would not encourage harsh penalization of individual vendors and food suppliers, given the many wide-ranging issues that lead to issues of food safety (not one person can be put to blame), it seems the penalty for selling unregulated foods in the city of Nanjing is actually quite minimal. According to a market manager at Kexiang Vegetable Market, if a vendor is found to be selling produce outside the IC system, they will be penalized 200RMB (\$35 CAD) for the first offence, 500RMB (\$85 CAD) for the second, 1000RMB (\$175 CAD) for the third (Anonymous, personal communication, July 17, 2014). Upon the fourth offence the vendor is removed from the market system entirely. However, given that market managers do not check every vendor every day for legitimate documentation, and do not test produce from every vendor, the likelihood of

¹⁰ Interview with Mr. Wong, Wet Market Manager Kexiang Vegetable Market, July 17, 2014

unregulated foods to be in the system remains quite high. In addition, many markets also make space for small farmers to directly sell to the public in areas outside or within wet markets. Though such space for small farmers is very important for livelihood support and is a positive attribute of a resilient and inclusive food system, foods sold through these direct transactions are not effectively monitored or regulated, and can be a source of vulnerability in terms of food safety.

In addition, the use of the IC Card system does not fully enable food traceability in Nanjing, and its ability to fully protect consumers from issues of food safety is questionable. In the interview with the Director of Food Safety, Wang Ling, she stated, “it is difficult to determine exactly where the food comes from, as it all depends on the suppliers. Zhongcai is responsible for testing, but not to know the origins of the food. We hold a responsibility to the customers to ensure the food is safe”. Since the origins of the food are not documented or properly tracked through this system, it would be difficult to adequately pinpoint a source of serious food contamination, if it were to occur. Lastly, I might also question the system’s focus on penalizing vendors and food suppliers as a way of mitigating food safety issues in the city’s food system. The main concern is that it does not fully consider the broader systems that have allowed for the over-use of chemicals and agricultural inputs in food production, and places to blame on individuals that are pressured economically to be as competitive as possible. Further, industrial and agricultural contaminants are a widespread concern for agricultural lands across China, and not one person can be blamed for food contamination. Though the system of food monitoring and distribution is quite progressive in Nanjing, it seems from this brief exploration of the processes, that there are many significant issues that should be considered.

Plate 3: Leek supplier at Zhongcai Agricultural Distribution Centre



Plate 4: Bird's eye view at Zhongcai Agricultural Distribution Centre



Plate 5: Testing a celery sample for contaminants at Zhongcai Distribution Centre



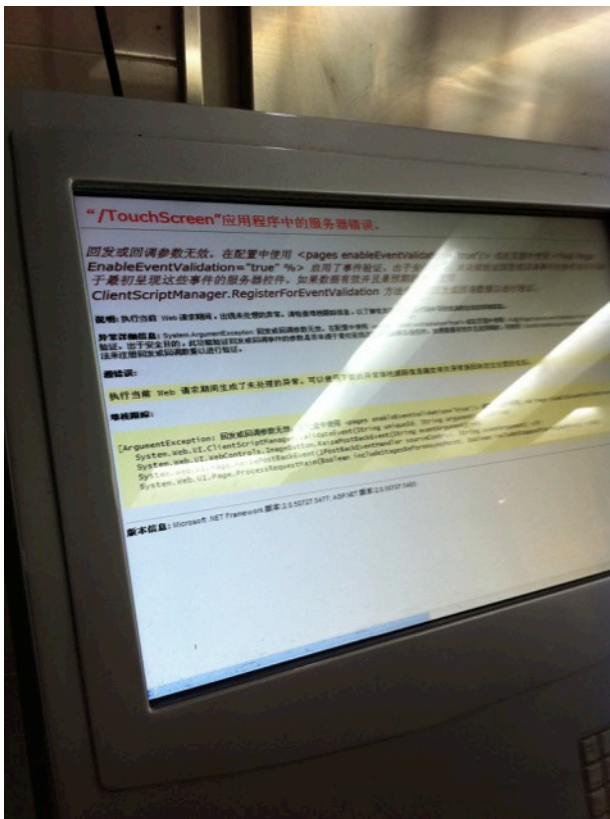
Plate 6: Demonstrating contaminant testing at Zhongcai Distribution Centre



Plate 7: Using a IC Card reader at Kexiang Vegetable Market



Plate 8: Error on IC Card reader at Kexiang Vegetable Market



6. Conclusion

In completing this research, and the process of writing this thesis, I have often asked myself, “What brought me here?” I asked myself this question when arriving in Nanjing with limited language skills. I asked myself this question when almost no one I spoke to in China related to my perspective on food security, or to the goals of my research. Throughout this journey, I asked myself, “What brought me here?” especially during the many times in China when I was sick in bed with an unknown illness. Today, I recognize that my experience facilitating food programming with Chinese immigrants in Canada, and my supervisor, Dr. Steffanie Scott, both had a tremendous influence on my research direction. When I discuss this work with both my clients and my supervisor, I am more convinced than ever that this research is significant. It is significant because it nourishes the mounting discussion that food security in China needs and deserves reconceptualization. It is significant because food security researchers and scholars have not yet delved into household level food security in China. It is significant because lives matter, and the experiences of individuals and households in China deserve recognition.

