Land Use Policy 96 (2020) 104681

Contents lists available at ScienceDirect

Land Use Policy

journal homepage: www.elsevier.com/locate/landusepol

‘If I want safe food I have to grow it myself’: Patterns and motivations of urban agriculture in a small city in Vietnam’s northern borderlands

Thi-Thanh-Hiên Pham[a,*], Sarah Turner[b]

[a] University of Quebec in Montreal, 315 Sainte-Catherine Street Est, Montreal, QC, H2X 3X2, Canada
[b] McGill University, 805 Sherbrooke Street West, Montreal, QC, H3A 0B9, Canada

A B S T R A C T

Urban agriculture literature regarding the Global South reveals important knowledge gaps concerning spatial variations of food gardens across cityscapes, gardener motivations, and tensions with urban planning regulations, especially in locales beyond sub-Saharan Africa. In Vietnam, urban agriculture is growing in popularity and gaining media attention but there is little research as to why urban agriculture is practiced in smaller Vietnamese cities, especially those close to rural hinterlands. In this paper we investigate small-scale urban agriculture – or food gardens – in Lào Cai, a small upland city located on the Sino-Vietnamese border. We find a complex diversity of garden sizes and land management arrangements where gardens are built, including on state institutional land, thanks to informal arrangements. Gardener motivations focus predominantly on food safety concerns, contrasting with key motivations found elsewhere in the Global South. Throughout the city, albeit more so in newly urbanising sectors, this urban practice remains precarious due to irregular land access and confusing city authority regulations. We thus examine how urban residents are working to access safe food and contribute to their city’s urban food system while state officials tend to focus their priorities elsewhere.

1. Introduction

Food safety is one of the most important ongoing concerns for urban residents in Vietnam’s large cities (Figuié & Moustier, 2009, p. 169). Agro-chemical contamination of local fruit and vegetables, and distrust of food and chemical products originating from neighbouring China, are common topics raised and debated – often over a meal – among relatives, friends, and neighbours (Mergenthaler et al., 2009; World Bank, 2016). In 2016, a government programme ‘*Say no to contaminated foods*’ was launched on national television, while a former delegate of Vietnam’s National Assembly, Trần Ngọc Vinh, is reported to have said “the path from the stomach to the graveyard has never been as short and easy as it is today” (Tuoi Tre News, 2017). In recent years there have been a number of food related scares reported in the Vietnamese media ranging from pesticide residues in vegetables to microbial contamination in meat (Dân Trí, 2019; VTV News, 2018). Newspaper articles with statements such as “Vietnam has seen numerous problems related to food safety in recent years, mostly resulting from imports of food preservatives from China” do little to appease concerns (Nguyen-Viet et al., 2017: online). Indeed, a study in Hanoi and Ho Chi Minh City, Vietnam’s two largest cities, revealed that people are willing to pay 60 percent more for residue-free vegetables (Mergenthaler et al., 2009).

Due to such concerns, one alternative being increasingly adopted is for people to obtain ‘safe’ vegetables by growing them themselves. Vietnamese media reports have highlighted this new tendency in Hanoi, the country’s capital, be it on rooftops, or on liminal spaces along road verges, railways, or median strips (anninhthudo.vn, 2015; VietNamNet, 2015; Zing.vn, 2017). However, this urban agriculture alternative has been relatively ignored in academic literature on Vietnam to date, with only a few studies focusing on gardens on urban land already designated for agriculture (e.g. Lee et al., 2010; Sautier et al., 2014) and predominantly located in Vietnam’s large cities, especially Hanoi (Anh et al., 2004; Jansen et al., 1995; Kurfürst, 2017, 2019; Le and Dung, 2016; Pulliat, 2015). Moreover, in both the existent literature on urban agriculture in Vietnam, as well as literature focusing on other Global South countries, we identify three knowledge gaps: a lack of clear understanding of spatial variations of small-scale food gardening; limited knowledge of the motivations of urban gardeners; and a poor conceptualisation of state-gardener relations.

First, with regards to spatial variations, researchers have been calling for more empirical research to quantify the extent of urban agriculture, particularly in the Asian realm (Hamilton et al., 2014; Poulsen et al., 2015). Few studies examine spatial variations of urban agriculture, with those that do focused on Global North (for example McClintock et al (2016) in Portland; Taylor and Lovell (2012) in Chicago; Pulighe and Lupia (2016) in Rome). These limited studies reveal that the extent and spatial patterns of residential urban agriculture vary widely due to urban form (including housing density and housing types), demographic and cultural factors, home ownership, and

* Corresponding author.
E-mail addresses: pham.thi_thanh_hien@uqam.ca (T.-T.-H. Pham), sarah.turner@mcgill.ca (S. Turner).

https://doi.org/10.1016/j.landusepol.2020.104681
Received 13 May 2019; Received in revised form 9 March 2020; Accepted 7 April 2020

economic factors. In the Global South, studies examining spatial variations of urban agriculture focus mostly on African cities. For example, in two mid-sized Ghanaian cities Mackay (2018) found that urban agriculture occurs in four land-use types: 1) backyard gardens, 2) undeveloped lots which are mostly privately owned, 3) open spaces on institutional land, urban parks, forests or farms and 4) along utility land (roads, bridges, etc). Urban agriculture was dispersed across these two Ghanaian cities rather than concentrated in specific areas, albeit some spatial patterns emerged. For instance, cultivated open spaces within institutional land were the closest to the city center, while gardens on undeveloped plots tend to be in the periphery (Mackay (2018). In Dar es Salaam, Drechsel and Dongus (2009) showed that newly emerging urban agriculture was found along rivers and railways (where construction is prohibited). They stressed that the spatial distribution of urban agriculture in the city was highly dynamic and changing dramatically because of urban growth. In comparison, the spatial distribution of urban agriculture in rapidly urbanising Asian cities across different land-use types and urban forms is still relatively unknown. Understanding such spatial patterns has important research and policy implications regarding food systems, fresh food deserts, land zoning, and the needs of specific populations of gardeners (Ayambire et al., 2019; Taylor & Lovell, 2012).

