SMALL-SCALE AGRICULTURE: A CASE STUDY OF SHIKOKU, JAPAN

by

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ABSTRACT

Growing concern about environmental and health impacts of our current industrialized modern food production and distribution system have made small-scale agriculture an attractive alternative for its responsiveness to the environment and its connection to people and places. This study delves into how small-scale agriculture is practiced in Japan, the opportunities for and challenges to small-scale agriculture, and implications this has on local food landscapes. For a variety of different reasons Japan, unlike the United States, has long relied on small-scale agriculture to feed their population. Recent times have found the country divided between incentivizing small farming operations or advancing agriculture through consolidation and mechanization. This case study of Shikoku, Japan seeks to better understand these opposing strategies for the future of agriculture and uncover the intricacies of small-scale agriculture.

The form and content of this abstract are approved. I recommend its publication.

Approved: Bryan Wee
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CHAPTER I

SMALL-SCALE AGRICULTURE

Food is the first of the essentials of life, our biggest industry, our greatest export, and our most frequently indulged pleasure.

Warren Belasco

Introduction. In recent years, concern has been growing in regards to consumer health and environmental protection in relation to the disconnection of industrial food production from local communities, fostering a greater desire for consumers to know the source of their food (Macias, 2008). Small-scale agriculture has long been a part of our collective history, yet, today it is often considered as a concept for developing rather than developed countries, being dismissed as backward, non-productive and non-commercial subsistence (Bamiduro and Gbadeyan, 2011). Small-scale agriculture encompasses most, if not all, of the alternative food networks currently available. Jarosz (2007) defines alternative food networks as networks that shorten the distance between producer and consumer, have small farm size (under 50 acres), utilize organic techniques, sell through venues such as cooperatives and markets or direct to consumer, and are committed to the social, economic and environmental tenants of sustainability. These types of alternative food networks serve as an ‘alternative’ to industrial food production where (in many instances) distance between producer and consumer is lengthened due to the distance food must travel from farm to factory to store to plate, economies of scale where expanding farm sizes require increased inputs by the producer in the form of machines and fertilizers, and less interaction with or understanding by the consumer of the origination, or source, of the food, thus leading to a disconnect between people and their food.
While all alternative food networks fall under the small-scale agriculture umbrella, not all small-scale agriculture endeavors are considered alternative food networks due to some small-scale operations using petro-chemicals and not being committed to the three legs of sustainability (economics, society, environment/ecology). For the purpose of this study, small-scale agriculture refers to those alternative food networks as defined by Jarosz (2007) in that they are characterized by their lack of chemical use and labor-intensive methods (Inuma, 1995, Fukuoka, 1978). This stands in stark contrast (and is considered oppositional) to modern agriculture as it has been realized in the United States (and other countries) through increased mechanization and monopolization, characterized by pesticides and machinery (Yamashita, 2006). Ultimately, small-scale endeavors seek to “respatialize and resocialize food production, distribution and consumption” (Jarosz, 2007, p. 1). This process of respatialization and resocialization allows the consumer to experience food that is “embedded with information” such as where, when, how and by whom it was produced (Venn et al, 2006).

The study of food respatialization and resocialization in Japan is important because it serves to connect residents with their history, their culture, and brings communities into closer contact around a central issue – food. In fact, during the 1960s Japanese women around Tokyo were so dissatisfied with imported, processed food that they started the Community Supported Agriculture (CSA) or teikei model of cultivation and distribution in which they sought out and made arrangements directly with farmers for natural, organic and local food (Schnell, 2007). This, in turn, created a new awareness among both producers and consumers around the importance of quality food and
strengthened the community as they worked together toward common objectives. In her book “Taste of Place”, Amy Trubeck (2008) contends that the flavor and odors of certain locales infuse the products that are born of these places and that the physical environment (soil, weather, topography) are primarily responsible for the creation of distinctive tastes for food and beverages, thus linking place, taste and types of agriculture and creating an “ecological relationship… between geography and cuisine” (pg. 150).

**Research questions.** In order to explore this concept of small-scale agriculture, alternative food networks and the way in which they interact with the communities they serve, I chose to consider the following research questions: 1) What does small-scale agriculture in Shikoku, Japan look like and how is it practiced? 2) What are the opportunities for and challenges to agriculture in Shikoku, Japan? 3) What are the implications of these findings for food and farming in small-scale environments? This type of study is important because, while it delves deeply into a particular place, it also serves to acquaint us with the value small-scale agriculture provides for both its producers and consumers, deeply linking them in their local economy (wherever that might be) and providing a dialogue between the two parties focused on their needs.

There are many different approaches to and models of agriculture, but for the sake of brevity and ease of juxtaposition this research will focus on two: 1) large-scale industrial monoculture agriculture and 2) small-scale polyculture agriculture. These models of agriculture represent the two ends of the agricultural spectrum and the opposing strategies for the future development of agriculture in Japan and, arguably, most places around the globe. The first strategy means to advance agriculture with the type of modernization that requires large tracts of contiguous land, allowing for spacious fields
and providing the economy of scale necessary to support the purchase of machinery necessary to farm these fields. The second strategy seeks to incentivize independent small-scale natural farming on smaller parcels and is considered to be human-centric. It is important to note that small-scale agriculture cannot fully replace industrial agriculture, but can instead serve an individualized and flexible alternative for those who seek to unite their food choices with their environment. While no agricultural system is a fully self-sustaining cycle, small-scale agriculture gets closest to a semi-self-sustaining cycle or, even, a regenerative system that serves to decrease the negative agricultural impacts of farming by reducing and, where possible, eliminating synthetic fertilizers and chemicals in favor of traditional nutrient cycling, such as utilizing composted food waste and animal fertilizer from on-farm systems, thereby minimizing external inputs and using what is readily available on farm, thus reducing waste and conserving energy within the system (Pearson, 2007). Alternatively, some small-scale agriculture is dismissed as “gardening” because it is done primarily by hand or with rudimentary implements, such as hoes, and it may only be done to earn some additional income on an irregular basis with the primary goal of fulfilling the food requirements of the producer (Ranasinghe, 2003).

Hilary Benn, the Secretary of the Environment for Australia, was quoted saying that “just as the 20th century was marked by the search for oil, so the 21st will be defined by the search for food and water” (Edwards, et al., 2010). Food is critical to a growing world population that is facing rapid urbanization (e.g. loss of arable land) amidst climate changes (e.g. unpredictable growing seasons) and diminishing natural resources (e.g. water shortages for irrigation). This is especially important for Japan because they lack
the expansive land resources needed to grow large quantities of food, are particularly vulnerable to natural disasters (e.g. earthquakes, volcanic eruptions and tsunamis), are heavily reliant on food imports, and are dealing with overfishing and increased contamination of the oceans they rely on for sustenance.

This said, it is prudent to debate whether current interest in small-scale agriculture is simply an attractive reaction to the economic/environmental downturn or whether it has the potential to become part of the increasingly urban landscape and change the way people (especially those living in cities) purchase, produce and consume their food (Broadway, 2009). For example, during the 1970s land in Mexico City and elsewhere around the globe was considered more valuable for urban development than for agricultural use; city development proposals at this time were based on a western model dominated by concrete, automobiles and greenspaces (“controlled imitations of nature”) and contribute to the pollution problems we face today (Losada et al., 1998). Planning has been slow to integrate agriculture due, in part, to the higher economic return and profile of housing and industry land uses, health and environmental risks from contaminated land, and political boundaries (Howe, 2002). As a highly urbanized society/developed nation, Japan needs to consider how, as a country and people, it can integrate small-scale agriculture as part of a robust food network. There is a push-pull between agriculture and development – the two are not mutually exclusive and there is a lot of gray area between the two extremes. Small-scale agriculture can fit nicely into developing cities if attention is given to its incorporation and communities are advocates for its retention (Figure 1).
Figure 1. Agriculture and Development Co-Existing

This image from Honshu shows vegetable fields and fallow rice paddies adjacent to housing and industry, offering an example of how the two can coexist.