This research had three main objectives. First, the study sought to determine how the Chinese government understands food security, in terms of scale and breadth, and to identify the implications of this. The second objective was to identify the perceived threats to food insecurity at the household or individual level in Nanjing; and lastly, to determine how urban residents respond to and cope with these perceived threats. This study is based on a review of literature combined with a case study in Nanjing, China, that involved a survey of 214 city residents, plus 36 interviews with urban residents, neighbourhood committee managers and wholesale market managers.

Through a review of the literature, this research found that food security as a concept in China only marginally addresses the multiple dimensions of this term as it is recognized internationally. The most recent reiteration of the term as defined by the United Nations Food and Agriculture Organization highlights that food security is achieved when all people have physical and economic access to *sufficient, safe and nutritious* food that meets their needs (FAO, 2003). Notions of food security, as typically expressed in Chinese government documents, do not encompass the shifting diets and food preferences, or the food safety fear held by Chinese population. In addition, this study found that the framing of food security as *national level* grain supplies does little to address the experience of food (in)security at the *household or individual level*.

Further, despite a tremendous amount of research on poverty in China, the literature does not adequately address individual and household-level food security concerns. This thesis found that food insecurity and poverty, despite being undeniably interconnected, remain conceptually distinct. Measurements of household food security encompasses much more than just poverty and income levels, as it indicates vulnerabilities to hunger as well as the more direct determinants of insecurity, such as the fluctuating costs of food and housing, and the lack of adequate social supports. But on top of these dimensions that relate closely to poverty measures, household food security requires that food sources must be not just *available*, but also *sufficient, safe and nutritious*. Many of *these* dimensions cut across all income groups.

Though this research did not specifically measure household food security in Nanjing, it did identify several significant perceived threats through both surveys and

structured interviews. The two main vulnerabilities experienced by residents were unsafe foods and rising/fluctuating food costs. On the whole, residents felt that food monitoring and regulation in Nanjing was not sufficient to ensure that food sources were safe. They felt vulnerable and exposed to threats of unsafe food in the production stage of the food supply chains from environmental pollutants and the overuse of agrochemicals in farming (synthetic chemicals such as pesticides and fertilizers), and from poor farming practices that result in unhealthy or diseased animals. Residents also expressed feelings of vulnerability to food safety threats throughout the food processing, preparation, and retail stages of the food supply chain. Issues such as the sale of out of date food, poor refrigeration, poor hygienic practices at markets, fake meats and fake foods, and inadequate labelling were the examples most frequently mentioned in interviews. Residents also expressed feelings of vulnerability stemming from the fluctuating and rising cost of food, and expressed concern about their ability to balance income and expenditures. This research found that the elderly and low-income people and small food businesses were most affected by fluctuating food costs, while food safety concerns were widespread among all income levels.

In response to these perceived vulnerabilities, this study found that residents have developed methods of food procurement and food preparation to cope with food safety anxiety. Residents look out for indicators that food is either unsafe or not healthy by seeking evidence that synthetic chemicals were used in the production of the food, or watching for signs that food was not fresh. For example, residents would look for cabbageworms as a sign that synthetic pesticides were not used on green vegetables, or for rings on tomatoes (which was rumored to be a sign that synthetic chemical fertilizers were used). Residents have also developed various food preparation methods in an attempt to make the food safer for consumption, such as soaking vegetables in water to wash off chemical residues, or cooking meat on high heat to kill bacteria. For more longer term adaptive capacities, residents indicated the importance of building strong social networks, such as building relationships with farmers and market vendors to maintain access to high quality, affordable foods. Residents also upheld strong family ties, where food is often at the center of the social gatherings. Though not explicitly stated, long term food security is likely to be upheld through the sharing of food, especially when food costs rise and fluctuate to significant degrees.

The experience of food insecurity on the ground departs greatly from food security as it is conceptualized by both the Chinese government and academic researchers. This thesis demonstrates that the *availability* of food does not equate to food security, especially when the safety of non-grain foods (such as fruit, vegetables, eggs, red meats, poultry, fish, legumes, dairy, and other staples) cannot be assured. In closing, a significant shift seems to be occurring in China, and I anticipate much more critical discussion will be forthcoming regarding China's food and food security in the near future. In moving forward, it would be valuable to have more in-depth research on household food security in both rural and urban areas of the country, as well as a more thorough understanding of food insecurity among the more marginalized communities, such as those with minimal social supports and migrants in large urban regions. In Nanjing in particular, a more thorough assessment of the pathways of food throughout the urban region would be a welcome contribution to urban food security research in Nanjing.