Second, the literature on the motivations for cultivating urban food gardens stresses that this activity is often linked to food insecurity in the Global South among the urban poor, being used as a coping mechanism to gain food access and augment incomes (Battersby, 2013; Hamilton et al., 2014; Poulsen et al., 2015; Riley et al., 2018; Zezza & Tasciotti, 2010). Yet recent papers on mid-sized cities in Ghana and Uganda suggest that urban food growers are the not necessarily the poorest residents nor the newest migrants since food gardens require access to land and capital (Mackay et al., 2017; Masvaure, 2015; Omondi et al., 2017). The limited literature focusing on China and Vietnam's large cities shows that city gardeners are socio-demographically diverse, varying from fairly 'poor' low-waged workers, to young professionals, families with children, and seniors or retirees (see Horowitz and Liu 2017, on Wuhan, China; Wang 2016, on Beijing; and Pulliat 2015, and Kurfürst 2019, on Hanoi). Recent studies on Hanoi's household-level gardening reveal that gardening motivations are related to broader problems of the food system. These include concerns over food safety and the need to access safe food (Kurfürst, 2019) when modern sources of 'safe food' (such as supermarkets) are not accessible or available to every resident (Wertheim-Heck et al., 2015). Furthermore, studies on urban agriculture in China and Vietnam are beginning to suggest that health and enjoyment can be as important motivations as income; sometimes even more so (Horowitz & Liu, 2017; Kurfürst, 2019). Nonetheless, we know little about what motivates food gardening in smaller Asian cities. Here, the proximity of urban residents to the countryside might influence the ways people access food, for example, via rural-urban informal food networks. Their food systems might be less 'modern', with consumers still having more 'traditional' food shopping habits, such as utilising wet markets, especially if supermarkets are scarce or poorly stocked. The motivations of urban gardeners in small cities hence deserve to be studied in more depth.

Third, urban agriculture scholarship in the Global South reveals a range of informal food growing practices, for example on liminal unused spaces such as road verges[1] . Yet, there is still a dearth of micro-scale analyses regarding how gardeners bypass urban plans and regulations to undertake urban agriculture if necessary, and how they negotiate and justify their practices (Hardman et al., 2018). A few recent papers on informal or guerrilla gardening in the Global North have begun looking at these concerns (e.g. Adams & Hardman, 2014; Crane et al., 2013) revealing land appropriation as an important approach. However, mechanisms underlying informal food growing in the Global South may differ from the Global North and have yet to be carefully analysed. Focusing on such actions in a postsocialist state, such as Vietnam, raises important political dimensions. Of particular interest is that Vietnam's urban planning is state-driven and strongly motivated by modernist policy and planning tools, especially from the 2000s onwards (Boudreau et al., 2016). Urban planning directives in Vietnam are top-down, with centrally designed plans confirmed at the provincial level. Public consultation is not the norm, with local populations finding out the consequences for their neighbourhoods after city plans are officially approved. Since the early 1990s, discourses of modernity, progress, and orderliness have been repeatedly drawn upon to underpin the state's goals for urban growth and specific urban forms (Boudreau et al., 2016; Nguyen et al., 2018). This specific brand of socialist urban planning (based on former Soviet approaches) has also resulted in all urban areas being divided into classes since 1990 (Class I to V and 'Special Cities') based on population size, population density, the proportion of non-agricultural activities, and other factors (Government of Vietnam, 2009). Ambitious plans have been subsequently produced to raise the position of small cities along this urban classification ladder. At the same time, the state maintains a centralized mode of distributing funding to cities. The state also continues its surveillance over most urban spaces, and undesirable 'backwards elements' such as street vendors or informal motorbike taxis increasingly find themselves excluded (Turner and Ngo, 2019). Therefore, understanding how Vietnam's modernity-oriented planning approach and state surveillance affect people's urban food growing practices and decision making would enrich conceptual approaches of urban agriculture in the Global South.

Our study aims to help fill these knowledge gaps by examining the practices of urban agriculture undertaken by residents in a small city in Vietnam. We ask two central research questions: first, what are the characteristics of, and motivations for, urban agriculture in Lào Cai – a small but rapidly growing city in upland northern Vietnam? And second, how do the practices of urban gardeners in this small city intersect with official visions for the city? We first develop our conceptual framework drawing from literature on urban agriculture, food security, and small cities. Before outlining our methodology, we contextualise our case study locale, the small, but rapidly expanding city of Lào Cai, located on the Sino-Vietnamese border. We subsequently analyse the spatial scope and patterns of urban agriculture in the city and determine the types of food gardens present before focusing on crop composition and gardening approaches. We then turn to explore gardener motivations and commitments, before focusing on a diversity of gardener interactions with official regulations and city plans.

It is important to define the form of urban agriculture we focus upon in this study because of the possible diversity, as well as lack of consensus, regarding what constitutes urban agriculture (Mackay, 2018; Thebo et al., 2014). In this study, we examine one form of urban agriculture, namely food gardens, which tend to focus on vegetables, herbs, and fruit, occurring at a small scale. We also focus only on urban zones of the city, excluding periurban gardens and large-scale commercial farms.

2. Conceptualizing urban agriculture, food security, and small cities

Although there are an increasing number of studies focusing on urban agriculture in the Global South and addressing its forms, prevalence, and roles (De Bon et al., 2010; Orsini et al., 2013; Poulsen et al., 2015; Zezza & Tasciotti, 2010), studies that *conceptualise* urban agriculture remain less common and tend to have focused on sub-Saharan Africa cases (the importance of scholarly work on urban agriculture in Africa can be noted from Poulsen et al.'s (2015) literature review). We draw on this literature here yet given the very different

[1] See a review in Hamilton et al. (2014) and more recent papers on African cities in Riley et al. (2018), Omondi et al. (2017) and MacKay (2018); for Hanoi see Pulliat (2015) and Kurfürst (2019).