Often, small-scale agriculture is viewed as a supplement to modern agriculture and not as a viable alternative food network. Yet, in order to achieve a sustainable lifestyle where communities can experience food, we must first explore/embracing its human-centric nature. The key lies in framing food beyond the issues of available land and water and into health and human behavior (Broadway, 2009). For small-scale agriculture to reach its full potential it will be necessary to a) fully understand the communities where it is practiced, b) support the goals of producers and consumers in local contexts, c) educate stakeholders and policy makers on its importance, and d) remain open-minded and flexible in its application. Depending on how small-scale agriculture enterprises are operated, they have the potential to serve as a supplement to mainstream agriculture for consumers who are willing to seek it out and pay for it, to produce specialty crops for sale to particular demographic segments, or to make a significant contribution to the food supply.
CHAPTER II
SPACE AND PLACE OF FOOD.

Simply, food comes from farmers and from the land. While recent experiments have attempted to grow meat in a lab (Post, 2012), there is no replacing the age-old techniques of growing plants and raising animals for food.

Hippocrates philosophized that “humans are creatures of the places they inhabit” and, if we take this to be true, then our food is also a product of the place from which it grows (Smith, Light and Roberts, 1998). Amy Trubek (2008) defines this as terrior, a French word that roughly translates to “the earth considered from the point of view of agriculture” (pg. xv) that frames people’s relationship to the land and is considered essential. A place is, essentially, space with a history (Smith et al, 1998) and it is this historical knowledge of space that is critical to attitudes toward decision-making about behavior within place (MacEachren, 1992). For example, at home in Wheat Ridge, Colorado my sense of place is immersed in small-scale agriculture and is, therefore, the lens through which I view the world. I live in a small house on just under a quarter-acre of land. My husband and I have a large organic vegetable garden, keep a dozen laying hens for eggs, and each year we raise a dozen chickens for meat. In addition to our home life, I am also a part of a goat co-op through Five Fridges Farm, a university research site, where I milk and tend goats two days a week. For two years my husband and I ran a small (5-10 person) CSA that delivered a basket of produce to our friends and their families every week through the months of July, August and September.

In France “people’s belief that the very soil, plants, climactic conditions, and animals [present in France] make France a unique piece of the Earth rather than [simply]
a nation among many others” and set it apart as a gustatory gem (Trubek, 2008, pg. 51). This type of mind-set can also be found in Japan, where the regard for rice grown domestically is inordinately higher than imported rice, in part for its contribution to flood control, soil conservation, preservation of underground water and land beautification – all of which would not be possible if the rice was not grown domestically (Ohnuki-Tierney, 1993). With this in mind, note that small-scale agriculture seeks to delve beyond the modern-day all-important imperatives of time and convenience to provide both farmers and consumers a more direct connection to the source of their food, resulting from agricultural practices that respond to the local environment and are focused on feeding nearby communities rather than faraway cities (Fukuoka, 1978; Trubek, 2008). Contrast this with the American foodview, which is more concerned with the ability to purchase a consistent product, a commodity, than by taste or place of origin of the product. Today, places themselves are treated more like commodities; they must be marketed to tourists or potential residents as somewhere they’d like to visit or live or, even, work. In a country like Japan where space is limited, it is imperative to use space efficiently and with proper allocation of resources to agriculture and development. Japan has accomplished this by being a very vertical society; by utilizing tall buildings and several layers of underground systems for subways and shops they have been able to avoid the horizontal sprawl commonly seen in the United States and conserve much needed flat land for agricultural use. Often, necessary infrastructure for small-scale agriculture is thought of as unsightly and considered “shackery” by the broader public (Figure 2).
In order to garner more support for small-scale agriculture it will be important to shift the perception of polytunnels, raised beds, chicken coops, fruit trees, goats, sheds and compost heaps away from “shackery” toward being charming and sustainable assets of a local food economy (Nichol, 2003).

On the surface, benefits of small-scale agriculture include improved air quality, reduced energy consumption associated with food miles, and improved biodiversity (Broadway, 2009), but a deeper look at active small-scale agriculture communities reveals enhanced city livability, restoration of local distinctiveness and, finally, a ‘sense of place’ that encourages collaborative, relationship fostering activities (Sonnino, 2009).

In order to understand why people participate in small-scale agriculture, motivations must be considered from the perspective of the producer as well as the consumer. Each participates due to their personal interests, whether it is on account of healthy food, supporting the local economy, or even simply for recognition of providing a service. Consumers are faced with many influences regarding “food, nutrition, environment and politics along with a diversity of desires, beliefs and preferences as well as issues
concerning availability, cost and convenience” (Jarosz, 2007, p. 234). Before consumers decide when, where and how to purchase and consume their food they must overcome all of these ingrained ideas about food – often cost and convenience are of utmost importance, while nutrition and environment are discounted.

Comparative studies between the U.S. and Japan show that Japanese society is deeply concerned with protecting the environment, that Japanese people are more concerned about food safety, are more sensitive about the use of synthetic chemicals, are willing to pay higher prices for sustainable produce and have a strong preference for vegetables of national origin (Palacios, 2005). In fact, more than half of the Japanese population belong to a consumer cooperative, many of which have direct-marketing relations with organic farmers (Moen, 1997).

Religion may also contribute to sense of place in Japan. Japan’s foundational ideologies include imperial rule, a strict social hierarchy, Confucianism, and Buddhism, while Japan’s indigenous roots are Shinto, meaning way of the gods (Woods, 2004). Shinto is primarily focused on maintaining harmonious relationships, believing that all things – rivers, rocks, trees – have spirits and deserve a degree of reverence. In Japan, agricultural roots are well established in the soil of deep Shinto-Buddhist spirituality and a multi-millennia long agricultural history.

As cities grow, agricultural activities are often displaced, relocated or engulfed by urbanization. Often, it is a strong cultural connection to agriculture that keeps pockets of agriculture alive in the suburban and peri-urban regions (Figure 3). In order to support these connections, policies for small-scale food systems need to be made collaboratively
with the community and, at the same time, require detailed data and information on many aspects of a city’s design and functioning (Sonnino, 2009).

Figure 3. Urban vs. Peri-urban
These images show the difference between an extreme urban setting and a fringe peri-urban area that incorporates agriculture.

Consider this: from 1961 to 2008 rural population in Japan declined by 79%, dropping from 14.5 million to 3 million (Muramoto, Hidaka, and Mineta, 2010). This is not just happening in Japan, the global trend is the movement of people from countryside into city. This shortage of people to work on the farm is one of the greatest limitations to agricultural sustainability – and one of the guiding reasons small-scale and urban agriculture should be viewed as viable alternatives for food production. For the first time in history there are more people in cities than in the countryside. While the growth of cities has significantly raised the caloric requirements, the available land to meet these requirements has been reduced by development (Kurita et al, 2009). Where rural residents are often engaged in or close to centers of food production, most urbanites must purchase their food and have little connection to its source (Sonnino, 2009).
In its simplest form, local food is defined as food or drink produced in the area where it is sold or traded (Nichol, 2003). However, “local” is also a construct, and “local food systems cannot be assumed to be uniformly good or progressive, because they emerge from a complexity of contingent, place-based social, political and ecological processes” (Jarosz, 2007, p. 233). It is commonly believed that increased local food production and distribution will lead to greater societal benefits (Macias, 2008). However, according to Sonnino (2010, p. 433) the secret lies in the “establishment of globally interlinked local food systems that use diverse technical, social and economic resources to improve the availability and accessibility of sustainably produced and distributed culturally acceptable food.” In Japan, chisan-chisyo is a concept that translates to “produce locally and consume locally” and calls for the “recovery of local foodsheds that can guarantee both the quantity and quality of agricultural products” (Kurita et al, 2009).
Small-scale agriculture, local food and alternative food networks seek to connect consumers, producers and food in a new economic space, provide a supply/distribution channel detached from the industrial, corporately controlled food chain while adopting principles of social-embeddedness, like trust and community, and are based on providing quality products with hopes of preserving or creating traditions (Venn et al, 2006). Howard (1999, p. 151) states that the “complexity of human life is compounded by the fact that we are all connected to agriculture in one way or another, and agriculture is irrevocably connected with the environment.” For consumers, simply knowing where their food comes from and how it was produced can provide a feeling of connection to the place where they live and the broader environment (Venn et al, 2006). To emphasize this desire for connection, there are agricultural parks located throughout Japan that offer visitors an opportunity to pick vegetables, pluck flowers, gather grapes and experience hands-on workshops while spending time in an agricultural setting.
CHAPTER III
SMALL-SCALE AGRICULTURE IN JAPAN