References

- Adger, W. (2006). Vulnerability. *Global Environmental Change*, 16, 268-281.
- Babar, L., & Kesteloot, K. (2009). Poverty and Residential Environment in Nanjing: Is there a neighbourhood effect? *Espace, Populations, Societes*, 3, 533-539.
- BBC News. (2014, 05 03). *China arrests hundreds over fake or tainted meat*. Retrieved 01 02, 2015, from China News: <http://www.bbc.com/news/world-asia-china-22393999>
- Bhattacharya, J. (2003). Poverty, food insecurity, and nutritional outcomes in children and adults. *Journal of Health Economics*, 23(4), 839–862.
- Bickel, G., Nord, M., Price, C., Hamilton, W., & Cook, J. (2000). *Guide to Measuring Household Food Security*. USDA, Office of Analysis, Nutrition, and Evaluation. USDA.
- Brown, L. (1995). *Who will feed China? Wake-up call for a small planet*. New York, New York, USA: W.W. Norton & Company.
- Chan, K. (1996). Post-Mao China: A Two-Class Urban Society in the Making. *International Journal of Urban and Regional Research*, 20(1), 134-150.
- Chan, K. (2009). The Chinese Hukou system at 50. *Eurasian Geography and Economics*, 50(2), 197-221.
- Chan, K. (2014). China's urbanization 2020: a new blueprint and direction. *Eurasian Geography and Economics*, 55 (1), 2014.
- Chen, G., Gu, C., & Wu, F. (2006). Urban poverty in the transitional economy: a case of Nanjing China. *Habitat International*, 30, 1-26.
- Chen, J. (2007). Rapid urbanization in China: A real challenge to soil protection and food security. *Catena*, 69 (1), 1-15.
- Chen, J. a. (2006). *Extending Social Assistance in China: Lessons from the Minimum Living Standard Scheme*. Working Paper, Chronic Poverty Research Centre.
- Cheng, T., & Selden, M. (1994). The origins and social consequence of China's hukou system. *The China Quarterly*, 139, 644-668.
- China News. (2014, 01 22). *Experts suggest that enhance food safety strategy for food security*. Retrieved 03 03, 2015, from Domestic News: <http://www.chinanews.com/gn/2014/01-22/5764057.shtml>
- Christiansen, F. (2009). Food security, urbanization and social stability in China. *Journal of Agrarian Change*, 9 (4), 548-575.
- Crush, J., & Frayne, B. (2010). *The state of urban food insecurity in Southern Africa*. AFSUN. Capetown: Unity Press.

- Ecker, O., & Breisinger, C. (2012). *The Food Security System: A New Conceptual Framework*. International Food Policy Institution, Development Strategy and Governance Division. IFPRI.
- Eriksen, P. (2008). What is the vulnerability of a food system to global environmental change? *Ecology and Society*, 13(2), Article 14.
- Fan, S. (2014, 01 27). *Food Security Portal*. Retrieved 04 05, 2015, from Toward a food secure China: <http://www.foodsecurityportal.org/toward-food-secure-china>
- FAO. (2003). *Trade reforms and food security: conceptualizing the linkages*. Retrieved 03 04, 2015, from FAO: <http://www.fao.org/docrep/005/y4671e/y4671e00.htm>
- FAO. (2006, June 02). *Food Security*. Retrieved 01 20, 2015, from Policy Brief: <http://www.fao.org/forestry/13128-0e6f36f27e0091055bec28ebe830f46b3.pdf>
- FAO. (2009). *Declaration of the World Summit on Food Security*. United Nations, FAO, Rome.
- FAO. (2012). *Coming to terms with terminology*. FAO, Committee on world food security. Rome: FAO.
- FORHEAD. (2014). *Food Safety in China: A mapping of problems, governance and research*. Forum on health, Environment and Development, Working Group on Food Safety.
- Gale, H. (2011, 04 04). *Building trust in food*. Retrieved 03 10, 2014, from China Dialogue articles: <https://www.chinadialogue.net/article/4207-Building-trust-in-food>
- Gao, H., Jiang, X., Wang, F., Wang, D., & Bian, Y. (2005). Residual Levels and Bioaccumulation of Chlorinated Persistent Organic Pollutants (POPs) in Vegetables from Suburb of Nanjing, People's Republic of China. *Bulletin of Environmental Contamination and Toxicology*, 74(4), 673-680.
- Gao, Q. (2011). *Anti-Poverty Family Policies in China: A Critical Evaluation*. Meeting report, United Nations, Department of Economic and Social Affairs (DESA), New York.
- Gao, Q. (2009). Anti-poverty Effectiveness of the Minimum Living Standard Assistance Policy in Urban China. *The Review of Income and Wealth*, 55, 630–655.
- Garnett, T., & Wilkes, A. (2014). *Appetite for Change: Social, economic and environmental changes in China's food system*. Food Climate Research Network, Department of Business, Innovation and Skills of the UK Government. Food Climate Research network.
- Government of Nanjing. (2009). *Nanjing.gov.org*. Retrieved 01 15, 2015, from Nanjing Overview: <http://english.nanjing.gov.cn/gynj/overview/>
- Haraway, D. (1991). *Simians, cyborgs and women: the reinvention of nature*. London, UK: Free Association Books.
- Hay, I. (2005). *Qualitative Research Methods in Human Geography* (Vol. 2). Oxford: Oxford University Press.

