Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
https://foodsystemsjournal.org

Suburban agriculture, immigrant farmers, and access to agricultural services and resources

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Submitted June 27, 2022 / Revised September 13 and November 1, 2022 / Accepted November 2, 2022 / Published online February 28, 2023

Citation: Xie, L., Qiu, Z., & Fu, M. R. (2023). Suburban agriculture, immigrant farmers, and access to agricultural services and resources. *Journal of Agriculture, Food Systems, and Community Development*, *12*(2), 235–248. https://doi.org/10.5304/jafscd.2023.122.001

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Abstract

While agricultural services are shrinking, the number of nontraditional farms run by immigrant farmers is rising in U.S. suburban regions. This study attempts to understand Chinese immigrant farmers' experience accessing agricultural services and resources in the New York metropolitan area and explores the need for changes in agricultural services to meet changing demand. Thirteen Chinese immigrant farmers in the region were recruited to participate in a semi-structured interview to understand their shared experiences of accessing agricultural services and resources. The study identified diverse ways of accessing agricultural services and

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Funding Disclosure

Zeyuan Qiu acknowledges partial funding support by the U.S. National Science Foundation (NSF, CBET-1903597). The funding agency had no role in study design, data collection and interpretation, or the decision to submit the work for publication.

Author Note

There is no potential competing interest to report. The study was designed and the interviews with participants were conducted while Zeyuan Qiu hosted Lin Xie as a visiting scholar at New Jersey Institute of Technology in Newark, New Jersey, during the 2016–2017 academic year.

resources in four critical areas of farming operations: agricultural technology, financial services, farm labor, and farming machinery; and also revealed the existence of "liability of newness" among those new immigrant farmers in operating farms. Most participants felt that they were isolated, with limited access to available services as new immigrant farmers, which constitutes the liabilities to their success in farming. Language barriers, cultural differences, distrust, and isolation were the main obstacles to access adequate services and resources. As farms and farmers are becoming more diverse in U.S. suburban regions, the provision of agricultural services needs to adapt accordingly to meet the growing needs of groups of farmers with varying farming experiences and demographic backgrounds and help them to overcome the liabilities as new immigrant farmers. This study contributes to understanding the farming experiences of minority farm groups, which help develop more inclusive agricultural services.

Keywords
Suburban Agriculture, Chinese Immigrant Farmers, Farming Experiences, Agricultural Services and Resources, Qualitative Research, Liability of Newness, Descriptive Phenomenology

Introduction

The demographic composition of farmers in the U.S. is changing. According to the U.S. Department of Agriculture Census of Agriculture, while 95.4% of farm operators in 2017 were white, non-white farmers increased significantly, by 20% from 2007 to 2017 (Census of Agriculture 2017 Highlights, 2019b). Although Asians were only 9.4% of non-white farmers in 2017, the number of Asian principal operators had increased 24.2% from 2012 to 2017 (Census of Agriculture 2017 Highlights, 2019a). More than half of Asian-operated farms are in suburban regions and produce specialty crops (Li, 2013; Census of Agriculture 2017, 2019a). Farms operated by Chinese immigrants are increasing for several reasons. First, the demand for ethnic and better-quality food products from the immigrant communities is expanding (Aldrich & Waldinger, 1990) as acceptance of Chinese culture and foods increases. (Coe, 2009). As discussed by Imbruce (2016), the development of the ethnic food network in New York City's Chinatown has been sustained by a global food and farm network that includes immigrant farms across the U.S. and global food supply chains. Second, there have been limited employment opportunities for low-skilled immigrants (Aldrich & Waldinger, 1990; Sanders & Nee, 1996), so self-employment through small-scale farming became a practical way of living because of inherited entrepreneurship, readily available human capital, and lower barriers to entering farming in terms of skills and investment (Hightower & Brennan, 2013; Salaff et al., 2003; Zhang, 2016). Third, farming is increasingly considered a leisure and investment opportunity in many suburban regions where farmlands have become scarce and their value has appreciated (Nickerson et al., 2012), attracting some high-skilled and affluent Chinese immigrants to farming.