My initial reading on Japanese agriculture uncovered thought-provoking connections to a worldwide grass-roots agricultural movement with the common goal of growing quality food. In his book *One Straw Revolution*, Masanobu Fukuoka, a recognized leader in the natural farming movement in Japan, makes the claim “farmers everywhere in the world are at root the same farmers.” This simple statement speaks directly to the global similarities in agricultural techniques and how cultural influences of land cultivation serve to unite us. Because of this, farmers around the world are connected through their united efforts around producing food.

Agro-ecosystems of Japan are characterized as small-scale, family-oriented, paddy-centered systems managed intensively by aged, part-time farmers and consist of three different varieties: 1) upland systems of vegetables, field and industrial crops, 2) orchard systems of mandarin oranges, apples, persimmons, chestnuts, grapes, etc., and 3) pasture systems (Muramoto et al., 2010) (Figure 5). These types of agro-ecosystems provide numerous functions, such as providing food and economic security for citizens, ecosystem services, environmental conservation, a foundation for rural communities and their economies, the basis of traditional food culture and serve as the primary force shaping the landscape (Fukuoka, 1978; Iinuma, 1995; Muramoto et al., 2010).
Figure 5. Comparison of Agricultural Land on Honshu, Kyushu and Shikoku.

These images serve to show the differences between the three islands. Honshu has large areas of agricultural parcels, consisting of fallow rice paddies and rows of cold hardy greens, adjacent to residential, commercial and industrial land-uses. Kyushu’s fields of greens and cold season vegetables are nestled in valleys and close to villages. Shikoku’s temperate climate makes for productive rows of vegetables, such as cabbages, root crops and winter greens at the base of the Shikoku Mountains.

Agricultural history. Recent archaeological research reveals that while Japanese communities altered their environments and “cultivated herbaceous and arboreal” plant species during the Jomon era (14,000 BC – 300 BC), agricultural lifestyles were not apparent until the successful introduction of wet rice agriculture from continental Asia during the Yayoi period (300 BC – 300 AD) (Bleed & Matsui, 2010). Wheat and barley cultivation, alongside the use of oxen to plough fields, came to Japan from South Korea in the 5th or 6th century and subsistence agriculture on small-scale farms of one hectare (about 2.5 acres) characterized Japanese agriculture into the 17th and 18th century (Iinuma, 1995). Even into the late 19th century, most inhabitants of the Japanese isles subsisted on food produced and processed within the immediate vicinity of their place of residence (Woods, 2004). Even now, average farm size per farm-household
in Japan is 1.36 ha, except Hokkaido where average farm size increases to 19.3 ha per household (Muramoto et al, 2010). World War II serves as the turning point in Japanese history, with food rationing and the quest for food becoming the preoccupation of individuals, especially those living in urban environments, in the early 1940s (Illinois, 2010). The changes that took place in agro-ecosystems after World War II took a process that was energy-producing due to nutrient cycling and, from an ecological perspective, turned it into an energy-consuming process requiring fossil fuels for machinery and chemicals (Muramoto et al, 2010).

Historically, Japan has been one of the most protectionist countries in regards to allowing foreign trade (Palacios, 2005). In fact, Japan isolated itself for 300 years from around 1553 until 1853 during which time it was able to provide everything its inhabitants needed. Even until the 1940s, Japanese agriculture was grown in “integrated, mixed farming systems with (semi) closed-loop nutrient cycles” (Muramoto et al, 2010). However, from 1942 onward, agricultural programs focused on boosting domestic supplies of food led to improvements in land infrastructure, heavier application of chemicals, the development of seed varieties responsive to these chemicals and, ultimately, disruption of the rural environment through leaching and runoff of these chemicals (Palacios, 2005). Beginning in the 1940s in the U.S and the 1960s in Japan, practices that kept nutrient cycles closed and local were abandoned in favor of modernization focused on increasing yields and expanding farm sizes (Muramoto et al, 2010). This modernization of agriculture brought high capital costs for mechanization, often forcing farmers to work off farm to pay for the ever-increasing expenses, and will only serve to “further eliminate smallholders, further subordinate agriculture to
reductionist technologies, and deepen the reproduction of poverty and hunger” (McMichael, 2009, p. 239).

Japan’s 1961 Agricultural Basic Law promoted specialization in mono-cropped, nongrain agricultural commodities, expansion of farm size and mechanization of farm labor alongside the intensification of chemical fertilizers and pesticides with the perceived goal of narrowing the income gap between farm and factory work. While this goal was achieved, it didn’t happen by increasing farm revenue – it was instead due to machines liberating the number of workers needed on the farm so they could pursue factory work to pay for the high cost of the machines. However, due to the small-scale size of Japan’s farms, machinery that is used for the large-scale monoculture fields (farming systems) in the US are less energy efficient on the smaller parcels. Small-scale, part-time farms are inefficient in terms of economic gain and energy consumption per area. The percentage of class II part-time households, or those with primarily nonagricultural income, increased from 27% in 1955 to 61.7% in 2005, during the same timeframe (1955-2005) households with hens and chickens decreased from 4,510,000 to 6,330 while the agricultural working population went from 11.96 million in 1960 to 2.52 million in 2005 (Muramoto et al, 2010).

Changes in small-scale agriculture have led farmers to become multifunctional and required that they diversify into new enterprises, such as value-added goods or additional work outside the home, so that they are not dependent solely on food production (Nichol, 2003; Yamashita, 2006). This is definitely the case throughout Japan, where diversified rural household and rural manufacturing have long been the norm, even serving as the foundation for the development structure of Japanese industry (Francks,
Most small-scale agriculture operations participate in multiple means of revenue creation, where alongside traditional fruit and vegetable production, raising of livestock, value added goods such as jams, sausages and pastries are produced. These places also serve as makers of textiles and household goods, language schools, nature guides, and tourism hubs. These type of activities among rural households have been recognized since the Tokugawa period (1600-1867), referred to as ‘supplementary work’, ‘side-line employment’ and ‘part-time farm’ over the years, and make up anywhere from 20-70 percent of non-agricultural household income (Francks, 2005). In fact, even as Japan became an industrial economy, small-scale flexible producers persisted with only 13% of households classified as full-time farms by the early 1980s (Francks, 2005). One reason that these small-scale operations have remained in place in Japan is that farmers will hold onto farmland lots for a long period of time for the fixed asset and inheritance tax breaks, thereby hindering the liquidation of farmland blocks for industrial, commercial, housing or consolidation purposes (Honma, 2009).

Today, rice is easily the most recognizable Japanese agricultural product, and in 2010 Japan’s self-sufficiency rate for rice (by weight) was 100% while Japan’s overall food self-sufficiency rate (in calories) dropped from 73% in 1965 to just 30% in 2010 (Statistics Bureau of Japan, 2012). This decrease in self-sufficiency is due, in part, to changes in the Japanese diet – away from rice and toward increased consumption of animal products. It takes up to 16 times more farmland, which Japan simply does not have, to sustain people on a diet of animal protein than it does to sustain people on a diet of plant protein (McMichael, 2009). Japan’s self-sufficiency rate of various agricultural products in 2010 was 56% in meat, 60% in seafood, 9% in wheat, 8% in beans, 81% in
vegetables and 38% in fruits (Statistics Bureau of Japan, 2012). These statistics also reflect a broader global trend, where higher levels of affluence and increasingly sedentary lifestyles in developed nations have led to a shift in dietary preferences. Like other nations, such as China, dietary changes threaten Japan’s food security and force them to be highly reliant on the purchase of import goods to feed their expanding population, particularly for wheat and beans. However, it is interesting to note that for two key ingredients of the historically common diet – rice and vegetables – Japan is largely self-sufficient.