- Heimer, M., & Thøgersen, S. (2006). *Doing Fieldwork in China*. Honolulu: University of Hawaii Press.
- Howitt, R., & Stevens, S. (2005). Cross-cultural research: ethics, methods, and relationships. In I. Hay, *Qualitative Research Methods in Human Geography* (Vol. 2, pp. 30-49). Oxford, UK: Oxford University Press.
- Huang, B., Shi, X., Yu, D., Oborn, I., Blomback, K., Pagella, T. (2006). Environmental assessment of small-scale vegetable farming systems in peri-urban areas of the Yangtze River Delta Region, China. *Agriculture, Ecosystems and Environment*, 112(4), 391-402.
- IFPRI. (2012). *IFPRI Discussion Paper 01166: The Food Security System, A New Conceptual Framework*. IFPRI, Development Strategy and Governance Division. IFPRI.
- Jourdan, A., & Goodman, D. (2014, 03 15). China plans investment and reform to ease urbanization drive. Retrieved 8 13, 2014, from *Reuters*: <http://www.reuters.com/article/2014/03/16/us-china-urbanisation-idUSBREA2F00420140316>
- Kriflik, L., & Yeatman, H. (2005). Food scares and sustainability: a consumer perspective. *Health, Risk & Society*, 7(1), 11-24.
- Lam, H., Remais, J., Fung, M., Xu, L., & Sun, S. (2013). Food supply and food safety issues in China. *The Lancet*, 381, 2044-2053.
- Lang, G., & Miao, B. (2013). Food security for China's cities. *International Planning Studies*, 18(1), 5-20.
- Leppman, E. (1999). Urban-rural contrasts in diet: The case of China. *Urban Geography*, 567-579.
- Lin, L. (2013, 10 18). *Chinese migrants struggle to find urban dream*. Retrieved 05 25, 2015, from China and the world discuss the environment: <https://www.chinadialogue.net/article/show/single/en/6426-Chinese-migrants-struggle-to-find-urban-dream>
- Liu, P., & McGuire, W. (2015). One Regulatory State, Two Regulatory Regimes: understanding dual regimes in China's regulatory state building through food safety. *Journal of Contemporary China*, 24(91), 119-136.
- Liu, R., Pieniak, Z., & Verbeke, W. (2013). Consumers' attitudes and behaviour towards safe food in China: A review. *Food Control*, 33, 93-104.
- Liu, Y., & Wu, F. (2005). Urban Poverty Neighbourhoods: Typology and Spatial Concentration under China's Market Transition. *GeoForum*, 37, 610-626.
- Lui, F. (2013, 5 15). *Nanjing resident population in 2015 will exceed 8.3 million*. Retrieved 1 13, 2015, from Yangtze Evening News: <http://www.yangtse.com/system/2013/05/15/017259446.shtml>
- MacRae, R., Gallant, E., Patel, S., Michalak, M., Bunch, M., & Schaffner, S. (2010). Could Toronto Provide 10% of its Fresh Vegetable Requirements from within its

- Own Boundaries? Matching Consumption Requirements with Growing Spaces. *Journal of Agriculture, Food Systems and Community Development*, 1(2), 105-127.
- Maxwell, S. (1996). Food security: a post-modern perspective. *Food Policy*, 21(2), 155-170.
- Maxwell, S. (2001). The evolution of thinking about food security. In S. Devereaux, & S. Maxwell, *Food security in sub-saharan Africa* (pp. 13-31). London, UK: ITDG Publishing.
- Maxwell, S., & Smith, M. (1992a). *Household food security: A conceptual Review*. Retrieved 01 12, 2015, from IFAD publications: www.ifad.org
- Maxwell, S., & Smith, M. (1992b). *International Fund for Agricultural Development (IFAD)*. Retrieved 12 06, 2014, from Tools and guidelines on household food security: http://www.ifad.org/hfs/tools/hfs/hfspub/hfs_1.pdf
- MEP. (2012). *Ministry of Environmental Protection of the People's Republic of China*. Retrieved 11 05, 2014, from Water: http://english.mep.gov.cn/standards_reports/standards/water_environment/
- Miller, T. (2012). *China's Urban Billion: The story behind the biggest migration in human history*. London: Zed Books.
- Moser, C. (1998). The Asset Vulnerability Framework: Reassessing Urban Poverty Reduction Strategies. *World Development*, 26(1), 1-19.
- Nanjing Daily. (2012, 5 6). *Nanjing Population Development Report 2011*. Retrieved 01 12, 2015, from Southern New Network: <http://www.njdaily.cn/2012/0506/136036.shtml>
- Ortega, D., Wang, H., Wu, L., & Olynk, N. (2011). Modeling heterogeneity in consumer preferences for select food safety attributes in China. *Food Policy*, 36(2), 318-324.
- Park, A., & Wang, D. (2010). *Migration and Urban Poverty and Inequality in China*. Institute for the Study of Labour (IZA). IZA.
- Pinstrup-Andersen, P. (2009). Food security: definition and measurement. *Food Security*, 1(1), 5-7.
- Pow, C.-P. (2007). Securing the 'civilized' enclaves: gated communities and the moral geographie in (post-)socialist Shanghai. *Urban Studies*, 44(8), 1539-1558.
- Rice, C. (2015, 04 14). *Food Safety News*. Retrieved 04 20, 2015, from What's In Your Food? A Look at Food Fraud: http://www.foodsafetynews.com/2015/04/whats-in-your-food-a-look-at-food-fraud/#.VU-_A63BzGc
- Rose, D. (1999). Economic Determinants and Dietary Consequences of Food Insecurity in the United States. *Journal of Nutrition*, 129(2), 517S-520S.
- Sen, A. (1981). *Poverty and Famines: An Essay on Entitlement and Deprivation*. Clarendon, Oxford.