Immigrant farmers tend to run smaller operations that grow specialty crops and have direct access to markets, and that use alternative farming techniques such as multi-cropping and low agrochemical inputs, differing from U.S. industrial agriculture (Imbruce, 2016; Minkoff-Zern, 2018, 2019). Thus, despite strong governmental support for farming through provisions of the U.S. Farm Bill and from U.S. Department of Agriculture agencies such as the Farm Services Agency and the Natural Resources Conservation Service, Latino immigrant farmers, for example, are often left out of various governmental programs; the lack of standards in their farming practice and their racialized identities are attributed to racial exclusion (Minkoff-Zern & Sloat, 2017; Zabawa et al., 2007). The fast growth of farms operated by immigrants re-ignites the debate on racial identity, immigration, and sustainability in a new perspective challenging not only conventional agrarian development theories, but also U.S. agricultural programs and policies (Agyeman & Giacalone, 2020; Horst & Marion, 2019; Imbruce, 2016; Minkoff-Zern, 2018, 2019; Minkoff-Zern et al., 2020; Ploeg, 2018; Reynolds, 2002; Seda, 2020). However, there is limited knowledge of the unique experiences of minority immigrants as farmers rather than as farm laborers. More research is needed to understand the lived

experiences of racialized farmer groups. (Minkoff-Zern, 2018).

The objective of this study is to explore the farming experiences of Chinese immigrant farmers, specifically their experiences accessing U. S. agricultural services and resources. It is expected that the number of farms operated by the Chinese and other immigrants will continue to increase and play an increasing role in the future agricultural economy. Their growth depends on their ability to access essential resources such as farming knowledge and technology, financial and farm labor services, and farming machinery. Some studies have explored the experiences and contributions of Chinese immigrants as farm labor (Leung & Ma, 1988; Tsu, 2013) or agents in the ethnic food network (Imbruce, 2016), but there is no study specifically dedicated to investigating the farming experiences of Chinese immigrant farmers as principal. A thorough understanding of their farming experiences would help develop more effective sustainable and inclusive agricultural extension and education services.

Theoretical Framework

In his seminal discussion of the "struggle for survival" in the evolution of organizations, Stinchcombe (1965) introduced the "liability of newness" concept to explain the high failure rate of organizations in the early stages of their life cycles. Lack of knowledge, experience, capital capacity, and lack of cooperation with and trust of "strangers"—i.e., older organizations—could potentially contribute to organization failure; therefore, social and economic supports are critical to enhance the survival chances of emerging organizations (Abatecola et al., 2012; Stinchcombe, 1965). Despite its significant impact on research on organizational evolution, the liability of newness concept has rarely been applied to study the evolution of agricultural enterprises. This study applies the liability of newness concept to assess the experiences of Chinese immigrant farmers in accessing agricultural services and resources to operate their farming enterprises. As with any early-stage enterprises, the emerging farms run by Chinese immigrants possess many liabilities that could lead to failure, such as lack of farming knowledge and experiences, financial resources, and a well-established social network to access agricultural resources and services. More extensive understanding of these liabilities will help construct social, economic, technical, and political "macro-structure," especially provision of agricultural extension services that better support the healthy growth of these immigrant agricultural enterprises.

Methods

This study applied a descriptive phenomenology approach to understand the lived experiences of the Chinese immigrant farmers in accessing services and resources in the broad U.S. agricultural production system. Understanding the farming experiences of Chinese immigrant farmers would help provide evidence for future policy changes and additional research to enhance the provision of agricultural resources and services. Phenomenology is a qualitative research method aimed at understanding the explicit and implicit structures and meanings of human experience (Conklin, 2007; Sokolowski, 2000). Descriptive phenomenology explores individuals' experiences of everyday life, describes the structure of such experiences, and provides a thorough understanding of shared experiences (Sokolowski, 2000). Phenomenology has been applied in various agricultural research settings, describing, for example, farmer experiences of being environmental stewards (Hanson, 2001), growing organic produce (Marabesi & Kelsey, 2019), pursuing agritourism entrepreneurship (Ainley, 2014), and even understanding perceived barriers to fertilizer use in Uganda (Mulvaney & Kelsey, 2020). This study followed the essential principles of Husserlian descriptive phenomenology (Husserl, 1962): "natural knowledge begins with experience and remains within experience" (p. 45), "every experience…has intentionality" (p. 222), "essential universality" (p. 47), or "essential generality" (p. 53) and "can be exemplified intuitively in the data of experience" (p. 50).

The study was conducted in the New York metropolitan area (NYMA), a popular destination for Chinese immigrants. NYMA is the largest metropolitan region in the U.S. and is comprised of New York City and surrounding counties in New York, New Jersey, Connecticut, and Pennsylvania.