**Geography & climate.** Japan is an archipelago made up of over 6,800 islands with a population of over 128,000,000 in a space of merely 145,900 square miles (377,900 km²) that is nearly 80 percent mountainous. The four largest islands – Hokkaido, Honshu, Shikoku, and Kyushu – account for 97% of Japan’s total land area (Figure 6). For comparison purposes, the 48 contiguous states measure 3,119,884 square miles (5,020,966 km²) and were home to 306,675,006 people in 2010. That same year, Japan’s population density was 343 persons per square kilometer, ranking it among the top 10 most populated countries in the world and making Japan one of the most highly urbanized nations in the world with at least four-fifths of its population living in urban areas (Mather, 1997; Statistics Bureau of Japan, 2012). This means every square mile, or 640 acres, in Japan would need to feed approximately 878 people; whereas residents of the lower 48 contiguous states are allotted 640 acres per 98 people. In other words, people in Japan have to produce more (food) with less (land). This is why small-scale agriculture is viewed as an approach that can meet the needs of a growing population in a

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¹ These numbers do not take into account lands unsuitable for agriculture.
changing landscape. As development continues to overtake the countryside, small-scale agriculture has the potential to fit into the gaps and remain a productive means to supply the urban population with food.

![Map of Japan](http://www.sweetsmores.com/wp-content/uploads/2013/07/Japan-map-001.jpg)


Map of Japan showing four main islands: Hokkaido, Honshu, Shikoku and Kyushu (north to south).

The strato-volcanic archipelago stretches from 20°N to 45°N with a climate that varies from subtropical in the south to cool temperate in the north. Japan is home to nine forest ecoregions, from subtropical moist broadleaf forests in the south to temperate broadleaf and mixed forests on the main islands and temperate coniferous forests to the north. Annual temperatures range from 10°C to 20°C while precipitation ranges from 1,000 to 2,000 mm annually. Most of Japan’s population is concentrated on 25% of the
land area comprised of scattered plains and intermountain basins, with the rest of the land area being mountainous and 13% of it farmed. Japan’s climate varies from north to south, from temperate to subtropic and experiences four seasons: mild winters, rainy late springs and early summers, hot and humid summers and typhoons during late summer and early fall.

**Labor.** Shortage in the working population in farming is one of the greatest limiting factors for agricultural sustainability (Muramoto et al., 2010). As it stands, Palacios (2005) recognizes that the “most visible characteristic of the Japanese farming population is its ageing” with only 20% of farmers under 50 years of age and 53% over the age of 65. Most Japanese farming households are hereditary, passing land and knowledge from one generation to the next, thus creating a barrier for newcomers interested in entering farming as an occupation. Another barrier lies in the need to acquire permission from the local agricultural commission before beginning an agricultural operation; the majority of farms remain small-scale, family-operated, part-time enterprises (Muramoto et al., 2010) with a “growing premium placed on the kind of careful work that only the family labour force of the small-scale cultivator could provide” (Francks, 2005, p. 463).

In most developed countries, manual work such as agriculture has been devalued and is not part of an educational curriculum, leaving younger generations either uninterested or unprepared for an agricultural livelihood (White, 2012). Of the younger generation interested in farming, many have no background in or around agriculture. Perhaps existing farmers are not the only people who can farm; new ideas could revolutionize the agricultural landscape and directly challenge the age-old hierarchy that
has existed (Nichol, 2003). Different generations have different ideas regarding their role in agriculture; for mature and elderly farmers the basic function of agriculture is simply food production, while the younger generation is more concerned with environmental impacts and benefits of agriculture (Palacios, 2005). Nichol (2003, p. 423) claims these “new entrants challenge the status quo about who belongs in the countryside and what agriculture should be like.” While younger producers do not farm solely for profit, they often feel betrayed by consumers who associate quality with appearance and have a preference for cheap chemical-laden products that have been provided by the maturing farmers they are replacing (Palacios, 2005).

Science. There is a constant removal of poetry from scientific writing. More and more, peer-reviewed journal articles are littered with facts and minute details, yet the larger, over-arching connections to the natural world remain untethered from these same details. We have gotten to the point where scientific truths are exalted above the absolute truths of the natural world, sometimes momentarily forgetting that scientific truths are concepts of the relative world and serve as temporary methods and directional markers for the loudest (and most funded) science of the day – it is in this same manner that food’s flavor varies, dependent on time, circumstance and, potentially, the disposition of the person doing the tasting (Fukuoka, 1978). “To know, by way of statistical analysis, government reports, and academic papers, the environmental impact of agriculture is to dissociate that impact from personal lives” (Howard, 1999, p. 160).

Politics/Policy. Many farmers feel that the Ministry of Agriculture, Forestries, and Fisheries (MAFF) is more concerned with the interests of agribusinesses and major corporations, and if MAFF supports organic farming at all it is only because money can
be made by the corporations that control distribution, processing and marketing (Moen, 1997). Some policy recommendations for Japanese agriculture have been to grow the industry as a means for not only feeding the Japanese people, but as a way to open Japan’s agriculture to the world in order to “spur food-related business” such as selling high-grade brands of Japanese-grown rice to wealthy consumers abroad (Honma, 2009). However, these recommendations can only be met if policies that reduce rice acreage are abolished and scattered farmlands are consolidated and cultivated by 21st-century high-tech production systems (Honma, 2009). It should be recognized that agricultural policy would be more successful if it corresponds to farmers’ values and convictions, for they are the ones responsible for adhering to and cooperating with whatever policies are put into place (Palacios, 2005).

Another perspective is that, because of the limited landspace and due to Japan’s ability to produce high-priced manufactured goods, they should expand their manufacturing capacity and contract agricultural production all together, causing them to rely even more heavily on foreign food imports (Yamashita, 2006).
CHAPTER IV
METHODOLOGY

Whereas traditional research seeks to maintain tight control over experimental conditions, case study evaluations are discovery and naturalistic oriented, allowing the researcher to “investigate contemporary phenomenon within its real-life context” or “experience directly the phenomenon being studied” by using multiple sources of inquiry, such as analysis of documents and archival data, interviews, surveys and direct field observations where the researcher is the primary instrument of data collection (Yin, 1992, p. 123; Yin, 2003). With the topic of agriculture, particularly small-scale, the case study method was a good choice as it allowed for enhanced understanding and an extension of experience without needing an experimental control versus test group design. Instead of attempting to control the variables as one would in such an experiment, the use of case study evaluation allowed for a robust exploration of the small-scale agriculture landscape, or “vernacular,” as it is present in Japan (Schein, 2010). This was done through secondary research followed by participant observation in country.

Case studies are best used when “why” or “how” questions are being asked (e.g. how is small-scale agriculture practiced in Shikoku, Japan), particularly in regards to circumstances in which the researcher has little or no control (Stake, 1978; Yin, 2003). At times, case studies are considered to be single case ethnographic evaluations where data collection and analysis occur simultaneously (Yin, 1992). Case studies feature a) descriptions that are complex and holistic, b) involve different variables, c) data gathered at least partially by participant observation, and d) an informal writing style (Stake, 1978;
Yin, 2003). Primary research methods for this study were secondary research and field observation.