- Scott, S., Si, Z., Shumilas, T., & Chen, A. (2014). Contradictions in state- and civil society-driven developments in China's ecological agriculture sector. *Food Policy*, 45, 158–166.
- Shieh, L. (2011). Becoming urban: rural-urban integration in Nanjing, Jiangsu province. *Pacific Affairs*, 84(3), 475-487.
- Smil, V. (2004). *China's Past, China's Future*. New York, New York, USA: RoutledgeCurzon.
- Smart, A., & Smart, J. (2001). Local citizenship: welfare reform urban/rural status, and exclusion in China. *Environment and Planning: A*, 33(10), 1853–1869.
- Staheli, L., Lawson, V. (1994). A discussion of 'women in the field': the politics of feminist fieldwork. *Professional Geographer*. 46(1), 96-102.
- Tarasuk, V., Mitchell, A., & Dachner, N. (2012). *Household Food Insecurity in Canada, 2012*. Research to identify policy options to reduce food insecurity (PROOF), Retrieved from <http://nutritionalsciences.lamp.utoronto.ca/>, Toronto.
- Temple, B., & Young, A. (2004). Qualitative research and translation dilemmas. *Qualitative Research*, 4(2), 161-178.
- The Canadian Trade Commissioner Service. (2015, 03 13). *Focus on Nanjing, China*. Retrieved 03 30, 2015, from Government of Canada: <http://www.tradecommissioner.gc.ca/eng/document.jsp?did=96285&cid=512&oid=32>
- The Economist. (2011, 10 29). *In the gutter*. Retrieved 12 02, 2014, from Food Safety in China: <http://www.economist.com/node/21534812>
- Turner, S. (2010). The silenced assistant. Reflections of invisible interpreters and research assistants. *Asian Pacific Viewpoint*, 51(2), 206-219.
- Veeck, A., Yu, H., & Burns, A. (2010). Consumer Risks and New Food Systems in Urban China. *Journal of Macromarketing*, 30(3), 222-237.
- Wang, X., Xiao, X., Zhang, A., & You, W. (2009). Consumers' attitude towards organic food in Nanjing city. *Journal of Anhui Agriculture Science*, 37(14), 6795-6804.
- Wang, H., Zhang, R., & Ortega, D. (2013). Chinese Food Safety Situation in a Globalized World Market. *Journal of Chinese Economics*, 1(1), 114-124.
- Watts, M. (1993). Hunger, Famines and the Space of Vulnerability. *GeoJournal*, 30(2), 117-125.
- Wesche, S., Huynh, N., Nelson, E., & Ramachandran, L. (2010). Challenges and Opportunities in Cross-cultural Geographic Inquiry. *Journal of Geography in Higher Education*, 34(1), 59-75.
- Wei, Z. (2012, 01 04). *Capital "population control"*. Retrieved 01 15, 2015, from Data Magazine: Special Report: http://data.bjstats.gov.cn/2012/tbbd/201201/t20120104_218341.htm
- Wu, F. (2007). The Poverty of Transition: From Industrial District to Poor Neighbourhood in the City of Nanjing, China. *Urban Studies*, 44(13), 2673–2694.

- Wu, L., Xu, L., & Gao, J. (2011). The acceptability of certified traceable food. *British Food Journal*, 113(4), 519-534.
- Xiao, Y., & Nie, F. (2009). *A report on the status of China's food security*. Beijing: China Agricultural Science and Technology Press.
- Yan, Y. (2012). Food safety and social risk in contemporary China. *Journal of Asian Studies*, 71(3), 705-729.
- Yang, J. (2012). *Tombstone: The untold story of Mao's great famine*. New York, New York, USA: Allen Lane Publishers.
- Zhang, C., Bai, J., & Wahl, T. (2012). Consumers' willingness to pay for traceable pork, milk, and cooking oil in Nanjing, China. *Food Control*, 27, 21-28.
- Zhang, C., Xu, Q., Zhou, X., Zhang, X., & Xie, Y. (2013). *An Evaluation of Poverty Prevalence in China: New Evidence from Four Recent Surveys*. International Food Policy Research Institute, Development Strategy & Governance Division. IFPRI.
- Zhang, H. (2011). *China and Global Food Security: Conflicting Notions*. S. Rajaratnam School of International Studies (RSIS). Singapore: RSIS.
- Zhang, K., Dearing, J., Dawson, T., Dong, X., Yang, X., & Zhang, W. (2015). Poverty alleviation strategies in eastern China lead to critical ecological dynamics. *Science of The Total Environment*. 506/507, 164–181.
- Zhang, Q., & Pan, Z. (2013). The Transformation of Urban Vegetable Retail in China: Wet Markets, Supermarkets and Informal Markets in Shanghai. *Journal of Contemporary Asia*, 43(3), 497-518.
- Zhang, X. (2005). Chinese consumers' concerns about food safety: Case of Tianjin. *Journal of International Food & Agribusiness Marketing*, 17(1), 57-69.
- Zhou, Z. (2014). Food security in China: past, present and future. In Nagothu, U. *Food security and development: country case studies* (pp. 35-56). New York, NY, USA: Routledge.

