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FOOD PRODUCTION IN CHONGQING, CHINA: OPPORTUNITIES AND CHALLENGES

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ABSTRACT: *Urban food production (UFP) has been the subject of much interest, especially in light of worldwide urbanization trends. There have been many place-specific studies and overviews about UFP, but very little in China. Studies investigating enabling and constraining conditions and people's motivations for UFP have also largely omitted China and they have entirely missed one of the fastest growing cities in the world, Chongqing. Research was carried out in several districts of Chongqing to assess the social composition of urban farmers and the conditions they face, as well as find out their reasons for farming in the city. Methods included transect walks, semi-structured interviews, crop inventory, and soil field analysis. Thirty interviews were carried out involving 37 participants, and crop and soil descriptions were completed at 28 and 15 sites, respectively. Results indicate that a majority of urban food producers are women and people older than 30 years. Most are not city natives and little more than half have had prior farming experience. They grow food often on thin soils in marginal spaces, usually having precarious land access contingent on business or government decisions that can lead to eviction or field destruction. Nevertheless, farmers grow a diversity of crops and sometimes raise other animals. Most farming is for subsistence and/or recreational and social networking possibilities afforded by UFP.*

Keywords: *Urban agriculture, Chongqing, China, Food*

INTRODUCTION

Institutional support for, and diffusion of, urban agriculture or gardening has grown over the past few decades, pointing to major social and environmental benefits (European Commission, 2007; FAO, 2010; Haughton and Hunter, 2003; Redwood, 2009). Some have observed that food production in cities often involves primarily women and the elderly (Hovorka, 2006; Mougeot, 2006). Urban farmers' motivations vary greatly, as do the socio-environmental conditions they face and which influence prospects for the feasibility of urban farming or gardening (Domene and Saurí, 2007; Orsini et al., 2013). For instance, in places like Nairobi, urban food producers are mostly women with tenuous or no land tenure guarantees. A primary reason for food production there is related to increasing economic duress, which undermines food access. Urban farming is highly diversified, including small-scale subsistence- and market-oriented farms or gardens as well as livestock and large-scale commercial operations. Yet in some Nairobi administrations, there are legal restrictions if not proscriptions on urban agriculture, while in others it is encouraged or tolerated (Foeken, 2006: 5-11). In more generally affluent places like Edinburgh, Scotland, community gardens are often led by women and there is minimal to no market orientation. Livestock is usually absent in such garden operations because of legal restrictions and/or a lack of available labor to tend to livestock or afford their upkeep. In that kind of situation, gardening activities not only have official recognition, but may also be represented in local government. Yet even under such institutionally favorable circumstances, urban food production can be stymied by nationally predominant perceptions that deem food production to be inappropriate for urban settings (Witheridge and Morris, 2016).

Nevertheless, interest in urban food production has risen markedly, involving a great range of social groups, from self-organized communities to international agencies. For the likes of Mougeot (2006), this kind of urban activity is considered urban agriculture (UA), defined as wherever people can find even the smallest place to cultivate. With such a broad definition, this may encompass what others might view as horticulture or gardening. There are certainly grounds for debating this issue, with respect to scale of production, feasibility of cropping systems, major infrastructural differences, and different cultural connotations, among other dimensions. For these reasons and to avoid tangential discussions, the term Urban Food Production (UFP) is preferred here. This more general term is especially useful for this case study in Chongqing, where farming and cultivation and even rural and urban are not so easily distinguishable.

Studies attentive to cultural dynamics (e.g., the contestation of meanings), social heterogeneity, and unequal benefits and burdens (social justice) have offered insights of significance well beyond academic circles. They demonstrate the contested aspects and political ramifications of UFP, its social potentials and limitations. They have also shed light on enabling and constraining conditions and people's motivations for UFP, which not only affect the

viability of UFP, but also the social distribution of UFP's benefits (see, e.g., Hovorka, 2006; Kato et al., 2014; Koont, 2008; Kurtz, 2001; McClintock, 2014). The strides made in such work, regrettably, have largely bypassed Chinese cities and, more generally, urban contexts undergoing simultaneously massive and rapid reconfigurations and expansions. The exiguous research on UFP in China, moreover, is mostly circumscribed to Shanghai and Beijing, and limited to assessing potentials for fulfilling institutional ends (Cai and Zhang, 2000; Peng et al., 2015; Peng and Hu, 2015). The even fewer studies on UFP in Chongqing do not address farming conditions and motivations and categorically excludes informal instances of food production (Zhou et al., 2013), which may constitute the main form of UFP in the area. As in the case of other studies in China, such research has focused on potentials, rather than urban farmers' identities, motivations, and the conditions they face, especially where no ostensible official support exists, as in Chongqing.