Chinatown in Manhattan, New York, was one of the earliest settlements for Chinese immigrants in the U.S. Flushing, in Queens, is a newly developed Chinatown and is expanding in size. New Jersey is also a popular home for Chinese immigrants. Mott Street in Chinatown is a regional distribution center and hosts wholesalers and retailers of agricultural products preferred by Chinese immigrants and their families. Although suppliers of the agricultural products include farms in Florida, California, and even South America, most seasonal agricultural products sold on Mott Street are produced in New Jersey. As such, all participants in the study but one were Chinese immigrant farmers from New Jersey; the remaining participant was from New York.

Data Collection

The number of farms operated by Chinese immigrants is still relatively small in the NYMA. Therefore, we adopted a snowball approach to recruit participants for the study. We secured the first group of participants through immediate personal and professional contacts. We followed the recommendations of the first group of participants to secure the second group of participants and so on until the threshold number of participants was reached. All participants met the following criteria: (1) first- or second-generation immigrants from China Mainland, Taiwan, Hong Kong, and Macao, (2) primary farm operators themselves at least 21 years old, and (3) ability to communicate in Mandarin Chinese.

Following a descriptive phenomenological approach (Dory et al., 2017; Fu et al., 2008), semi-structured interviews were conducted with the Chinese immigrant farmers to understand their farming experiences of accessing agricultural services and resources. A key step in applying descriptive phenomenology is not to introduce bias and preconceptions to participants. Therefore, the phenomenological reduction strategy of "bracketing" was adopted in the interview question design and interviewing process, in which existing knowledge and researchers' personal understanding of farming experiences was intentionally bracketed out (Denzin, 1989; Dory et al., 2017; Fu et al., 2008, 2009). The interview questions were carefully designed without directly asking the participants whether they can access agricultural services and resources. Instead, we elicited their experiences using such open-end inquiries as "please introduce yourself," "please describe your farm," "please describe your experiences of accessing agricultural services in the local area," and "please describe your experience of accessing agricultural services and resources from governments."

The interview questionnaire and guide were first developed in English for evaluation and approval by the Institutional Review Board (IRB) at New Jersey Institute of Technology in Newark, New Jersey and then professionally translated into Chinese for interviews after IRB approval. The interviews were conducted in Mandarin Chinese. Informed consent was secured from all participants following approved IRB guidelines to ensure privacy. A nominal one-time payment was given to each participant to compensate for the time spent for the interview. All interviews were conducted in private settings. A coding system with numbers instead of participant names was used to ensure confidentiality. Participant recruitment and interviews occurred between June and August 2017. Following Dory et al. (2017), each interview lasted from 40 to 120 minutes and was recorded using a digital audio device. Observational data for each participant were also recorded. All the interviews were professionally transcribed in Chinese and checked for accuracy. The researchers are fluent in both Chinese and English.

Thirteen participants, one woman and 12 men, were interviewed (Table 1). Age of the participants ranged from 27 to 73 and was 51.5 years old on average. Five participants immigrated from Taiwan, seven from the Chinese mainland, and one was born in the U.S. and inherited the farm from his father. All participants, except one, had higher education degrees: Five bachelors, five masters, and two Ph.Ds. Ten participants worked on farming full-time and three part-time. Most were first-time farmers with limited farming experience. They grew a variety of products, including vegetables, flowers, mushrooms, oysters, grapes, and edamame. The average size of their farms was 41.5 hectares (ha); the smallest farm was 2.4 ha and the largest was 161.9 ha.

The sample size for this descriptive phenome-

nological study, i.e., the threshold number of participants, was "determined by the richness and saturation of the interview data, that is, when the same information has been repeated by the participants…regarding the description of their experiences" (Dory et al., 2017, p. 3). Strong convergence emerged when interviewing the 13th participant. To ensure that all important information was captured, we conducted a second-round interview using the same interview questions with one of the 13 participants. Data saturation was assured as no new information emerged in the second-round interview.

Data Analysis

The transcribed interview data were analyzed with a descriptive qualitative method based on intuitive reflections and strategies of continuously "comparing and distinguishing, collecting and counting, presupposing and inferring" (Husserl, 1962, p. 93). Crucial to this method is systematically classifying data into fewer content-related themes that share the same meaning, which are coded in color and text (Dory et al., 2017). We followed the seven-step data analysis procedure described by Dory et al. (2017) and Fu et al. (2008, 2009) to examine data, compare codes, challenge interpretations, and inductively develop themes. We first individually read the transcripts in Chinese several times to gain a broad understanding of the text, and then met to identify significant quotations and discuss key codes related to the research question. The first author took the initiative to combine the coded quotations into one file and confirm the accuracy of the code and quotation by comparing to the original transcript. Then we individually analyzed the quotation files and identified major themes by putting key coded quotations together for each research question. We then met as a group to review major themes and discuss them to resolve any discrepancies, and to review the transcripts and validate the structure of themes alongside interview data. Multiple discussions were followed until consensus was achieved about each aspect of data analysis. The specific themes, codes, and quotations were translated from Chinese to English and reported in the Results section. Efforts were made to differentiate and compare the experiences of the 13 subjects, with careful selections of text demonstrating the true meaning of their experiences.