APPENDICES

Appendix 1: Survey questions with Chinese translations

<p>1) I feel the food at wet markets is safe and healthy.</p>	<p>1. 我觉得菜市场卖的食物是安全健康的，相比杂货店卖的食物具有更少的农药和化学用物质。</p>
<p>2) I am concerned about the decline of the environment, and feel it is having an impact on the food we eat.</p>	<p>2. 我很担心环境退化，这会对我们吃的食物有影响。</p>
<p>3) I often felt in the last 12 months that the food I had purchased was not fully safe to eat.</p>	<p>3. 在过去的 12 个月里，我经常会觉得购买的食物没有完全达到安全食用的标准。</p>
<p>4) Recently, a household/family member got sick because of food contamination.</p>	<p>4. 最近，因为食品污染问题，家庭里有一个成员生病了。</p>
<p>5) I feel the food available to me and my family is good both in quality and quantity.</p>	<p>5. 我和我家庭可获得的食物从质量和数量上都有保证。</p>
<p>6) The cost of food is of growing concern to me.</p>	<p>6. 我越来越关心食物的价格。</p>
<p>7) In the last 12 months I worried whether our food would run out before we could purchase more.</p>	<p>7. 在过去的12 个月里，在买到足够食物之前，我会担心家里的食物会吃光。</p>
<p>8) I think most people in Nanjing can afford or have access to enough food to have a healthy life</p>	<p>8. 我认为在南京的大部分人能买得起，或有足够多方法买到维持健康生活的食物。</p>
<p>9) My home shares food with my extended family and other close friends on a regular basis.</p>	<p>9. 我家会定期和我的亲友进行聚餐。</p>

10) I know a lot about cooking and how food relates to health because my parents or other relatives taught me.	10. 我很了解关于烹饪以及食品与健康方面，得益于我的父母和亲人在这方面的教育。
11) In general, I think the younger generation is becoming less skilled in cooking and food preparation than earlier generations.	11. 一般而言，我认为年青一代相比老一代，更缺少烹饪和食物准备的技巧。
12) I often learn about food and how it relates to health through the internet or television (or social media).	12. 我经常从网上、电视或者社交媒体上学习与食物相关的知识，以及食物与健康的关系。
13) I feel that foreign restaurants and fast food chains are impeding on Chinese cultural cuisine.	13. 我感觉外国餐厅和快餐阻碍了中国传统美食的发展。
14) I think foreign food in stores improves the quality of the food in Nanjing, and creates a higher standard of food.	14. 我认为商店里的外国进口食品提高了南京食品的质量，并且创造了一个对食物更高要求的标准。
15) I am concerned about the possibility of genetically modified organisms (GMO) in the food that I purchase.	15. 我比较关心我所购买的食物出现转基因食品的可能性。
16) I feel concerned that the future generations will have poor health because of the changes in diet.	16. 由于饮食的变化，我觉得未来一代的健康会变得糟糕。

Appendix 2: Results of survey questions

(N=214)	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Non-response
1) I feel the food at wet markets is safe and healthy.	42	84	50	35	2	0.4
2) I am concerned about the decline of the environment, and feel it is having an impact on the food we eat.	70	92	23	14	8	3.3
3) I often felt in the last 12 months that the food I had purchased was not fully safe to eat.	17	88	44	48	10	3.3
(4) Recently, a household/family member got sick because of food contamination.	11	33	35	69	58	3.7
5) I feel the food available to me and my family is good both in quality and quantity.	38	84	48	26	7	5.1
6) The cost of food is of growing concern to me.	90	83	23	8	2	3.7
7) In the last 12 months I worried whether our food would run out before we could purchase more.	12	46	27	83	33	6.1

8) I think most people in Nanjing can afford or have access to enough food to have a healthy life.	29	92	36	33	13	5.1
9) My home shares food with my extended family and other close friends on a regular basis.	47	91	27	32	5	5.6
10) I know a lot about cooking and how food relates to health because my parents or other relatives taught me.	51	93	25	24	5	7.5
11) In general, I think the younger generation is becoming less skilled in cooking and food preparation than earlier generations.	56	87	21	30	7	6.1
12) I often learn about food and how it relates to health through the internet or television (or social media).	56	101	24	15	4	6.5
13) I feel that foreign restaurants and fast food chains are impeding on Chinese cultural cuisine.	38	39	42	59	22	6.5