**Secondary research.** Databases searched included Academic OneFile Plus, Academic Search Premier Plus and Web of Science, all available through Auraria Library (library.ucdenver.edu), as well as Google Scholar. Historical materials, archived materials and current peer-reviewed journals were pulled from these databases using various keywords. These keywords included small-scale agriculture, alternative food networks, community supported agriculture, farming, and agriculture. After an initial review of overall materials available, the search terms were narrowed by adding Japan or Shikoku, Japan. A substantial amount of research was conducted during fall semester 2012 (August – December), prior to traveling to Japan, with the bulk of the research completed upon returning during spring, summer and fall semesters of 2013 (January – October). Some records dated as far back as the early 1900s; I focused on research conducted within the past 20 years, making an exception for several books and articles of importance that date as far back as the late 1970s.

**Field observation.** For the field observation portion, I traveled to Japan from December 28 through January 19, 2013. The first two weeks (December 28 through January 9th) were spent as part of a course, Geography by Rail, led by two instructors from the UC Denver Geography and Environmental Science Department. We traveled throughout the island of Honshu, staying in Tokyo and Kyoto and making day trips to Nara, Osaka, Okayama, Lake Biwa, Hiroshima, and Hakone. The extent of my interaction with small-scale agriculture was through the windows of the train as we moved across the countryside and in the markets we encountered along the way, most
notably The Nishiki Market in Kyoto (see Appendix A). We also had the opportunity to experience local restaurants for meals, as well.

Traveling with a large group with designated sights and experiences was a good initial introduction to Japan and allowed for a transitional, immersive experience. Each student was required to select a specialty before arriving in Japan; my specialty was agriculture. Other examples of specialties included water, environmental education, political science, energy and climate. The ability to converse with peers on these different topics served to provide a broader comprehension of what we were experiencing day-to-day and allowed us to work together with different viewpoints to further understand the cultural landscape, food and geography of Japan. According to Schein (2010, p. 225), cultural landscapes are the buildings and spaces that give character to a place, are “representations embedded in, and that embed meaning in, everyday life” and are local, existing somewhere in particular. I was fortunate to share these first two weeks of travel with fellow students and researchers, and gained a better understanding of Japanese culture and way of life than would have been possible on my own.

A large part of the course required that we keep a travel journal where we would record daily insights and anecdotes about our experiences. Often, we would write in our journals during the train rides or when we returned to our hostels each night. I extensively documented the entire trip photographically as well. The following is an example of an entry into my journal from December 30th during our travel from Tokyo to Kyoto:

Agriculture is embedded in the urban landscape; citrus groves, greenhouses, hoop houses and fields. The way the Japanese have integrated agriculture among other land uses is astonishing. There is absolutely no waste of space. Neat little square fields and long rectangles of greenhouses abut residences.
Upon course completion and feeling more confident traveling in Japan, I traveled with one other student to the islands of Kyushu and Shikoku for independent travel and observation from January 9th until January 13th. We traveled as far south as possible on the Shinkansen to visit the town of Kagoshima on Kyushu and were able to visit Sakurajima, where they grow the world’s largest turnips and the world’s smallest mandarin oranges. Sakurajima also has a live volcano that is constantly spewing smoke and ash, which was visible from everywhere in Kagoshima and served to amaze my travel partner and myself. We traveled from Kagoshima to Matsuyama, which allowed us to travel a bit of the northwest Shikoku coastline. Again, the majority of my observation was through train windows, in restaurants and markets, while we were able to see fields of turnips and groves of mandarin oranges on Sakurajima. Recorded in my journal from our trek between Okayama and Matsuyama:

So much ag! I picked the right island… crops apparent: greens, roots, citrus, grapes and cabbages. From Okayama to Matsuyama my gaze was on the countryside out the window. So different from the rest of Japan – this island seems to be the “working class” island with a few high end “land lords.”

My final days in Japan (January 14th – January 19th) were spent on a small-scale organic farm outside Kochi City on the island of Shikoku, Japan. I selected the island of Shikoku because of Masanobu Fukuoka and his book, *One Straw Revolution*. Regarded as the father of natural farming, it made sense that I would search out an organic farm on the island where he spent his life farming and learning about the rhythms of nature. Besides, I truly enjoy getting away from “the beaten path” and knowing that Shikoku is not well traveled (beyond the few who come for the 88 temple Buddhist pilgrimage that circumnavigates the island) made it attractive to me and, in a way, could provide a more
authentic experience of small-scale agriculture. I searched for and connected with an organic farming host family through the organization World-wide Opportunities on Organic Farms (WWOOF). For the purposes of WWOOF, organic simply means to farm without chemicals. Each host is different; many are too small to warrant organic certification of any type and most self-identify on their profiles what percentage they consider themselves to be organic.

WWOOF is an organization that links volunteers, known as WWOOFers, with organic farm host families for a work/accommodation exchange (Figure 7). The organization began in England in the 1970s and spread from there to more than 40 countries. In order to identify an organic farm in Shikoku I joined WWOOF Japan through the website www.wwoofjapan.com. The website serves as a portal to connect WWOOFers with willing hosts. Hosts provide accommodation and meals in return for assistance, providing the WWOOFer with knowledge and skills as a result. Some WWOOFers remain with their host family several weeks or several months, depending on their availability. I was able to stay with my host family for five days.

![Image of WWOOF Japan Logo](www.wwoofjapan.com)

Figure 7. Worldwide Opportunities on Organic Farms (WWOOF) Japan Logo.
Source: www.wwoofjapan.com

The WWOOF Japan logo shows a few of the different activities that hosts and their volunteers, called WWOOFers, participate in.
The host family I stayed with was two women, V and T, who owned a few parcels of land that they called Spring Farm and consisted of a homestead, a bamboo forest, a yuzu (pronounced you – zoo) orchard, a large vegetable garden plot and an area for ducks and chickens. Fortunately, V was from Australia and spoke fluent English (which I had learned from the WWOOF website prior to arriving) and I was fortunate to be able to communicate with T, a native of Japan, through an application on her iPhone that allowed her to speak Japanese into the microphone and in return would translate and speak English. I was one of two WWOOFers staying with them at the time; the other WWOOFer, S, was from Hokkaido and could speak a little English because she had spent time in both California and Texas.

An average day for me with my WWOOF host meant rising between 6:00 and 7:00am, either sleeping in a little or getting up to go for a short hike through the yuzu orchard and bamboo forest before collecting eggs from the ducks and chickens and joining my host family and fellow WWOOFer for breakfast sometime between 8 and 9am, depending on what was decided the evening before. During breakfast we would discuss what jobs would need to be completed for the day – each day was different. The first day we chopped and stacked wood for our host’s wood stove (and sole source of warmth) in their house, the second day we chopped wood, harvested yuzu, and amended garden beds, the third day we split bamboo and squeezed yuzu for juice, and on the fourth day we mended garden beds and built a sumi kiln. We would have lunch together everyday around 12:00 or 1:00pm – which was delicious and authentic. My hosts were vegetarian, so lunches consisted of fried tofu and vegetables, rice with seaweed, miso soup, umeboshi (plums), as well as red curry with coconut milk, eggplant and
mushrooms. Every day at 5pm there was a PA system at the school just down the way that would play music and signal our quitting time. It was one of my favorite things from the entire experience. In addition, it chimed every half an hour throughout the day, and one evening made an announcement about someone coming to town from the university to host a discussion regarding clean up the waterways. The announcement was also an invitation for anyone willing to join in and bring ideas to the table. At the end of the day we would all gather for dinner. There were a couple of nights it was just S and myself, as V and T were working. On nights that V was home she would make sweets to test out recipes for new items to sell at the market – the sweets were all dairy free and consisted of yuzu tarts, tiaramasu, and steamed tofu cakes. By the end of my time with V, T and S I was not quite ready to leave. It was a wonderful, immersive experience and something I will treasure.
CHAPTER V
CASE STUDY OF SHIKOKU, JAPAN

There is very little literature strictly on small-scale agriculture from the island of Shikoku, Japan that has been translated into English. The most influential work comes from Masanobu Fukuoka in the form of his tome *One Straw Revolution*, recognized as one of the forefront works on natural farming. It was with his words in mind that I traveled to the island of Shikoku, seeking a deeper understanding of small-scale agriculture.