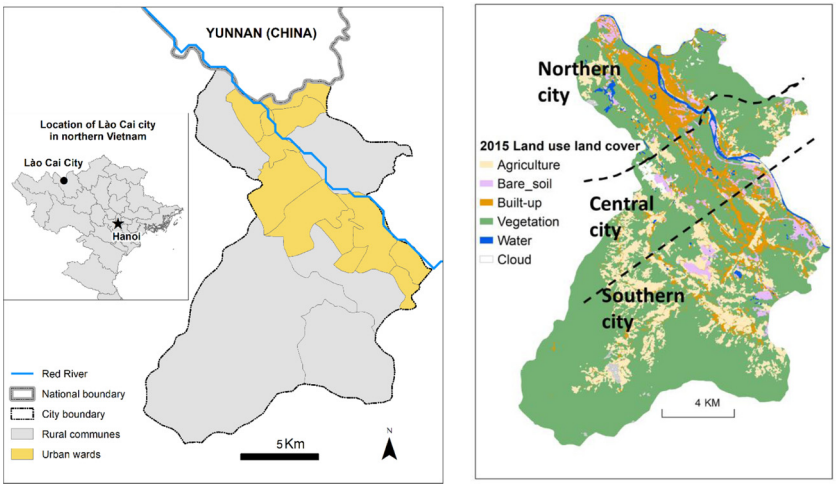

Fig. 1. The urban wards and rural communes of Lào Cai city (left) and land use land cover map of Lào Cai city from SPOT 2015 images (right) (Source: Authors).

contextual nature of our study with regards to food access, economic growth, and political system, we only highlight conceptual ideas that are relevant to Vietnam and to its small cities, such as Lào Cai. For example, Masvaure (2015) conceptualised urban agriculture in Africa by critically reviewing several commonly used and interwoven theoretical models including sustainable livelihoods approaches, dependency theory, modernisation theory and labour surplus theory. Of these, we draw on livelihood approaches to explore the degree to which urban residents are using agriculture as a means to make a living and to add to their asset portfolio (Chambers & Conway, 1991). We also remain cognizant of the degree to which planning discourse in Vietnam is based on a modernization theory approach. Additionally, while working in Cape Town, Battersby (2013) underlined the need to frame urban agriculture through the lens of food systems. Urban agriculture is thus considered as a way to increase access to food in cities and hence mitigate the negative impacts of broader socio-economic processes such as structural adjustment programs. Battersby (2013) also stressed the need to (re)politicise food studies and urban agriculture, especially because urban agriculture has been used to shift responsibility for food access from the state to the poor. These are debates that we also wish to address in our study, while keeping in mind that Vietnam has experienced higher rates of economic growth in recent years than most Sub-Saharan African countries.

We also draw on recent debates regarding food security. Food security is argued to exist "when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life" (Leroy et al., 2015, p. 169). This commonly cited definition focuses on four dimensions of food security, namely availability, access, utilization, and stability, and five additional components: quantity, quality, safety, cultural acceptability, and preference (ibid.). Each initial dimension can have some or all additional components. For example, access can refer to all the subsequent components: access to enough food (quantity), access to quality food that provides all essential nutrients, access to safe food free from contaminants and without health risks, and access to culturally acceptable and preferred foods that fit into traditional or preferred diets (Leroy et al., 2015).

Of particular interest for this paper are concerns over access to safe food. Food safety debates in Vietnam articulate around fear and distrust towards local food production and provisioning systems and, in turn, the ways people create trust and navigate such food provision systems (Ehlert & Faltmann, 2019). These food provision systems range from individual food vendors, local wet markets, and national supermarket chains, to global food networks (Figuié et al., 2019; Wertheim-Heck et al., 2015). Numerous studies have shown that in Vietnamese cities the need for trust among growers, vendors, and consumers is high (Gerber et al., 2014; Wertheim-Heck et al., 2015), with consumers wanting to know exactly where their fruit and vegetables are sourced due to ongoing food scares and rumours (Kurfürst, 2017; Naziri et al., 2014; Wertheim-Heck et al., 2015). Due to such fears, new avenues to source safe food are emerging in Vietnam's larger cities such as certified 'safe' or organic foods. Yet these are outside the price-range for many urban residents while trust in 'modern' supermarkets appears hesitant (Wertheim-Heck et al., 2019). Other approaches to accessing 'safe and clean' food that have been documented include local residents buying directly from trusted food vendors, or growing food oneself (Gerber et al., 2014; Kurfürst, 2017).

Finally, we wish to draw on literature regarding small cities in the Global South given that residents' everyday experiences are often quite different from larger urban areas. Urban research to date has tended to concentrate on large cities (Kanai et al., 2018; Roy, 2009), yet, 52 percent of the world's urban population lives in urban centres with less than 500,000 residents (UNFPA, 2007). Moreover, small urban centers (small cities or towns) are expected to account for about half the urban population growth in the coming decades, set to become the dominate urban form in the Global South. Authors such as Roy (2009) and Robinson (2006) have advocated for the multiplicity of geographical contexts and sizes of cities to be better highlighted and understood, with the need for more studies of cities that are 'off the map' or 'not city yet', especially in Global South contexts. Indeed, a recent bibliometric assessment reveals that urban research published from 2004 to 2014 overwhelmingly ignored cities having less than one million inhabitants in Asia (Kanai et al., 2018). From a more conceptual angle, Bell and Jayne (2009, p. 690) have noted that "smallness is bound up with particular ways of acting, self-images, structures of feeling, senses of place, aspirations". With such calls in mind and given the growing number and hence importance of small cities worldwide, we want to better understand how urban agriculture plays out in a small city context.