This study therefore builds on and extends existing approaches that are attentive to social processes, especially UFP's social composition, the conditions abetting or discouraging its development, and people's motivations. Furthermore, it contributes an analysis of places under-studied relative to UFP and uncovers some of the characteristics that can arise in and are specific to a situation of intense and rapid urbanization. As one of the fastest urbanizing regions in China, Chongqing is an especially significant location to explore the context-dependent nature of UFP's feasibility. After a brief overview on the city of Chongqing and a description of the methods employed, the results obtained are discussed relative to the social composition and background of urban food producers. We report the reasons interviewed food producers give for their involvement in such activity, and the conditions, in terms of opportunities and challenges, that urban food producers face under conditions of rapid urban growth and land commodification pressures. A discussion follows on the specificity of the context of Chongqing and what it may mean for UFP there and other areas of the world experiencing similar pressures and fast-paced changes.

STUDY AREA

The city of Chongqing (29° 33' 46.8324"' N; 106° 33' 5.6124"' E) lies in a hilly region within a monsoonal humid subtropical climate (Cfa in the Köppen system), at the confluence of the Yangzi (Chang Jiang) and Jialing rivers (Figure 1). In 1997, the sub-provincial city of Chongqing merged with three Sichuan prefectures (Fuling, Wanxian, and Qianjiang) to form the country's fourth central government administered municipality (alongside Beijing, Tianjin, and Shanghai). The creation of the Chongqing municipality helped to facilitate China's efforts to economically develop its western provinces as well as coordinate the resettlement process of residents dislocated by the construction of the Three Gorges Dam project.

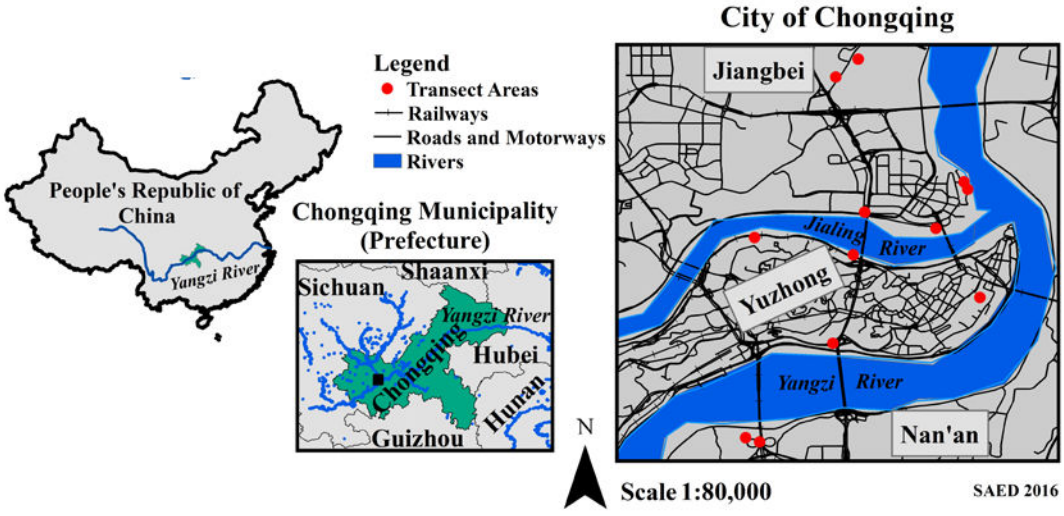

Figure 1. Location of Chongqing municipality, the city of Chongqing's three districts included in the case study, and the transect areas where interviews were conducted.