When I first arrived at Spring Farm my hosts sat me down to review a packet of information about the farm and the area (Figure 8).

![Figure 8. Spring Farm Homestead](image)

This image of Spring Farm shows the main house, guest quarters and bamboo forest.

Luckily, as I was there during the winter, I would not have to worry about the poisonous snakes or the biting centipedes – but needed, instead, to be aware of the potential for a large earthquake. According to my hosts, everyone in Kochi and the surrounding area is
prepared for the next big one by keeping shoes and a backpack of supplies under their bed for when it comes. It was an interesting glimpse into living life on the edge of an ocean, and a revealing peek into how attuned they are to the natural order of things. They didn’t speak about “if” the earthquake would come, but “when.” I also learned they have a word for this attitude, they call it “goman,” which roughly translates to “grin and bear it.”

I’ve organized this case study into two main categories 1) geography and climate, and 2) sense of place. These serve to capture the main ingredients essential for small-scale agriculture on Shikoku, Japan. It is important to first understand the lay of the land and the culture before exploring the intricacies of food and farming.

**Geography & climate.** The island of Shikoku, Japan is only 225 kilometers from east to west and varies from 31 to 50 kilometers north to south, for a land area of 18,800 square kilometers (7,259 square miles). With a population of approximately 4,142,000 in 2005, the name Shikoku translates to mean “four provinces”, namely Ehime, Kagawa, Tokushima and Kochi (Figure 9).
Shikoku means four provinces – namely, Ehime, Kochi, Tokushima and Kagawa.

Shikoku is one of the four main islands of Japan, the other three (north to south) are Hokkaido, Honshu and Kyushu. Shikoku is the 50th largest island by area in the world, and the 23rd largest by population. Shikoku is separated from the island of Honshu by the Inland Sea and is bordered on the southern side by the Pacific Ocean. A mountain range running east to west across the island creates a divide between the northern, more populous side, and the southern part of the island (Woods, 2004). The city of Kochi is nestled in the southern bowl created by this mountain range and is open to the Pacific Ocean. Shikoku has no volcanoes; the largest peak, Mount Ishizuchi, stands 1,982 meters (6,503 feet). This means Shikoku was formed solely by the action of plate tectonics.

USA agriculture, by comparison, is based on dry climate, reduced labor and mechanization for large areas of production, while Japanese agriculture is humid, intensive and based on production per unit – essentially mixed farming based on the labor
of the family (Inuma, 1995). Shikoku is relatively mild in the winter, rarely getting below freezing with colder nights and days that heat up to around 10 degrees Celsius. However, due to the proximity of the ocean and the humidity, it felt much colder than it would in Colorado, where it is dry.

**Sense of place.** The island of Shikoku is best known for its 88 Buddhist Temple Pilgrimage. Fukuoka, who conducted his life’s work on Shikoku, subscribes to the Buddhist philosophies of discontinuing the desire for material possessions and personal gain and of moving toward spiritual awareness, believing that the best way to live is “simply and directly” with gratitude for and attentiveness to the ordinary activities of daily life. For me, Spring Farm was the place I felt most connected to the Japanese culture. An example of an important moment was when we sat down to eat, before taking a bite we would say *itadakimas*, which was explained to me as a way to say “thank you to the farmers, to the plants, to the sun, to everything for the life and the energy they provide.” Being on an organic farm and learning this gave me a deep appreciation for what it takes to bring the food to our plate, and a realization of the gratitude and reverence necessary for the process.

Today, farmers can privately own land and manage it however they see fit; there are areas of cropland, grassland, deciduous forest and conifer plantations (Kamada and Nakagoshi, 1997). From conversations with V, she revealed that it is very difficult to buy land in Japan as someone different owns each plot and there are rarely large tracts of available land located together. Sometimes the owner is deceased and before being able to sell the land it must be transferred to a living person within the family – often this is either hard to do or ends up in a family feud where cousins or other relatives are not
interested in selling the land. V mentioned she has friends that have been travelling Japan seeking property for nearly 15 years, but every time they think they’ve found a spot that fits what they are looking for they either can’t find a living relative or get wrapped up in a feud.

Further consideration of the available land reveals that, unlike U.S. cities that have kept urban and rural areas largely segregated, many Asian cities, including those in Japan, have mixed urban and rural land-use patterns at their urban fringe (Kurita, Yokohari, and Bolthouse, 2009). These fringe areas happened, in large part, due to Japan’s boom period from the late 1950s through the mid-1970s when rapid development of cities overtook the adjacent agricultural land, largely without planning laws (Kurita et al., 2009). Over time, in Japan, the rural-urban divide lessened as farmers “came to see the differences between themselves and their urban consumers as prejudices inculcated from childhood… and came to see the rural-urban dichotomy and class-based divisions as an unnatural and imposed separation of people with common interest and a shared social vision attempting to reshape society from the grassroots” and are thereby “engaged in concrete actions to create new cultural values and new social relationships that challenge the dominant culture’s socio-political assumptions” (Moen, 1997, p.17). This was evident at Spring Farm and throughout Shikoku. Vegetable fields (or small plots), greenhouses (or their smaller counterpart, hoophouses) and orchards were intermingled among residential, commercial and industrial complexes. The farm was approximately 30 minutes out of the main part of Kochi City, yet it was located near a school and had neighbors with agricultural land within a minute’s walking distance (Figure 10).
The industrial globalization of our food system has detached us from an awareness of when particular fruits and vegetables are at their peak and should be consumed. In order for small-scale agriculture to be successful, it is consumers who must adapt their purchasing, processing and eating habits according to the constraints of the seasons (Cone and Myhre, 2000). It is important to note that my time on Spring Farm was during the winter months, when it is usually considered the agricultural off-season. I appreciated being there during this time. While it is easy to see and interact with agriculture during the spring planting and the fall harvest, the winter months truly allowed for me to see the preparation and production that are possible during the winter. While we were chopping and stacking wood to heat the homestead during the colder months and splitting bamboo to use around the property for various purposes (e.g. fencing, gutters, flooring), the chickens and ducks were still laying eggs. We were able to harvest citrus (yuzu) from the groves and the vegetable garden was lush with spinach and...
root crops (Figure 11). Figure 12 shows Fukuoka’s seasonal food mandala for Shikoku; in the center are grains, followed by vegetables, seafood and fruit trees listed by their appropriate month of harvest.

**Figure 11. Duck and chicken enclosure at Spring Farm.**
The duck and chicken enclosure is fenced with bamboo from the property, contains rain barrels to catch water for the animals to drink and bathe in and has several yuzu trees for shade.

**Figure 12. Nature’s Food Mandala** (Fukuoka, 1978, p. 131)
This diagram shows the seasonality of harvest in Shikoku, Japan.
Farming and small-scale agriculture are multifunctional activities that “safeguards the rural landscape, prevents flooding and soil erosion, preserves water resources, constructs a friendly environment for a comfortable human life… and serves as the backbone of the life of the people and the national economy stability” (Palacios, 2005). In order to carry out the multifunctions of agriculture, indigenous knowledge, or perhaps another way to think of it is as “natural human capital”, is key and may be thought of as a “portable asset in which we invest time and resources over a lifetime to increase our knowledge of the natural world” and, in doing so, pass it on to the next generation by word of mouth or apprenticeship (Macias, 2008). The sheer fact that V and T opened their home to WWOOFers shows that they are dedicated to passing on their knowledge. They host between 40 to 100 WWOOFers annually, including people from all over Japan, the U.S., Germany, France, and Australia, and have had many volunteers return for several stays over the years. Each one of these people experience and learn from the way V and T live their lives and take whatever little pieces they can with them, a little seed to sprout in the soil of their own ambitions at home.