3. Contextualising the study area: urbanization in the small city of Lào Cai

Lào Cai, a provincial capital city in northern upland Vietnam, is located on the Sino-Vietnamese border (Fig. 1). We chose Lào Cai as our case study site because the city is arguably a vanguard of the urban transition currently underway in upland Vietnam, being promoted by the state as a model of upland urbanisation. Lào Cai City sits directly on the East-West Economic Corridor of the Greater Mekong Subregion, which has gained substantial funding from the Asian Development Bank

and is firmly supported by the Vietnamese state. Since 2000, Lào Cai's urban form has been changing rapidly with the implementation of new urban zones, the construction of luxury housing, relocated and enlarged state buildings, and newly paved boulevards and highways. These are all part of a drive by national, provincial, and city authorities to increase market integration, stabilise the borderlands, and upgrade the city's current Rank 2 status with regards to the country-wide urban classification system (see Henein et al., 2019).

By 2016, Lào Cai City's population was 112,773 (Lào Cai's Bureau of Statistics, 2016), with an average annual growth rate of 2.4 percent (National Institute of Architecture, 2012). Currently, the city consists of 17 administrative units, with 12 urban wards and five rural communes. Annual expansion rates of built-up areas since 2000 have been between 15 percent and 18 percent (National Institute of Architecture, 2012; Trincsi et al., 2014), while the 2012 Master Plan[2] for the city calls for an expansion of the city surface by an additional 35 percent by 2030 (National Institute of Architecture, 2012). The most recent 2018 Master Plan encourages a further expansion of 24 percent by 2050 (Lào Cai Provincial People's Committee, 2018).

Land-use and land cover mapping (see details in Section 3) shows that the city's built-up areas are predominantly within the Red River valley, where the north-south highway and the city's main boulevards are also located, creating a long, linear form (Fig. 1). Based on this mapping and observations on the ground, we divided the city into three sectors distinguished by their urban form, functions, and recent or current urban change projects. First, the northern city sector was established prior to French colonialism as a border crossing point (Turner (2010) and remains the densest residential area with abundant services and street connectivity. This sector is the hub of economic activities, thanks to its large, busy daily markets, and its proximity to a key border crossing to China. Second, in the central city sector, a number of new developments are found, including provincial administration buildings which were moved here and enlarged at the beginning of the 2000s, along with large military-like parade grounds. A luxury gated residential compound was recently added, as well as a variety of other housing types ranging from expensive townhouses to smaller-scale units. Lastly, the southern city sector was formally a different urban township, Cam Đường, until it was merged with Lào Cai city in 2004. A housing construction boom has taken place in this southern sector since 2010, along with new physical infrastructure (roads, sewage, electricity). A number of upmarket residential compounds with surveillance systems are also under construction, for which hundreds of former residents (often farmers or others involved in agriculture in some way, such as vegetable traders) have been displaced, with their land expropriated (observations and interviews, 1999-2019).

4. Methodology

This research draws on a mixed methods approach bringing together land-use land cover (LULC) mapping, urban food garden mapping, semi-structured interviews with residents, city officials, and urban planners, and longitudinal observations. To characterize the built density of the city, a LULC map was generated from the classification of SPOT image (5 m spatial resolution, acquired for 2015). We used an object-oriented approach to classify the image with eCognition software, while ground-truthing was also conducted in 2015. The overall accuracy (computed using both ground-truthing and visual interpretation of the SPOT image) is 86 percent.

The urban garden mapping covered each of the 12 wards (administrative areas) of Lào Cai City, for which we used Arc Collector installed on an Android tablet. By systematically visiting each street, we mapped all cultivated areas with dimensions larger than one meter square (this threshold was chosen according to the accuracy of drawing the gardens on the tablet and the accuracy of the tablet's GPS).[3] An individual garden plot was determined to be one physically separated from another (such as by a fence or row of trees), or standing alone. An individual plot could thus potentially be gardened by more than one individual. As highlighted earlier in our definition, we only focused on gardens growing food, not flowers nor livestock, and we excluded commercial farms.

While we have been observing land use changes in the city since 1999 for a variety of projects, we conducted interviews specifically for this study during summer 2017 with 43 gardeners, ten heads of neighbourhood units (*tổ trưởng tổ dân phố*)[4], and two city officials. The 43 gardeners were located in the eight urban wards of the city where gardening is the most common (see Fig. 1). Using a stratified purposeful sampling approach, these gardeners were chosen as illustrative of the range of gardens and individuals involved, based upon three criteria determined from our observations during urban garden mapping, key informant reflections, and observations since 1999. First, we aimed for a sample of the broadest range of garden locations and types possible (Table 1). Second, we interviewed gardeners spanning the breadth of age groups we had observed or had heard were gardening (see age details below). Third, key informant interviewees had noted that gardeners tended to span socio-economic status, and hence we sampled for this too, reflected in the occupation groups listed below. We recruited interviewees through snowballing (especially to gain a range of ages and socio-economic status) and interception in the field (we visited gardens in the early morning or early evening when gardeners tended to be present). Interviews were conducted face-to-face in Vietnamese and lasted between 30 and 60 minutes. We paused this study at 43 gardeners upon reaching data saturation, with no new notable dimensions emerging from the interviews (Saldaña 2013).

Gardener interviewees were aged between 30 and 80 and all were married with children. The household size varied from two to 17, with a median of four. Gardener professional occupations were diverse and included: those considered 'well-paid' by local standards such as teachers, hotel owners, and other white-collar workers (13 interviewees); retired public servants and retired soldiers (12); low-waged workers such as child carers, cleaners, and freelance workers (3); self-employed traders including street vendors and home-based small shop owners (7); and retired farmers and 'housewives' (4) (three interviewees preferred not to reveal their occupation). Two-thirds of the interviewees were women with women being the household member most likely to be available for interview or more willing to be interviewed on this topic. However, half of our women interviewees mentioned that their husband and children also participate in gardening.