Results

The 13 participants represented the diversity of farms operated by immigrants in the region. First,

Table 1. Participants and Their Demographics and Farm Characteristics

ID	Gender	Age	Education	Farming Career	Starting Year	Size (ha)	Products	Organic Farming
P1	M	39	Ph.D.	Part-time	2015	25.9	Vegetables	Yes
P2	M	69	Bachelor	Full-time	1991	16.2	Nursery/Vegetables	Yes
P3	M	50	Bachelor	Full-time	2000	121.4	Vegetables	Yes
P4	F	50	Master	Part-time	2013	9.3	Vegetables	Yes
P5	M	73	Master	Full-time	2010	2.4	Nursery	—
P6	M	66	Master	Full-time	2005	8.1	Nursery	—
P7	M	45	Bachelor	Full-time	2000	61.1	Vegetables	No
P8	M	53	Bachelor	Full-time	2016	13.6	Mushrooms	Yes
P9	M	27	Master	Full-time	2001	19.0	Mushrooms	Yes
P10	M	31	Ph.D.	Full-time	2016	161.9	Edamame	Yes
P11	M	63	K–12	Full-time	2008	40.5	Vegetables	No
P12	M	53	Bachelor	Full-time	2001	20.2	Oysters	—
P13	M	50	Master	Part-time	2010	40.1	Vineyard	—
Average		51.5				41.5		

their personal backgrounds were diverse, ranging from high-skilled immigrants, such as computer programmers, newspaper reporters, and entrepreneurs to low-skilled immigrants who had previously worked in Chinese restaurants and grocery stores in New York City. Four participants were highly educated in agriculture and aquaculture and immigrated to the U.S. as agricultural specialists. Second, the organizational form of those farms was diverse. Three farms were corporations that operated like most modern enterprises: the owners did not directly operate the farm but entrusted it to professional farmers or farm managers. The other ten, family farms, were mainly operated by family members. Third, their business objectives were diverse. Most participants made a living by farming, but some operated farms for leisure and investment purposes. Such diverse personal backgrounds, organizational forms, and business objectives resulted in diverse ways to access agricultural resources and services.

Theme 1: Accessing farming knowledge and agricultural technology

Regardless of prior background in farming, it is a new undertaking for immigrants to operate a farm in the U.S., which involves new knowledge, including of plants, soils, climate, diseases, rules and regulations, and farming technologies. Agriculture is driven by advances in agricultural technology, and access to agricultural technologies is important for improving agricultural productivity and profitability. This study identified four ways of accessing farming knowledge and technology by the participants.

Obtaining technical support from public service agencies

The agricultural experiment stations and cooperative extension services have offices with experienced staff to offer science-based education programs and bring the wealth of knowledge of state land-grant universities to farmers and communities. Out of the 13 participants, two had obtained support from public or university extension service. They found that science-based education programs were useful and the extension agents helpful. Participant P2 stated that he had participated in various workshops organized by county agricultural extension agents, who were "between governments and farmers and help spread information from governments to farmers, and also help introduce new products or technologies to farmers." Participant P2 added: "If you have any problem or any difficulty, you can always call them. They will help you sort the problem out." Participant P5 agreed: "If you have any problems such as pest and disease issues and don't know what to do; or you don't even know what the problem is, then you can just take some samples and sit down with an agricultural extension agent."

Learning from other farmers

In the peer learning practice, farmers interact with other farmers in a community to obtain farming knowledge, which has proven to be one of the most effective ways for farmers to learn and master agricultural technology (Faysse et al., 2012; Foster & Rosenzweig, 1995). Many participants maintained good relationships with neighboring farmers and gained knowledge and skills from them. For example, one participant learned pest control techniques from a farmer neighbor. To gain knowledge and technology from other farms, some farmers "visited and consulted with other farmers" (P7), "temporarily worked for other farms or greenhouses" (P5), or "collaborated with a local large organic farm" (P10). In addition to direct learning from others, some participants relied on social media to gain knowledge. For example, participant P4 mentioned a WeChat (a popular social media platform among Chinese immigrants) group for communication on agricultural technology that included a professor of agronomy and other local Chinese immigrant farmers.