Small-scale agriculture can “re-embed” people, both consumers and producers, by linking them to the land and providing them with a seasonal awareness (Cone & Myhre, 2000). On a basic level, “a sense of rootedness in a place is an important part of what it means to be human” (Smith et al., 1999) for if we are uprooted, meaning we “see and shape our world according to global perspectives”, we then have no clear sense of where we belong (Howard, 1999). According to Moen (1997), by establishing social relationships based on equality and fairness, people can feel fulfilled and connected, leading to a true sense of community and bypassing the conventional market to establish
direct-marketing relationships based on trust and mutual respect. This attitude was
apparent during my stay at Spring Farm. They have a well-connected network of people
with whom they trade and do business. The Sunday market in Kochi is renowned for the
variety of goods they provide, and even the local supermarket (Sunymart) provides a
small area for local producers to bring in a basket of goods for sale.

For most small-scale agriculture farmers, farming is more than a means of making
a livelihood. It becomes all-consuming and spreads into every facet of their lives –
beginning with the food they eat and extending to the community they interact with.
Often, in order to survive they must have additional sources of income, whether they sell
produce to local restaurants or work full- or part-time jobs during the winter or
throughout the year (Cone and Myhre, 2000). Both V and T had part-time jobs away
from the farm; T as a tutor and V as an accountant. They also sold most of their yuzu
crop and ran a food import business from Australia, but kept their vegetable gardens
mostly for themselves. While staying with them, as I noted earlier, V was working on
recipes for sweets to sell at market. They also had a network of people they bartered and
did business with – a particular gentleman they would purchase rice from, a family that
owned a bakery they would trade goods for T’s tutoring services and a couple of local
kids that would come help them during the busiest harvesting months.

Unfortunately, globalization undermines local economic resilience and the
autonomy of local communities while increasing their dependence on foreign goods
(Grewal & Grewal, 2011). Self-sufficiency, also referred to as self-reliance, requires that
food production take place close to where consumers will purchase and consume the
product. This creates local jobs, allows for reintegration of nutrient cycling where kitchen
and food waste can be converted to fertilizer, and promotes a sense of community and a feeling of community empowerment (Grewal & Grewal, 2011). While I did not participate in any local markets during my stay at Spring Farm, I did get to see how they utilized outputs from one system as inputs for another. We composted all of our food and used dried and burned poultry waste as a partial amendment for the garden beds.

Locally grown organic foods are often purchased primarily by well-educated and well-paid urban consumers, when even the farmers who grow the food would be unable to afford the farmers market prices (Jarosz, 2007). Thus, the paradox of availability of fresh, organic produce – cheap food is at odds with the need for favorable farm income (Guthman, Morris, and Allen, 2006). V and T both expressed dismay at the fact that since they don’t use chemicals their yuzu fruit sometimes has funny bumps or misshapen rinds. Often, consumers don’t want to purchase these types of fruits or think they should be able to get a discount for them solely based on their appearance, when in fact they are of higher quality than the chemical laden, plastic looking fruits sold in markets. Fortunately, there are not many yuzu producers and there is a high demand for the juice and the fruit. They are able to sell large quantities to a single distributor at a good price and keep a few bushels to sell at their local market whole or in the form of sweets or to keep for their personal use.
CHAPTER VI
DISCUSSION AND CONCLUSION

In reality, farms and food production do not exist in seclusion or the utopic rural settings commonly prescribed to them (Robothan & McArthur, 2001). Venn et al (2006, p. 248) contend that “agriculture has become an increasingly specialized activity undertaken by relatively few people, and remote from the experience of most urban, and many rural, dwellers” leaving few consumers with the opportunity to interact with the people who produce their food or an appreciation of the process to bring food from the farm to their fork.

As the city continues to overtake the countryside, cultural continuity and the modern/traditional blend will become a part of the urban and fringe landscape. This is evidenced by how agricultural fields are absorbed, supported or destroyed. Even though there are many pushing for the modernization and consolidation of agriculture, Japan simply does not possess the physical space or have the necessary flat land available to support fields of monoculture crops. Due to ever-increasing constraints from limited land space and an expanding population, Japan will have to rely on small-scale urban agriculture if they intend to continue providing sustenance to their growing population. However, in order to fully understand all the implications for small-scale agriculture, more research is needed on land tenure, ownership and the state of agricultural parcels in Japan.

Small-scale agricultural opportunities in Japan are evidenced by the creation of niche market opportunities, leading to the formation of distinctive local specialties with products that are aimed to meet local tastes using a particular local raw material (Francks,
This, in turn, lends itself to a lively and engaged local economy, bolsters the prosperity of the community and increases their connection to small-scale agriculture. As niche markets expand, farmers will be further incentivized to retain their land for financial purposes and, thereby, hinder the farmland consolidation necessary for larger commercial industrial operations. Small-scale endeavors have shown that they can coexist with development, especially when considered early during the planning process, and are a way to provide a sense of place as well as a link to Japan’s history, further strengthening their cultural identity. Environmentally speaking, polycultures common in small-scale agriculture increase biodiversity and reduce the need for chemical pesticides and fertilizers by utilizing integrated pest management and on farm nutrient cycling, thus reducing both inputs and waste for a return to a regenerative system.

However, small-scale agriculture in Japan must still overcome several obstacles. Urbanization contributes to the loss of agricultural land to development for homes, businesses and other uses. While farmers may prefer to remain small-scale and human-centric, Japan’s government and MAFF seek to emulate the United States apparent agricultural advancements and put pressure on farmers to consolidate farmland and modernize agriculture through mechanization and monocropping. The ageing farmer population and lack of new farmers entering the work force, coupled with the fact that most agricultural operations are family-oriented and hereditary, means there is limited potential for growth and refinement of small-scale agricultural endeavors and more of a chance these lands could potentially be sold to large corporations. At the same time, dietary shifts toward meat and wheat and away from rice and vegetables create a larger
need for imported food, and less of a need for the rice and vegetables that are grown locally.

While small-scale agriculture as it is in Shikoku, Japan cannot be directly replicated in other places due to its unique history, culture, geography and climate, it can serve as an example of the possible opportunities and obstacles that small-scale agriculture may face. Different places have different needs; small-scale agriculture is dependent on the distinctiveness of a place’s geography, climate and, ultimately, culture. Additional case studies of places with unique attributes would lend themselves to comparative investigations of the similarities and differences of small-scale agriculture around the world and, potentially, show that farmers everywhere are, at their roots, the same – just as Fukuoka claimed – and tap into the undercurrent of the “worldwide grassroots” movement of small-scale agriculture. Cuba, for example, is an island much like Japan. In fact, Cuba could be considered a micro-continent, owing to the highly diverse nature of its natural biodiversity, soil types, geographic landscapes, geological ages and microclimates (Levins, 1993). Yet, Cuba’s approach to small-scale agriculture was a product of necessity when the Soviet Union, its largest trade partner, collapsed and, further hindered by the U.S. embargo, crippled Cuba’s ability to secure petroleum for transportation and chemical pesticides and fertilizers. This, in turn, caused them to embrace agriculture that was grown organically and close to urban centers for ease of distribution. In depth case studies of Cuba return a very different perspective of small-scale agriculture. There is no one universal similarity between small-scale agriculture activities; even operations a mile apart will have differences to contend with, whether it be soil, water, seed type or a microclimate. In reality, the only universal tenant of small-
scale agriculture is that it is unique to the individual place where it is practiced. Even so, other places could benefit by reviewing the way small-scale agriculture in Japan has been allowed to flourish in the fringe areas of cities and how local markets support it.

While the environmental, health and community benefits of small-scale agriculture are well documented in the literature, little has been done to understand the production potential of small-scale agriculture. Further studies along these lines would help understand how small-scale agriculture can contribute to the greater food supply and provide credibility for it as a viable alternative to the industrial food complex.