Chongqing city's urban growth has subsequently been quick and intense, overtaking nearby rural areas, including farmland (Zhao et al., 2014). According to the Chinese Statistical Yearbook (2014), Chongqing municipality's population growth has increased by approximately 1.3 million residents from 2005 to 2013 (National Bureau of Statistics of China, 2014). This population growth, attributable to rural-to-urban migration within the municipality, is comparatively smaller than the population growth rates of China's other municipalities during the same time period, including Beijing (5.7 million), Tianjin (4.29 million), and Shanghai (5.2 million). However, Chongqing's urbanization rate (13.14 %) over the same time span is faster than the national average (10.74 %). This disproportionately high rate of urbanization relative to population growth can be explained by land speculation pressures that lead to the expansion of the city much beyond actual housing needs (see also He and Wu, 2009).

It is worth noting that of the four centrally administered municipalities, Chongqing is the least urbanized with regard to the proportion of the municipal population that lives in urban areas. In 2005, the proportion of urban residents within the Beijing, Tianjin and Shanghai municipalities was 83.6, 75.1 and 89.1% respectively, while the Chongqing municipality had only 45.2% urban residents. By 2013, the number of urban residents grew at modest rates in Beijing (increased by 2.68 to 86.3%), Tianjin (increased by 6.9 to 82%) and Shanghai (increased by 0.5 to 89.6%), while the percentage of urban residents in the Chongqing municipality grew by 13.1 to 58.3%. This population increase, combined with city infrastructure investments, not only highlight efforts to develop this part of the western China municipality economically (Lai, 2002; Liu et al., 2016), but it also underscores the further potential for increased urbanization (Zhu, 2014). As a result, land speculation pressures have concomitantly become very intense, thereby curtailing land access for most people. This affects UFP directly because land available to grow crops is made increasingly scarce. However, as will be discussed below, local inhabitants have sometimes been able to access and grow food on land where construction has begun but has stalled.

At the same time, the former Chongqing Municipality Government, under the "National Plan on New Urbanization" (Zhu, 2014), instituted a reinvestment campaign favoring the raising of local living standards, such as providing more affordable housing. The policies included granting hukou status (urban residence permit) to millions of rural migrants (Cao, 2014; Ou, 2013; Wanghu and Jinliang, 2015). Furthermore, farmland, upon which Chongqing urban expansion continues to encroach, was supposed to be protected, according to official pronouncements. As stated by Vice Minister Wang Shiyuan of the Ministry of Land and Resources, "(T)he protection of arable land will be a foundation and precondition for urbanization. We will continue our strictest regulations in preserving the quality and quantity of arable land" (China.org.cn, 2014). Chongqing therefore presents a situation where economic development programs, intense industrially based urbanization, rural-to-urban migration, farmland policy, and mixed farming types (labor to agrochemically-intensive) overlap and confront each other.

METHODS

The study was carried out as a team of two faculty members and five undergraduate students during the month of July 2015. Satellite images included in ESRI databases and photographic essays (Franco et al., 2015) were analysed to determine the more likely locations of UFP areas. The highest resolution achievable was 1:24000 for the satellite imagery. Owing to the multiple seasons represented in the satellite imagery, areas appearing in various frequencies of green, brown, and yellow were selected, particularly if they appeared to be open or partially wooded areas, if they included fine lines or striations, and if they had well-defined geometrical shapes. For logistical reasons, three Chongqing districts, Yuzhong, Nan'an, and Jiangbei, comprised the extent of the areas considered in the study (Figure 1).

Scouting trips to suspected UFP areas preceded transect walks. A transect walk is herein defined as systematically traversing a defined path (transect) across a community or project area together with local inhabitants to explore general social and environmental conditions. In this case, conditions may be, for example, high-rises with internal courtyards or open lots surrounded by different types of housing. Urban food producers within the three districts constituted the statistical population. Transect walks served to determine the most likely sites to meet food producers. After several mixed results, transect walks were conducted during early morning, as it became clear that it would be the most appropriate timing to maximise recruitment. Sites pointed out to us by locals or sites with evident signs of UFP (e.g., standing crops or their residue) were revisited if no potential interviewees were found or if recruitment was initially unsuccessful. Participant recruitment occurred during transect walks and, if they consented, a full semi-structured interview was carried out.