Relying on prior personal farming experiences

Experience is an essential dimension of human capital and critical to the operation of an enterprise (Ainembabazi & Mugisha, 2014). Farming experience is a process through which farmers perceive and participate, accumulate knowledge, and adopt technologies. Five participants clearly indicated that they or their family members had farming experiences prior to immigration, which were helpful in their farm operations in the U.S. Participant P1 said, "My parents were vegetable farmers in China.

They have worked on vegetables their whole life in China and still love growing vegetables. During their visit to the U.S., they converted my backyard into a vegetable garden." He eventually bought a farm so that his experienced parents could work on it. Participant P11 said that he had been growing corn, sorghum, and hybrid rice for over ten years before coming to the U.S. Four participants have advanced degrees in agriculture-related fields, such as a master's degree in agronomy (P5, P6 and P9) and a doctorate degree in food science (P10). Participant P12 said, "I majored in fishery in college and came to the U.S. as an expert working in aquaculture."

Learning by doing

Regardless of their farming backgrounds, all participants had gone through the process of learning by doing, which plays a critical role in helping farmers to overcome technical barriers, learn agricultural technology, and accumulate farming knowledge (Foster & Rosenzweig, 1995). Participant P7 claimed he "did not know anything about farming at the beginning, had to gradually figure it out." Participant P6 described his whole farming experience as a learning by doing process: "From how to build a greenhouse to what to plant and how to plant, I had to figure it out gradually." Learning by doing is important not only for the less experienced farmers, but also for those experienced ones because farming practices, scales of production, and natural and socioeconomic environments differ considerably between their original countries and the U.S. One of the most experienced participants said, "For nearly 20 years, I have been gradually learning and improving" (P3). As a part of learning by doing, some participants would get agricultural knowledge by reading books and searching for information. "If I didn't know, I would try to find an answer from books" (P5). Most participants relied on "the internet to learn; whenever I had a technical issue, I would go online" (P1). Another participant said, "I could find solutions from books on most technical problems."

Despite diverse ways of accessing farming knowledge and agricultural technology, participants still had a lot to learn and needed support. For example, farmers in the region of the study generally control weeds using landscape fabric, mulch, and herbicides. However, many Chinese farm operators in the U.S. had just begun their farming career, and their knowledge of farming was very limited. Weed control was one of the biggest challenges they faced, as seven of 13 participants were specifically practicing organic farming. To manage organic farming, they "spent a lot of time to pull out the weeds" just as traditional Asian farmers have done; "pulling out the weeds is daily work" (P1). They also have limited knowledge for dealing with insects. To avoid pesticides, some participants sometimes used "tobacco and white vinegar to treat visible insects" (P4).

Theme 2: Accessing financial resources

Farming is a capital-intensive business. Capital is needed to upgrade farm equipment and pay for labor and materials, such as seeds and agrochemicals, often before any harvest. Flexible access to financial resources is critical to operating farms and improving productivity (Fakowski et al., 2010). The Chinese immigrant farmers in this study had diverse ways to access financial resources to support their operations.

Obtaining financial support through informal channel

Seven participants funded their operations through personal and family savings. Participant P7 "started from scratch and have gradually accumulated year after year." Another participant shared the same experiences of saving and reinvesting: "started from zero, saved dollar by dollar; and then slowly reinvest" (P5). To cover temporary shortage, many participants turned to relatives and friends to borrow "[US]$3,000 from one and [US]$5,000 from another" (P11) to maintain operations.

Accessing external financial services

To support farming operations, there are a variety of formal financial services, such as commercial banks and government-backed agricultural loan programs. For example, the Farm Service Agency (FSA) offers various loan programs to help start, expand, or maintain a family farm. In this study, only a few participants obtained government-backed, no-interest loans for farming machinery

purchases. Participant P1 "bought a tractor with a no-interest loan, which is helpful; it incurs no interest; I have five or six years to pay it off." Some participants participated in the Environmental Quality Incentive Program, with technical and financial assistance offered by Natural Resources Conservation Service (NRCS) and FSA, respectively. Discussing a high tunnel system built with such support, Participant P1 said, "It is very practical. The thousands of dollars subsidized by NRCS is very helpful." Participant P6 used a low-interest loan from a commercial bank to start and operate his greenhouse, but the bank was a foreign commercial bank that supports immigrants' entrepreneurship in the U.S.