**Connection to a worldwide grassroots movement.** According to Howard (1999), the small-scale farming economy is tied to sense of place and the social and cultural order because farmers, as members of the community to which they sell, have direct access to the needs and desires of their consumers. Too often our traditional financial system devastates local economies by removing money from local communities and transferring it to large corporations and financial centers. As we move forward, creating resilient local communities will become more and more important. Grassroots is the most basic level of an activity – and growing food serves to accommodate our most basic need. By growing and consuming food within the communities in which we live we strengthen our understanding of the connections between people and environment and are able to see the detrimental environmental and health costs of large-scale industrial food production. Small-scale agriculture is experiencing a renaissance currently due to grassroots organizations educating the communities they reside in about the simple pleasures of local food. It is often said that the kitchen is the heart of the home and the
place where people tend to congregate – and that is true. Food begets community; community begets change.

**Food as the next global agenda.** Perhaps because industrial food costs are becoming more pronounced as time goes on, food has been gaining recognition on the global stage. The contamination of our waterways and the disappearance of our topsoil create an urgent need for regenerative agriculture. As our climate continues to shift we will be required to find innovative ways that use less nonrenewable and polluting inputs and incorporate the semi-closed loop cycles of small-scale agriculture. “Food and farming are the front and back of the same body” (Fukuoka, 1978, p. 147). While they have grown further apart from each other in the eyes of the consumer, we increasingly understand that food, a necessity of life, comes to us by way of farming and that the current state of affairs is inadequate. Depending on where you are in the world, different issues around food will arise. There are issues of water scarcity (necessary for raising crops), issues of hunger (not enough available food) in some areas while in others cheap, processed food has led to oversaturation from too much to eat, but without the proper nutrition leading to a host of diet-related diseases. Then, there are the ever increasing natural disasters (flooding, drought, etc.) that directly affect our food supply. These are just a few of the issues that will catapult food and agriculture to the top of the global agenda.

**Implications of small-scale agriculture for food landscapes.** Small-scale producers select farming models based on a variety of pressures exclusive to their situation, such as farm size, farm scale, crop mix, growing practices, labor demands and the needs and desires of the individual farmers and their families (Jarosz, 2007). While,
for some, growing food is solely for personal use – for others it is a way to engage in their community, earn a living and provide a service. As producers reconnect to their community and learn the desires of their consumers they will reshape the food landscape by creating a hub where people can directly come in contact with the impact of their dietary choices instead of tapping into the disconnected global foodchain, thus creating a more human-centric society. Food is a product of place, as are people. Connecting the two is imperative for sustainable livelihoods. As discussed throughout this study, food does not exist in the commonly ascribed rural depictions of barn, field and tractor removed from the city. Instead, as small-scale agriculture becomes more common it can be a part of urban and peri-urban areas, allowing consumers to enjoy a direct connection to food beyond what is found on the grocery store shelves along with a familiarity of what grows and when, thus reconnecting individuals to the rhythms and seasons of nature.

In a world facing rapid urbanization, drastic climate change and disappearing natural resources, small-scale agriculture serves as an adaptive recourse to combat these issues. Small-scale agriculture endeavors can fit into cities and fringe areas, are more responsive to changes in climate than large operations and, instead of being resource intensive, are resource regenerative. Policy makers and planners would be wise to incorporate agriculture into their agendas, creating an atmosphere of cooperation between urban and rural stakeholders that values the infrastructure necessary to support small-scale agriculture instead of designating it unsightly and best kept out of modern cities. The integration of small-scale agriculture infrastructure into cities and fringes areas will serve as an important educational component for both producers and consumers while, at
the same time, aid a change in human behavior that shifts dominant food decisions away from convenience and appearance and toward improved nutrition and environmental conditions.

One of the greatest limitations of agricultural sustainability is the shortage of people to work on the farm. As people continue to move out of the countryside and into cities it only makes sense to move agriculture to where the labor force resides, providing greater opportunities for employment and access to a larger employee base. As small-scale enterprises become more and more multifunctional through diversification they will require a workforce that has various abilities, such as accounting and marketing, in order to be successful. At the same time, moving small-scale agriculture nearer to city centers allows for the operators to pursue other avenues of employment, if desired and necessary, and the space to seek more diverse markets for their products locally.

Ultimately, the appeal of small-scale agriculture comes from the fact that as we continue to develop agricultural land, our cities and population continue to expand and we continue to use natural resources at a faster rate than they can be replenished we will need to find ways to produce more with less. Small-scale agriculture is an important avenue for cities, countries and communities to increase their self-reliance in regard to food production. On the scale between industrial and small-scale agriculture it will be important to address where and how small-scale operations fit into the larger food system. Direct markets allow producers to avoid middlemen, sell products at retail prices and connect consumers with the impacts of their food buying decisions (Guthman et al., 2006). Around the world there is a movement happening; it goes by many different names – slow food, organic, natural, chemical-free, permaculture, pick your latest
ecologically sound buzzword here – but the energy pushing the movement is all the same. People are seeking real food grown by real people all around the world in an attempt to reconnect with nature in its perfect and mysterious splendor. Communities today are seeking clean, quality nourishment from farmers they can trust – away from machines, monoculture and segregation of plants and livestock and toward small-scale, self-sufficient integrated systems. It is critical that we support each other in our endeavors, that we support human scale farming rather than machine scale manufacturing. Fukuoka recognized, even in the late 1970s when he penned his book, that to do away with machinery and chemicals and focus on people and ecology would bring about a complete change in the economic and social structures. For, according to Fukuoka:

> Each person should ponder seriously how much hardship he is causing by indulging in food so expensively produced. … People who limit themselves to a simple local diet need do less work and use less land than those with an appetite for luxury. … [A simple local diet] is the very finest diet nutritionally, and enables human beings to live simply and directly. If we do have a food crisis it will not be caused by the insufficiency of nature’s productive power, but by the extravagance of human desire. (p. 104)

Small-scale agriculture is distinctive, responsive and unique to the place where it is practiced. It provides a deep link between producer and consumer, allowing for continued and ongoing dialogue between the two. As generational familiarity moves from the countryside to the city, the younger generation’s values and attention may turn increasingly toward urban issues rather than agricultural needs. Using the examples in this study from Japan, as well as France and Cuba, it is apparent that small-scale agriculture is not a new endeavor, but, instead, an enterprise that, with minimal adaptation, can help to overcome recent problems of pollution and industrialization of the global food system. However, small-scale agriculture must develop organically from
within communities themselves because, unlike global corporations and their commodity chains, members of the communities in question are the only ones who possess intimate knowledge of their individualized needs. Empowering communities through the development of small-scale agriculture provides them with a tool to strengthen their local economy and become more self-reliant while building stronger and more resilient communities in the process.
REFERENCES


Howe, J. (2002). The planning for urban food: the experience of two UK cities. Planning Practice & Research 17:2, 125-144.


APPENDIX A.

IMAGES OF SMALL-SCALE AGRICULTURE IN JAPAN

This image from Honshu shows a small plot of vegetables amidst fallow rice paddies.

Between Kyoto and Nara is a small tea plot abutted by apartment buildings.

This is a prime example of different land-uses for nearby parcels.

At the Nishiki Market in Kyoto almost everything is locally produced and procured.
APPENDIX B.

GLOSSARY

Barter economy. Within many agricultural communities there exists a lively trade economy for goods and services. Instead of being entrenched in the idea that the only thing worthwhile is cold, hard cash and profit, communities are turning to each other in ways that can serve to bolster community connection and recognize that goods and services have value beyond monetary means. One example of this type of community exists online with the Fourth Corner Exchange (www.fourthcornerexchange.com) an Alternative Monetary System that supports a cooperative economy and is part of the Life Currency Cooperative Exchange (www.lifecurrency.org).

Mono-cropping. Mono-cropping, also referred to as monoculture, is the cultivation of one (mono) crop species in a given area. Mono-cropping decreases biodiversity and degrades soil nutrients, making monoculture fields more susceptible to disease and pests, leading to the increased need for chemical pesticides and fertilizers. Monocultures are in use today because of the apparent ease with which farmers, using machinery, can plant and harvest large swaths of land.

Peri-urban regions comprise the transition zone between the edge of the newest suburbs and the outer limits of the commuter belt surrounding large population centers.