14) I think foreign food in stores improves the quality of the food in Nanjing, and creates a higher standard of food.	22	69	48	45	15	7.1
15) I am concerned about the possibility of genetically modified organisms (GMO) in the food that I purchase.	67	74	31	21	5	7.5
16) I feel concerned that the future generations will have poor health because of the changes in diet.	67	62	31	29	9	7.5

Appendix 3: Structured interview questions for market shoppers

Written and translated July 7, 2014

<p>Interview questions for shoppers:</p> <ol style="list-style-type: none">1) From your perspective, which topics covered in the survey stood out as most important to you?2) What do you think are the main environmental problems that impact the quality of food sold in the market?3) Do you know what GMOs are?4) Many people think that the younger generation has less food skills (cooking and preparing food) than older generations. In your opinion, what is the reason for this change?5) Do you think the information shared on television and the Internet about food preparation and health is accurate?6) Generally, many people have a fear of food contamination, but the standards of food quality seem to be improving in the city. Do you think government is effective in regulating food? If not, what is the reason?	<p>采访问题 针对顾客:</p> <ol style="list-style-type: none">1) 在您看来, 问卷调查中的哪个主题涵盖的内容具有最重要的意义?2) 您觉得哪个环境问题最影响市场中的食品质量?3) 您知道什么是转基因食品吗?4) 很多人认为年轻一代比老一代更加缺乏食物技能(烹饪和准备食物), 您认为是什么原因导致了这一变化?5) 您认为电视和互联网上关于烹饪和健康的信息是否准确?6) 许多人经常为食品污染问题而担心, 但在城市中食品质量的标准似乎在不断改善。您觉得是不是因为政府的相关政策对调控食品质量有效? 如果不是, 您认为是什么原因带来了这种改善?
---	---

Modified July 10, 2014

<p>Interview questions for shoppers:</p> <ol style="list-style-type: none">1) From your perspective, which topics covered in the survey stood out as most important for you?2) Do you think the information shared on television and the Internet about food preparation and health is accurate? If so, what are some examples of healthy eating tips you have recently learned from television, the Internet or other media sources?3) Many people feel some level of distrust for food safety in China. When you are preparing food at home, what are some methods you use to ensure it is safe for you and your family? How do you choose the best foods in the markets?4) What types of food specifically do you feel might be unsafe that is sold in the market? Do you avoid these foods, or do you prepare them in a way that makes them safe?5) The cost of food is of growing concern to many people in China. How does the rising cost of food effect you?	<p>采访问题 针对顾客:</p> <ol style="list-style-type: none">1) 从您的观点来看, 问卷中哪些方面对您而言最为重要?2) 您觉得网络上和电视上分享的有关食物制备和食物健康的信息是可靠准确的吗? 如果您觉得是准确的, 可以举一些您最近从电视、网络或者其他媒体学习到的健康饮食小窍门的例子吗?3) 很多人对中国的食品安全并不完全信任。当您在家中准备食物时, 您有什么方法可以确定它对您及您的家庭是安全的? 您在市场里如何选择最好的食材呢?4) 你认为市场上有哪些食品你感觉不安全? 你会避免吃这些食物么? 或者你会用一种特殊的方法烹饪使他们更加安全?5) 食材价格的上涨在中国引起很多人的关注。您觉得食品价格的上涨如何影响您呢?
--	--

<p>Interview questions for shoppers:</p> <ol style="list-style-type: none">1) In your perspective, which topics covered in the survey stood out as most important to you?2) Many people feel some level of distrust for food safety in China. When you are preparing food at home, what are some methods you use to ensure it is safe for you and your family? How do you choose the best foods in the markets?3) What types of food specifically do you feel might be unsafe that is sold in the market? Do you avoid these foods, or do you prepare them in a way that makes them safe?4) The cost of food is of growing concern to many people in China. How does the rising cost of food effect you?5) In the surveys, many people mentioned that they often share food with family and friends. In what ways does your family share food with other households? Why might you share food with others? Does the rising cost of food effect your ability to share it?	<p>采访问题 针对顾客:</p> <ol style="list-style-type: none">1) 从您的观点来看, 问卷中哪些方面对您而言最为重要?2) 很多人对中国的食品安全并不完全信任。当您在家中准备食物时, 您有什么方法可以确定它对您及您的家庭是安全的? 您在市场里如何选择最好的食材呢?3) 你认为市场上有哪些食品你感觉不安全? 你会避免吃这些食物么? 或者你会用一种特殊的方法烹饪使他们更加安全?4) 食材价格的上涨在中国引起很多人的关注。您觉得食品价格的上涨如何影响您呢?5) 在我们的调查中, 我们发现很多人都会跟他们的朋友亲戚聚餐。请问您和其他的家庭会通过何种方式一起聚餐呢? 为什么您会考虑和朋友亲人一起聚餐呢? 食品价格的上涨会影响您聚餐的频率吗?
---	---