Interview questions covered the following topics: crops grown; harvest estimates; farming experience; age and geographical origin of interviewee(s); use made of harvests; duration of plot use; degree of external assistance; previous land use; and farming techniques. Translators from a local university were hired to overcome language and

other cultural barriers. A total of 30 semi-structured interviews were conducted, involving 30 cropping areas and a total of 37 urban food producers (henceforth referred to as units and interviewees respectively). Crops were inventoried for all areas and soils were field-analysed wherever allowed or logistically feasible (in 15 cropping areas) according to standard USDA procedures (Schoenberger et al., 2012). Soils were analysed for depth, colour (using Munsell color charts), texture (manually determined), consistence (manually determined), structure, rooting depth, coarse fragment percentage, and relative coarse fragment and meso- and macro-organism abundance (using Munsell book percentage estimation charts). Color was used as indicator for organic matter content, a preliminary way of assessing soil fertility with due care for confounding factors (e.g., fresh manure application).

RESULTS

Most of the interviewees were women (57%), and all interviewees were above the age of 30 (86% are more than 50 years old; n=37). Most were not native to Chongqing and originated largely from the surrounding countryside (Table 3). Out of the interviewees that responded to the question on farming experience, 17 stated either that they grew up in farming households or learned how to farm from their family members (n=27 interviewees). However, most had relatively little farming experience.

Table 3. Interviewee Characteristics

Gender (n=37)		**Provenance (n=28)**		**Years of Farming Experience (n=27)**			**Economic Purpose (n=29)**	
Female	Male	Local	Elsewhere	<1	1-10	>10	Subsist.	Occas. Sale
21	16	9	19	11	5	11	26	4

The primary reason given for producing food was to provide for subsistence. In fact, from interviewees' responses, it can be claimed that the food they produce helps feed about 100 people, when all households represented are tallied (n=26 food production units). Only 14% of units sold surplus produce and even in such cases production was mostly for subsistence (n=29 interviewees). Three interviewees indicated that at least part of the surplus is marketed to nearby boat restaurants, which are semi-permanently floating structures along river banks (in one case, the boat restaurant was run by the interviewee). The food production areas of those interviewees were located close to such restaurants. Aside from largely subsistence orientation, interviewees gave varying reasons for being involved in UFP. Some pointed out the dietary and cost-reducing benefits of additional food supplies for themselves and/or their household members, while other emphasised a desire for continuity with a farming life style, true to their farming household origins. Others conveyed a need for recreational activity that is viewed as productive.

The techniques used to produce food varied according to circumstances, such as plot size and distance to a water source. Only in four cases did interviewees report being assisted by other household members (n=30). The vast majority (26 interviewees) worked the land alone. Irrigation was in all cases derived from local supplies. Watering was done manually, using buckets and other containers. No irrigation infrastructure was available or built, such as canals or piping. Nine interviewees indicated that they use night soil as fertiliser and only two respondents stated that they use agrochemicals (n=22 interviewees). The rest use a variety of organic compost, ranging from household consumables or production residues (e.g., milk, eggs, rice, leftovers, soy milk pulp) to varieties of livestock manures and composted weeds.

There were 44 different crops inventoried for all visited plots combined. The most frequently grown crops are long beans, cucumber, beans, maize, courgettes, chilies, and water spinach. Crop diversity on average was between seven and eight crop types and ranged from one crop to 23 crops in a single plot. Typically, the crops are grown in strips, but there were 10 cases were polyculture was noted (the reasons for cropping differences could not be ascertained). Soils tended to be less than 20 cm deep (10 of 15 cropping areas), which severely limits rooting. Average colour value (a 0-10 scale of a colour's relative lightness, with zero for black) was 3.8 on the Munsell chart. Because of the variability of the hues (2.5 to 10), comparisons are difficult, but such colour values tend to indicate moderate organic matter content (Schulze et al., 1993). Except for two cases, soils tended to be sandy with blocky structures and loose to friable consistence. Some soils consisted of transported sediment mixed with various organic materials. This was evident on three occasions where urban food producers created soils by mixing sediment and organic materials. Such manufactured were no deeper than 10-15 cm, directly on top of concrete pavement. Otherwise, soils

showed signs of truncation (e.g. topsoil was missing), affected by excavation for building foundations and other construction processes. In one area (Nan'an), soils were well-developed, well over 20 cm in depth. The soils were part of a steep ravine of about 10 to 20 m, leading to a dried-up channel. In other instances in the same area, soils were located on a sloping wooded area that forms part of a public park.