5. Urban agriculture in Lao Cai City

5.1. Spatial variations and garden types

In total we were able to identify and map 472 food garden locations in Lào Cai city, with a total land cover of 37.96 hectares. Fig. 2 shows the distribution of these gardens locations, clustered into hexagonal cells of 4.6 ha.[5] The locations of gardens clearly follow the linear form

[2] These Master Plans are a classic example of both modernisation theory at work and socialist state-planning.

[3] We excluded food growing in styrofoam boxes (common in Hanoi) since the spatial extent was much less important.

[4] Urban wards and rural communes are the smallest administrative units in Vietnam that are clearly demarcated and mapped. The urban-rural division is decided by the government based on population density and other related factors, but a city can officially be comprised of both units. Each urban ward is further divided into neighbourhood units (*khu phố*). The heads of these units (*tổ trưởng tổ dân phố*) are the only people in the entire state administrative hierarchy in Vietnam chosen directly by local residents, and are often a long-term retiree resident (Gibert, 2018).

[5] We chose an hexagonal grid in order to better visualize the distribution of

Table 1
Distribution of gardener interviewees according to locations of gardens in Lào Cai City.

Location of gardens	Number of interviewees
River bank	5
Sidewalk	7
Railroad	2
Vacant land	13
Between-building lots	11
Institutional land	3
Residential yard	2
Total	**43**

land between buildings or vacant land waiting for construction (Fig. 3). This can be explained by the availability of land in these sectors where urban development projects (such as housing, road infrastructure, and water infrastructure) are underway, and where recent planning approaches have included broad boulevards. These boulevards have created many opportunities for urban agriculture on liminal spaces such as along incomplete sidewalks and in median strips.

Fig. 3 shows all the gardens mapped from our ground observations. In the city's northern sector, gardens along the river banks are the largest (median size of garden locations around 6,500 m^2), while other gardens in the northern sector residential areas are much smaller (median size approximately 190 m^2). In the central and southern re-

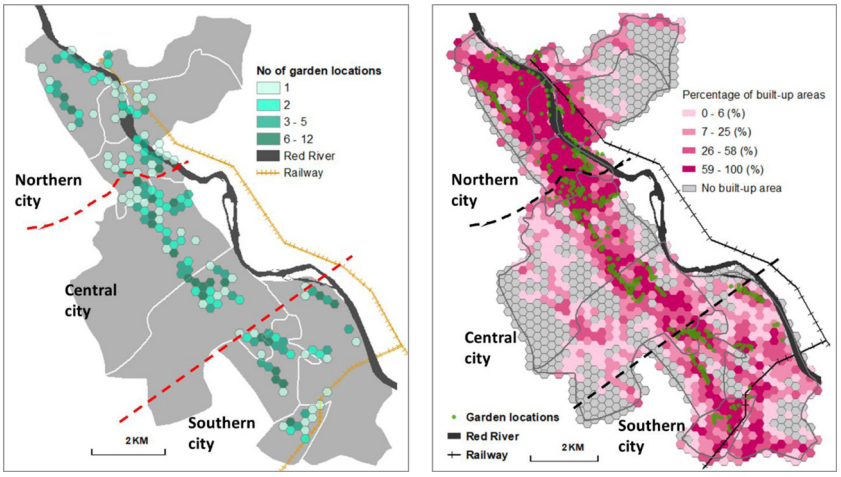

Fig. 2. Distribution of garden sites in the city (left), and their location in relation to built-up areas (right). One garden site is often aggregated garden spaces used by several gardeners.

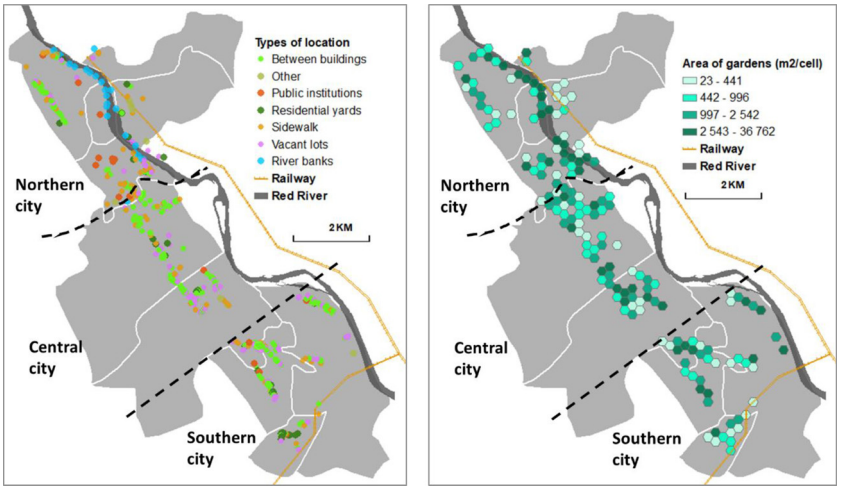

Fig. 3. Maps of garden types (left) and their area (right) across the city.

of the city, with gardens occurring predominantly along the Red River, main roads, and railway line, especially in the longer-established northern city sector. In the center and southern city sectors, most gardens are between buildings or on vacant lots, following the main transportation axis of the city. Overall, garden locations are more numerous in the central and southern parts of city, especially on unused sidential sectors, gardens located on vacant land and along sidewalks (median size approximately 280 m^2) are larger than gardens in the northern residential areas. The characteristics of the gardens thus follow differences in the built environment, varying across the three sectors of the city. Photos of typical garden layout in the three sectors illustrate this tendency (Figs. 4 and 5).

We distinguished six main types of food garden forms and configurations (Table 2). The most common types are gardens between buildings (47.25%) and in vacant lots (21.40%). Gardens abutting sidewalks or where one would expect a sidewalk to continue if it were continuously sealed, comprise a third group (16.31%). The remaining three types, each with less than 10 percent coverage, include residential

(*footnote continued*)
gardens and built-up areas. The edge length of hexagons (130m) was chosen to capture the city's diverse urban forms, after several tests of edge length. Each hexagon represents an areal surface of 4.6ha.