Appendix 4: Structured interview questions for market managers

<p>Questions for market managers:</p> <ol style="list-style-type: none">1) In general, how is the market managed? Who oversees the day-to-day operation? Is there an umbrella company that runs the operation?2) What kinds of regulations are set in place? How is health and safety managed, and what are some of the guidelines?3) How are vendors chosen for the market? In general, what are the monthly fees to run a vegetable stall? What are the fees to run a meat stall?4) In light of the threat of bird flu, how has the market reacted to this scare? What are some other areas of concern?5) Generally, where are the vegetables coming from that the vendors are selling? Where does the meat come from? How do the market managers monitor this?6) Do you have any recommendations on how we can learn more about food distribution in Nanjing?	<p>采访问题针对市场经理:</p> <ol style="list-style-type: none">1) 总的来说, 市场是如何进行运营的? 谁负责监管日常运营呢? 哪家公司负责市场空间的运行?2) 市场有哪些完善的管理规则呢? 如何健康安全地管理市场? 有哪些指导方针保证市场顺利运行?3) 市场如何选择进驻的摊主? 一个蔬菜摊位的月费用大概是多少? 肉类摊位的月费用呢?4) 鉴于禽流感的威胁, 市场是如何应对的呢? 除此之外, 还有哪些值得市场关注的领域?5) 一般来说, 蔬菜摊主如何取得他们售卖的蔬菜? 肉类摊主的肉是如何取得的呢? 市场管理者会监督它们的获取途径吗?6) 请您对我们如何更多地了解南京地区的食品配送提出建议?
--	---

Appendix 5: Semi-structured interview questions for Neighbourhood Committees

- 1) As part of the neighbourhood committee, what are your main responsibilities? What is the role of the committee?
- 2) How long have you been working for the committee?
- 3) Can the committee offer any basic demographic information about the community? Some information that might be useful to this study are:
 - Family structures: how many people generally in homes (one family, two families? Extended families?)
 - Possible types of work done by inhabitants;
 - Are the people that live here generally native to Nanjing? Are there many people that have migrated from other regions?
 - What is the average income generally? What is the income range?
 - What percentage do you think are retirees; young professionals? Children?
 - Where do you think most people purchase their food in this community?
 - Is there any green space to grow fruits or vegetables? Does anyone keep chickens?
- 4) Could you tell us any historical facts about this community? How old is it? How has it changed over the years?
- 5) Could you tell me the boundaries of the community? Where does it end and start?
- 6) Are there any official statistics about the community that can be shared?

Appendix 6: Semi-structured interview questions for employees at Zhongcai Agricultural Distribution Centre

Interview #1: Ma Xunping, Deputy director

1) What is the main role of Zhongcai in Nanjing?

Interview #2: Wang Ling, director of the food safety office

1) Does the food come from? What percentage of produce, meat, eggs, and grains and other agricultural goods are from the peri-urban region of Nanjing? How much of the food is imported from other regions?

2) What is the main role of Zhongcai in managing the market?

3) What is the IC card system and how does it work?

4) How is food safety managed? How is the food tested for safety?

5) What are some of the most common contaminants found? What are acceptable amounts of these contaminants in food?

6) Are many insecticides and pesticides found on the produce that are not legal in China? What happens when contaminants are found?

7) Can you give us more information or any literature on Zhongcai and its work?

Appendix 7: List of codes from HyperRESEARCH

Resident concerns	
Food safety	Superficial government regulation
	Food adulteration
	Animal health
	Synthetic agricultural fertilizers
	Synthetic agricultural pesticides
	Food additives
	Genetically modified organisms
	Fabricated foods
	Food origins
	Food quality
	Spoiled meat
	Food handling
	Low quality animal feed
	Out of date food
	Distrust for vendors
	Unsafe meat/animal proteins
	Unsafe fish and seafood
	Distrust imports
	Trusts imports
	Unsafe prepared foods
	Unsafe processed foods
Perceptions of food regulation	Distrust regulation

	Distrust systems of monitoring
	Distrust authorities
	Distrust media
	Trust regulation
Food cost	Rising food cost
	Low wages
	Food cost mild worry
	Food cost affects daily life
	Food cost impedes on social interaction
	Food cost not a concern
Food literacy	Poor media advice
	Generational lack of food skills
	Declining food skills
	Lack of food skills non-issue
	Convenience foods=declining food skills
Coping mechanisms	Avoid sale items
	Avoid processed foods
	Buy trusted brands
	Buy large chains
	Choose imports
	Choose seasonal
	Food prep to avoid bacteria
	Food prep to avoid chemicals
	Choose fresh

	Grow own
	Certification/labeling
	Avoid frozen meat
	Buy from farmer
	Cook at home
	Slaughter animals self
Neighbourhood Committee	Average income
	Demographics
	Housing cost
	Housing size
	Housing types
	Employment types
	Food sources
	Retirees/elderly
	Growing food
	Social supports
	Community issues
	Migrant
	Roles and responsibilities
	History
Zhongcai	Approval process
	Contaminants
	Food origins
	Food safety

	IC card system
	Roles and responsibilities
	Testing
Session details	Date/location
	Market description
Interviewee profile	Female
	Male
	Age 20s
	Age 30s
	Age 40s
	Age 50s
	Not local
	Local