Most participants are reluctant and/or unable to finance their farm operations through external and formal financial services. Participant P5 said that "local farmers may borrow government-backed agricultural loans from the U.S. banks, but we are not familiar with these loans and lending procedures. We have to rely on our own gradually accumulated savings." Eight participants clearly indicated that they had never applied for any governmental funding support. Some participants said that they even "did not know" the existence of such funding support. Participant P2 thought that "governmental assistance is very important…but I have been not aware of any assistance from agricultural department or farm bureau."

Theme 3: Accessing farm labor

Farming is a labor-intensive business. Stable access to farm labor is critical to operate a farm. However, demand for farming labor is often seasonal, making it difficult to maintain a stable labor force, especially for small farms. Two participants were content with their access to farm labor. Participant P6 had maintained a stable team of workers over many years. Participant P13 contracted all the farm work to a service company by signing a labor contract in advance. However, the labor shortage was the biggest problem encountered by all other participants; they had to be creative to obtain farm labor.

Relying on personal networks

Most participants simply engaged themselves and their family members more and intensified their labor to overcome the shortage. Participant P4 said, "I am the laborer, and so is my husband." Participant P5 gave a more specific account: "My work is equivalent to three hired laborers…a typical laborer works 40 hours a week, but I work 80 hours a week. Additionally, my work efficiency is 50% higher than theirs." Participant P7 gave a specific example of stretching themselves to overcome the labor shortage: "At the busiest harvest time, we had to work overtime to prepare the shipment until one or one thirty in the morning. My father then drove to Chinatown. After coming back, he would sleep for a few hours before repeating the process again. At some point, he only slept eight hours in three days." Some participants would turn to their relatives and friends for help when immediate family labor was not sufficient. Participant P3 asked "Godmother's brothers, and Godfather and his relatives for help." Participant P1 pointed to a worker on the field on his farm: "She is my neighbor's mother. I asked her to work for me a few hours a day." Some participants sought help directly from their home country: "This is the farm owned by an elder of a family clan…Ten to twenty of his family members and/or relatives would visit the farm temporarily and provide timely help during the harvest season" (P3).

Go through formal channels

Some participants "put job advertisements in Chinese newspapers" to recruit labor from Chinese immigrant communities, and some used labor agencies to obtain temporary workers. Participant P7 said, "We hired temporary workers through a labor agency to do some low-skilled work like shipment preparation. There are minor skill requirements for temporary workers. They can come and go without big impacts on the operation."

Sharing labor force

Labor demand is seasonal, but timing varies by farms and their products. Some participants drew on timely availability to meet labor needs. Participant P3, who runs a vegetable farm, said that he often borrowed workers from a nearby friend who operated a horticultural farm: "We each have our own hired labor. When I am busy, I would ask him to send his workers to help. I do the same when he

is in high demand." Labor sharing is a creative way to overcome the conflict between seasonal labor demand and the desire to maintain a stable labor force.

Theme 4: Accessing farming machinery

Farming machinery improves agricultural productivity (Edgerton, 2009). However, our study found that participants generally had limited access to farming machinery.

Relying on self-service

Some participants pointed out that they had no money to buy machinery and had to use hand tools to work on the fields during the initial period of farming. Participant P1 said, "Local farmers found it funny. My neighbor, a local farmer, would imitate the way of using a hoe to remove the weeds every time he saw my father." Many participants gradually learned to purchase and use farming machinery to replace human labor. Participant P1 continued his story: "We initially bought a small tractor for my parents to use…I bought a tractor last fall…and this year I bought several used equipment and prepared the fields all by myself using those machines."

Obtaining external support

The participants also tried to access farming machinery services through their social networks. When necessary, participants would ask other farmers, especially neighboring farmers, for help. One participant asked his neighbor to prepare his fields for planting. His neighbor helped prepare the initial three-acre field of his vegetable farm with plowing and ridge making. Participant P4 turned to a farmer friend for timely use of heavy machinery: "A friend rented a bulldozer for a week, but finished his work early. Since we are not far away, I wanted to use it on my farm."

Although some participants such as P6, P10, and P13 were content with their needs for farming machinery and services, most participants encountered difficulties in obtaining services suitable to their small-scale operations. Participant P4 said, "I had a hard time to find a service provider who offers small combine or bulldozer. I don't need the big one. I finally found one, but they didn't want to lease it to me only for a few days." As farming is a seasonal operation, some participants complained they could not get timely services from others: "These seeds had to be planted early, but the local farmer who provided me machinery services was busy with his work during the early planting season. He came to help me only after he finished all his work. Last year, it was in late May and early June when he came to build the ridges for planting" (P1).