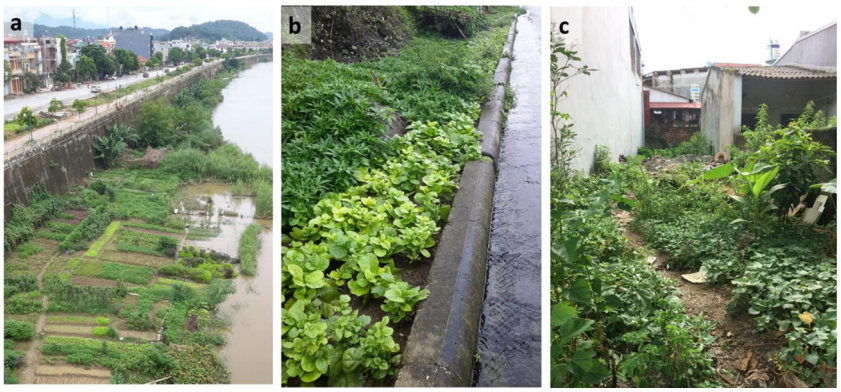

Fig. 4. Examples of typical gardens in the city's northern zone: a) along the Red River banks; b) on a pavement; and c) in a disused lot between residential buildings.

yards, the banks of the Red River, and compounds of state institutions or public organisations (such as a school yards).

5.2. Crop composition and gardening techniques

Our interviewees' gardens ranged in size from 30 m^2 to 300 m^2, with a median size around 50 m^2. It should be noted that this means that the gardens depicted spatially in Figs. 2 and 3 are actually often aggregated garden spaces used by several gardeners. The length of time residents have been gardening also varied but followed a pattern across the three different city sectors, with gardens in the north tending to be more established, especially along the river banks (from three to ten years), while gardens in the central and southern sectors were newer, having been started between one to six years before our interviews.

We found varieties of all four common cultivars in Vietnamese food, namely tubers, cucurbits (gourds), leafy vegetables, and herbs including medicinal species (Figuié, 2003) in Lao Cai's urban gardens. From interviews and observations we noted that residents were altering vegetables for the two growing seasons (winter, from December-March with an average temperature of 17 °C, and summer from May-September, with an average temperature of 28 °C). In summer, gardeners usually have around five types of leafy vegetables, plus common herbs for daily meals (e.g. Vietnamese coriander, chilies, spring onions, and perilla, a type of mint found in Asia). In winter, gardeners grow more vegetable varieties, such as cabbage, broccoli, and different types of mustard greens. Interviewees noted that it is easier to grow vegetables in winter due to the cooler temperatures and increased rainfall.

Almost all interviewees watered their gardens, except one woman who noted that her garden was mostly rain-fed. Concerning sources of water, interviewees predominantly (77%) used tap water that they had to carry or pump from their house or workplace (when gardening there), while others took water from rivers (11.5 %), or from their own, or neighbour-shared wells/ponds (11.5%).

Table 2
Garden types and their occurrence

Garden type	Count	Percentage of each garden type
Between buildings	223	47.25
Vacant lots	101	21.40
Sidewalk	77	16.31
Residential yards	32	6.78
River banks	23	4.87
State institutions	16	3.39
Total	472	100

Interviewees reported different soil qualities, with the 'best' being along the Red River banks and the worst being in unused land or vacant construction lots, which often contain debris from demolished buildings. All the gardeners we interviewed use animal manure, human urine, and home-made compost to fertilise their soil. Those with larger gardens also use commercial fertilizers (organic, mineral, and/or NKP), which they purchased in the city. All gardener interviewees except one stressed that they do not use chemical pesticides, with the vast majority making pesticides themselves by combining chili, garlic, and high proof drinking alcohol. One female gardener who was previously a farmer, explained in detail how her household eliminated different insects:

Every morning and afternoon I check for pests and diseases on our vegetables, so we solve this problem quickly. … If there are worms, we

Fig. 5. Examples of typical gardens in the city's central and southern zones: a) between residential buildings; b) on a vacant lot; c) on a median strip; and d) on a pavement.

use our experience and manually catch them. … For bugs on peas, we spray diluted dishwashing liquid on the leaves. We catch leaf rollers [*Lamprosema indicata*] by hand and don't spray pesticides. If there are cabbage moths [*Plutella xylostella*], we use lights at night to catch them, because in daytime they hide in the ground, and in the evening, they crawl out to eat leaves (Thúy).[6]

Such practices, which were common amongst our interviewees, suggest that urban food gardeners in Lào Cai have sound knowledge regarding farming techniques, which they noted was due to their former experiences as farmers, from talking with family and neighbours, or from the internet.

6. Lào Cai gardener motivations and commitment

The most important motivation driving all the gardener interviewees to begin gardening was to provide clean, safe vegetables for their families. As Vinh, a male gardener in his fifties explained: "In recent years, where have all the diseases, especially cancers, come from? Because of dirty food! We try our best to get clean food for our children's families and our grandchildren". All gardener interviewees stressed that vegetables were important for all daily meals and that growing their own vegetables was the safest approach to meet their needs. For less affluent residents, growing vegetables was also the least expensive way to gain safe food, compared to others 'safe food' options such as supermarkets or 'safe food' shops (see Pulliat (2015) and Wertheim-Heck and Spaargaren (2016) regarding Hanoi).[7]

Highlighting their food safety concerns, many gardeners expressed distrust of vegetables available in the city's marketplaces. Lan, a woman in her fifties explained: "Some professional vegetable producers have a plot reserved for their family's consumption and a separate area of vegetables grown for sale. They themselves do not dare to eat vegetables planted in the 'for sale' area. Hence I'm very scared when I have to buy vegetables".[8] Others argued that they had previously become sick from vegetables bought from local markets, while two gardeners specifically mentioned their distrust of any food from China. Interestingly, these two respondents still grew some Chinese seed varieties, with their concerns focusing on Chinese agro-chemical contamination instead.