Conditions for food production were invariably tenuous at all sites visited. In 17 of the 24 cropping areas where total food production duration could be ascertained, farming had occurred for less than two years. Average land access was 1.86 years. This is too short a time span for adapting to local environmental conditions, engaging in long-term land-use planning, and investing one's labor and resources on land improvements, even if farmers wished to undertake such activities. In any case, UFP is at most tolerated by local institutions and land access is via informal agreements with corporate or government entities that own such land. This can mean being evicted at a moment's notice, which impedes planning much beyond a single growing season. Urban food producers are almost all landless, the exception being a household at the bottom of the above-mentioned ravine in Nan'an. There, surrounded by high-rises, a public park, and roadways suspended on gigantic pylons, many neighbours have taken whatever plots are available, creating a large farming community comprised of tens of households over an area tens of hectares in size. This exceptional circumstance contrasts with the typical marginal, temporary nature of available spaces, where construction is in the planning phase or has been interrupted, or where construction is not sufficiently profitable. At times, food is produced in the interstices of buildings and bridges or along river banks, as in the centrally located Yuzhong district.

DISCUSSION AND CONCLUSIONS

On the basis of this first study, it appears that Chongqing food producers tend to be middle-aged to elderly, mostly women, and originating mainly from outside of the city. The latter suggests that food production is in part affected by the recent internal migration within China. Long-term displacement effects from the building of the Three Gorges Dam may in part play a role in this migration, as attested in other studies (e.g., Qin, 2010). The reasons for urban farming are also varied, as noted elsewhere (e.g., Veen et al., 2015). Some urban farmers are continuing what they had done when living in more rural areas before they moved to Chongqing. Others enjoy the sense of community, engaging in UFP as a way to socialise with other retirees in the neighborhood. This is similar to what has been witnessed in a study in Dublin, Ireland (Kettle, 2014). Some interviewees indicated a desire to avoid what they pejoratively call "Mahjong culture", which alludes to mostly elderly people who are perceived as wasting time in trivial pursuits. Still others just want to improve the range of food sources for their diet and that of their families. Unlike some areas of the world, such as Toronto (Wekerle and Classens, 2015; see also Certomà and Tornaghi, 2015), UFP is not being practised as an overtly political act. The purpose is often to improve one's livelihood (e.g., to reduce food costs) and for some it is mainly a pleasurable hobby. In some respects, these motivations are similar to those shown in other urban centres. However, what is arguably specific to Chongqing is an elderly-specific preoccupation with self-image (the need to show oneself as being active), a focus on food provisioning (not just an interest in cultivation), combined with the desire to continue rural life-styles in the city. Arguably, such admixture of perspectives is traceable to the widespread experience of rapid social change, characterised by widening urban-rural income-gaps and related migration as well as urban expansion into formerly mostly farming communities (now squeezed or ensconced within high-rise buildings).

These motivations clash with highly precarious conditions for producing food. With no institutional support, food production in Chongqing occurs largely in marginal spaces and informally. It can be within public parks or in cramped blocks between buildings where sediment has been mixed with organic wastes to form very thin soil. It may be on foundations of razed structures or areas being prepared for new construction. In this latter case, land access, already provisional because of lack of tenure or any state guarantees, is fleeting and cropped areas can be destroyed at any moment, as several interviewers pointed out or experienced. Given such social and environmental conditions, urban farmers show great innovative capacity in finding ways to access land and in successfully growing enough food to improve their livelihoods. In some respects, the UFP situation outlined here may represent an ephemeral process linked to a conjuncture of rural displacement, changing central-government policies (e.g., over residence permits), and rapid urban expansion and intensification. Further, longer-term study would assist in determining the spatio-temporal extent of the political and environmental ramifications of urban food producers' actions and their consequences beyond Chongqing.

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