Theme 5: Obstacles to Accessing Services and Resources

Despite growing interest in farming, Chinese immigrant farmers had practical difficulties in accessing necessary services and resources, largely due to their status as immigrants.

Isolation in production

Despite the diverse ways of operating farms and accessing services and resources, most participants generally are isolated when conducting their farming operations and rarely deal with broader farming communities. Most Chinese farms primarily produce special vegetables and oriental flowers to serve the growing demands of Chinese immigrant communities. As Participant P1 said, "Mexican goes to Mexican farms, Chinese goes to Chinese farms, and American goes to American farms." Therefore, his farm cultivates "Chinese produce that local American does not eat, and the consumers are mainly Chinese." Participant P3 said, "We came from Taiwan, and all things we knew were Taiwanese produce. Thus, we started our farm to produce Taiwanese produce." Some participants "do not like" (P7) and "are afraid of strangers" (P11) to visit their farms.

Language and communication barriers

Some participants considered their poor English a barrier to communicating with others and accessing information on resources and services. Participant P11 said, "I don't have any experience dealing with the government. I don't know English. Whatever I need, I tell my son. He helps out." NRCS programs were often brought up in the interviews. Participant P1 said, "NRCS does not proactively communicate the information on those programs

with me while local American farmers know it well." Some participants visited the governmental websites for more information but often experienced "language obstacles because that vocabulary is difficult to understand" (P4). Some participants complained that the information on those websites was incomplete; when they called for additional inquiries, "no one picked up the phone. There is no specially designed website that hosts all agriculture-related information" (P4).

Cultural difference

There are cultural differences between the Chinese immigrant farming community and American society. Most Chinese immigrant farms focus on agricultural products exclusively for Eastern Asian immigrant consumers rather than the local American consumers. Some Chinese immigrant farms do serve American consumers, but they must overcome some cultural barriers. Participant P6 gave a vivid example, "The taste of local American is different from ours. Chinese like red, and everything is red, but Americans don't like red. **…** Yellow and light blue flowers were the best seller during Easter, and I thought Americans like yellow and light blue. Therefore, I prepared such color flowers on Mother's Day but couldn't sell them at all."

Distrust

The cultural difference can lead to mistrust. Participant P1 said, "Local Americans sometimes came to visit my store on my farm, but usually didn't buy anything. A local American visitor once told me that my tomato did not have tomato flavor, but my tomato seed were from my neighbor, an American farmer." Distrust extended to the government, with some participants feeling that they were treated differently by government organizations. Participant P1 said, "Most people who work at NRCS are white. White farmers always get funding when they apply, but I didn't get it when I first applied for it. I waited for two years to get it**…**local American farmers got more funds than I did." Some participants did not want to be "involved in politics because we are disappointed with the government**…**we just follow the rules to do our business. We are immigrants. We need to keep reminding ourselves about that. No matter what you do, the government would see you differently. We work harder than others because we are the first-generation immigrants" (P6). Participant P6 cited an example of a harsh treatment from a local government: "I applied for a permit for my greenhouse. Although no issue was found during the inspection, the township refused to issue the permit for its operation. The township fined me [US]$2,000 a day after its opening. It took three years and numerous efforts and resources to win the lawsuit against the township. The case was finally settled by paying [US]$8,000 fee instead of the accumulated fine of [US]$2 million." Some participants simply believe that "the government does not bring benefits, but always tries to find your faults; therefore, we are not willing to deal with the government" (P7).

It should be noted that some young farmers have opposite opinions about government agencies. The second-generation immigrant farmer said, "It is quite smooth to deal with the government. They tell us what to do, and we do it" (P9). Participant P10, who has a Ph.D., said, "Agricultural extension helps us collaborate with other farms and introduces us to some government programs." Participant P12 said, "The state agencies liked my operation very much and were helping me expand my business."