Home food gardening was also deemed economically profitable for one third of the gardeners. Our interviewees told us they saved between VND300,000 to VND1 million per month (approximately USD15 to USD50), with the largest noted savings being VND6 million a month (USD300) for one gardener with a large 300 m^2 garden (feeding a household of five adults and two children). Some interviewees sold their surplus vegetables to friends, colleagues, or at markets. Oanh explained that she sold her vegetables to her friend who ran a small shop:

> My friend sells clean vegetables. Whenever they don't have enough to sell, I harvest mine for them. My friend already has a reputation for clean vegetables, so people buy their vegetables there often; they aren't afraid. They don't dare to buy vegetables at the market. My friend only takes vegetables from me.

Nonetheless, five gardeners thought that growing their own vegetables was more expensive due to fertiliser and water costs but preferred to continue, noting that they wanted to prioritize their health.

Interviewees also raised other health-related motivations, including the physical benefits of gardening, as well as it giving retirees 'something to do', including individuals who had never gardened before. Ánh, a female gardener in her early fifties explained: "My husband used to have gout which is very painful; he had to be on a strict [vegetarian] diet and was unhappy. But since we start to grow vegetables, he gardens every weekend or whenever he has time and feels in better health, … no more pain … he can even eat beef and dog now". Mental health benefits were also noted by three quarters of the gardeners, with Duyên, tending to her vegetables in an unused lot telling us "in the afternoons, people go to their garden to water vegetables. They garden and talk at the same time. Everybody feels very happy".

It was clear that urban gardening also helped reinforce social relations and kinship ties. All the gardener interviewees shared seeds and extra vegetables with their children's families, their friends, or neighbours. Oanh, a female gardener in her sixties introduced earlier, lived on her own and summarized these connections: "I grow vegetables for myself, and to give to my children and friends whenever I see them. I don't sell much. For all the vegetables, like pumpkins, I eat the ugly ones, and the nice ones I save to give to my children whenever they come home".

Gardeners were adamant that their practices were having broad positive impacts on the city. For example, Duyên, a woman gardening in an unused lot explained that using vacant land not only provided a garden for her family, but also improved the environment with such land not going to waste. Garden activities were also said to deters pests, insects, and rodents in the surrounding areas. Some interviewees also linked gardening with public health and education. As Hùng, a male gardener in his mid-fifties noted: "If each individual is not healthy, then society can't develop. If gardening is organized in the city, people will educate themselves so as to respect the environment; the future of the city". In addition, a few interviewees expressed that gardening was positive as it helped eradicate crimes or social evils (*tệ nạn xã hội*). Giang, an elderly male gardener in Nam Cường ward detailed: "Vacant land is not good. Not only is the environment unclean, but the dense grassland will create conditions for many social evils, such as drug users". Tấn, the head of a neighbourhood unit in Kim Tan ward confirmed that urban gardening "helps prevent crimes, because clean rivers and river banks will not create conditions for criminals to hide". Tấn also thought gardening was a way to keep people busy, and hence helped residents avoid playing illegal lottery (*đánh đề*).

Despite the range of motivations raised by urban gardeners, they also noted that gardening required a number of commitments, especially time, energy, and cash. Gardeners reported that their plots required a lot of time and labour to improve soil quality, including the removal of rocks and gravel if they were establishing a garden in a new location, such as a vacant site. A number of gardeners mentioned that their initial harvests were very low, with poor tasting vegetables, and it was only after adding more organic fertilizers and trying different soil enhancement techniques, that their crops improved. Since the gardeners tended to avoid using herbicides and pesticides (or only use organic pesticides), many caught insects and removed them manually, as noted earlier, which was also time consuming. Economic investment in large gardens could also be substantial. For example, one household was spending over VND 2 million annually (USD100) to buy manure, seeds, seedling, and organic fertilizer, for a 300 m^2 garden. Beyond rats stealing crops, gardeners also lamented that some of the city's officials were not the most honest. Four gardeners recalled having had crops stolen, as exemplified by Oanh's story: "Around here things are stolen; it must be the environment people [Provincial Department of Natural Resources and Environment officials]. When I lived near the park, it was also the environment people who stole. Close to *Tết* [Lunar New Year], they took two bunches of bananas this big! [about 1.2 m long, emphasized with her hands] They took all the bananas for *Tết*".

[6] All names are gender appropriate pseudonyms.

[7] In 2018 there were four 'safe food' shops in Lào Cai city. These shops usually sell food that is certified as organic or deemed 'safe' by the Vietnamese Good Agricultural Practices (VIETGAP), a set of standards established and regulated by the Ministry of Agriculture and Rural Development. Safe vegetable production has to follow conditions and practices that adopt integrated pest management and the use of low-toxic pesticides (World Bank, 2016).

[8] Interestingly, this comment has also been confirmed to us by rural residents in Yunnan, China, just across the border, where they also keep two vegetable plots; one for their own consumption and one for cash crops with heavier pesticide use.

Fig. 6. A sign in front of a garden reminding the land owner to register their property (*bìa đỏ*, in Vietnamese) at the Lào Cai City People's Committee.

7. Accessing garden land in Lào Cai

The access residents had to gardening land varied greatly. Beyond gardening on their own private land, we distinguished four types of agreements and negotiations regarding access to possible gardening land. Most commonly, about 30 percent of gardeners used land without permission, citing that this was because they did not know who the owners of the land were. This happened in land parcels between buildings and on vacant lots waiting for construction. Indeed, as the city expands there are an increasing number of lowland developers buying up land for future projects or for speculation. Our interviewees mentioned that land owners often lived elsewhere, and we observed a number of official signs in front of vacant lots in newly planned neighbourhoods to remind absent land owners to register their property at the People's Committee of Lào Cai City (Fig. 6).