Discussion, Implications, and Recommendation

Agriculture in U.S. suburban regions is experiencing a transformation. Large-scale industrial agriculture has been fading away in the suburbs, and pockets of small-scale farms that produce specialty products and are often run by immigrants have emerged to fill the niche and take advantage of proximity to consumers and markets. It is expected the trend will continue, since most suburban regions have adopted aggressive farmland preservation programs to retain it for agricultural operations (Hellerstein et al., 2002). However, new immigrant farmers face numerous obstacles for entering the farming business as a newcomer, which can be characterized as liability of newness. The findings from this study confirmed the existence of the liability of newness among these Chinese immigrant farmers. First, studies show that

immigrant farmers face many obstacles including inadequate English communication skills, insufficient social networks, and lack of technical knowledge and resources that often prevent immigrants from successfully operating farms (Asiedu et al., 2012; Jensen, 2006; Salaff et al., 2003; Sanders & Nee, 1996; Smithers & Sethuratnam, 2013). Our study finds that those obstacles are real among Chinese immigrant farmers and had significantly affected their access to services and resources. Second, this study also found that Chinese immigrant farmers primarily used informal channels to obtain financial resources to operate and expand their farming operations. The predominant use of informal channels for financial services often implies significant barriers to formal financial services (Banerjee & Duflo, 2007; Madestam, 2014; Tsai, 2004). Third, although the network of food supply chains in Chinatown, New York, is global, as described by Imbruce (2016), the operation of farms by Chinese immigrants was conducted locally and often in isolation, forming an enclave economy on the production side. Similar experiences of liability of newness were recorded among other immigrant farmers, such as Latinos (Gonzalez & Jeanetta, 2013; Minkoff-Zern & Sloat, 2017; Zabawa et al., 2007).

Public investment in food and agricultural research and various agricultural education and extension programs has successfully supported farm operations and spurred U.S. agricultural productivity growth (Pardey et al., 2013). These programs help improve farmer decision-making and raise productivity, contributing to agricultural development and prosperity (Anderson & Feder, 2004). Jin and Huffman (2016) estimated a real internal rate of return of 67% for public agricultural research with a productivity focus, and a rate of return of over 100% for narrowly defined agricultural and natural resource extension. Public agricultural education and extension are closely linked to a decentralized and state-based university research system with additional support from state and local government (Norton & Alwang, 2020). As the share of the agricultural economy in suburban states like New Jersey shrinks, so does the federal and state funding for these programs, resulting in a significant decline in agriculture education and extension programs in the region. This further hurts the community of immigrant farmers as they have been already experiencing difficulties and barriers to access these services traditionally provided.

Despite isolation and many obstacles, the immigrant farmers are resilient in dealing with difficulties in their farm operations to overcome the "liability of newness." In many cases, their farming businesses are expanding and flourishing. However, to facilitate further growth in farms operated by immigrants, the agricultural education and extension programs in suburban regions need to adapt to the transformational changes in suburban agriculture to meet the new kind of demands (Brown, 1981; Calo, 2018; Knutson, 1986; van den Ban & Hawkins, 1996). First, as more immigrants, including Chinese and Latino, are engaged in farming, language barriers and cultural differences are limiting their abilities to access services and resources. Agricultural extension and governmental service agencies can adapt to such situations by providing multi-lingual supports in their programs. Second, immigrants generally have a limited understanding of agricultural and relevant regulatory policies. The governmental agencies can take a proactive approach to improve communication and reduce distrust with immigrant farmers. Third, local governments and community groups can play more active roles in organizing and/or hosting multi-cultural festivals to strengthen communication and exchange between immigrant farmers and their communities and to understand cultural differences. Fourth, agricultural extension services could develop a one-stop service platform that consolidates multiple services to help farmers to obtain services more effectively. Fifth, more innovative financial services can be created to better serve the financial needs of immigrant farmers to support their farm operations.

Limitations and Future Research

This is the first study to investigate the farming experiences of the Chinese immigrant farmers as principal operators in terms of their access to agricultural resources and services for overcoming the liability of newness and operating farms. This qualitative study has some inherent limitations. First, the experiences described here are limited to

Chinese immigrant farmers in the New York metropolitan area. Second, the number of participants is relatively small. Third, most of the participants are first-generation farmers, and the experiences of more long-term Chinese immigrant farmers in other regions such as California may be quite different. More in-depth research is needed to understand Chinese immigrant farmers' obstacles to accessing services and resources, such as the language barriers, cultural difference, distrust, and isolation described in this study. In-depth research is also needed to understand how their racial identity may help expand their farming operation, integrate with the broader, even the global agricultural and food system, and develop a market-oriented yet sustainable agricultural system. The growth of small-scale immigrant farmers in an industrial agricultural system also calls the conventional agricultural development theories into question. More research and theoretical development are also needed to understand the increasing presence of small-scale immigrant farmers and to facilitate their growth.

Acknowledgments

The authors would like to thank Stacey Foster (JAFSCD volunteer author mentor) and two anonymous JAFSCD reviewers for their helpful editing and insights to improve the quality of this manuscript. The authors also deeply appreciate the support of the study participants who shared with them their farming experiences and inspirations.

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