Second, about one-third of gardeners had borrowed land from the official owner, with a verbal agreement that the gardener could use it for a set time period. This was common for land parcels between buildings, in school and government yards, and some vacant lots. One neighbourhood unit head in Nam Cường ward detailed that in most cases gardeners would receive permission and no money changed hands. However, the story of Hà, an elderly female gardener, shows that her negotiations to access land in a school yard were long and difficult:

> The land belongs to the school, and they didn't allow us to garden at first. Then they abandoned it, and we didn't have clean vegetables to eat, so we started gardening. We said whenever they wanted it, we'd return immediately, we wouldn't keep it, there'd be no point. But then they took it back and fenced it all off. That stopped everything for us. So we jumped to over there [pointing to a vacant lot].

Third, about 25 percent of gardeners cultivated on state-owned land without formal permission including sidewalks, median strips, and government owned-land. While one could label this group and some members of the first group 'guerrilla gardeners', we found a number of variations. These differences were in regard to the different *informal* permissions gardeners had to obtain from a neighbourhood unit head or the city's Department of Urban Environment (*Tổ Môi trường Đô thị*), and how gardeners interpreted policies. A male interviewee, Minh, gardening in a vacant lot near the city's recently expanded Tran Hung Dao boulevard explained:

> This type of land [used for urban gardening] either belongs to somebody who hasn't used it for building houses, or it belongs to the ward and they haven't used it either. We just asked the neighbourhood unit head [to grow vegetables], they let us do whatever, except for illegally building houses. If it's only growing seasonal vegetables, nobody worries about it. There are lots of people doing it here. Everywhere, where there are vacant lots, people make use of them. Nobody bans us from growing seasonal vegetables.

State officials in the city thus tended to turn a blind eye to such urban agriculture practices, while many private land owners tolerated gardening by others on their vacant land. Finally, the least common approach, for only ten percent of the gardeners, was to garden on their own land or to have received verbal permission from a local state official to establish a garden.

Interestingly, none of our interviewees reported direct conflicts with authorities, and there were almost no conflicts between neighbours and gardeners (except complaints regarding the smell of human urine used as fertiliser). All the gardeners we interviewed said that they would accept to return the land they were gardening if they had to, although they were not necessarily very happy about this idea. Thịnh reflected on the possibility of losing his garden land: "If they take back my garden, though I'll regret my wasted labour spent on renovating it, I'll return the land because the fact that they initially lent me the land to grow vegetables was very positive". Similarly, during fieldwork, we observed a series of gardens that had been recently confiscated by the state along the Red River, in order to reinforce the bank. These gardeners regretted the demise of their gardens because of the time wasted, loss of profits from vegetable sales, and the satisfaction it had provided them. Yet they also noted that in such cases the loss was not necessarily long-term, as the sub-tropical climate allowed people to 'grow anytime', and most local vegetables require a short growing season. Quyên, a woman planting on a large sidewalk explained: "I only need 30 days to harvest *rau cải mơ* [mustard greens]. If I know I can stay here for two months, I'll continue to cultivate". Importantly, all the gardeners argued that their gardening practices were legitimate, with this viewpoint being directly linked to their need and their perceived *right* to access safe vegetables. Three neighbourhood unit heads were a little more reserved in their opinions however, stating that while urban gardening was a positive trend, residents had to be realistic regarding how much land was available.

City officials to whom we spoke seemed rather keen to wash their hands of any responsibility regarding either supporting or policing such gardens. They also seemed fairly unaware of the spatial scope of these gardens to date. For example, the vice-director of the Institute of Urban Planning told us: "It's agriculture, so it's not under our responsibility. It should be the Department of Agriculture and Rural Development who takes care of this". Yet, the local official in charge of agriculture in Bình Minh, a southern ward of the city, responded that food gardens were not agriculture because they were located in the city. In turn, while neighbourhood unit heads and officials at the city's Department of Urban Environment seemed aware of the benefits of informal food growing within the city's boundaries, this had not been formalized in any urban policies or planning initiatives.

8. Discussion

Our case study suggests that 'smallness matters' in explaining several characteristics and patterns of urban gardens in the small city of Lào Cai. First, our mapping exercise highlights that food gardens are numerous across all sectors of the city and occur in many different forms and sizes. This diversity is most likely accounted for by the low density of buildings of Lào Cai city in comparison to the densely built urban form of larger Vietnamese cities such as Hanoi where we are currently completing a sister study. One particular finding of interest was the presence of gardens in institutional yards (not only in schools but also diverse state offices) in this small city, similar to what MacKay (2018) found in two mid-sized Ghanaian cities, but not a result that we

have found to date in Hanoi. We suggest that this particular pathway to access land for urban agriculture may be more important in small cities than in large ones. This is perhaps due to greater land availability, lower land pressure, and more personal relationships between local residents and officials or workers at institutions in small cities.

Second, living in a small city means proximity to rural agricultural zones, which urban gardeners noted means easy access to purchase seeds, fertilizers, and even soil. Third, in this specific case, more than 60 percent of our interviewees were previously farmers or from a farming family, and hence have the skills and knowledge networks needed to maintain healthy urban gardens. Fourth, the prevalence of small-scale food gardens in our case appears to be partly explained by the dominant role of traditional food channels (i.e. wet markets, street vendors) which urban residents are increasingly wary of, and the limited availability of modern sources of safe food, such as 'safe food' shops or supermarkets, in Vietnamese small cities (Wertheim-Heck et al., 2014). Last but not least, our study shows a near absence of conflicts between gardeners and landowners, including the state, a point we return to shortly.

Beyond city size however, the 'newness' of certain segments of the city was also providing opportunities for urban gardeners. It was in the relatively newly established central and southern residential sectors of the city that the largest gardens were found, and where vacant land and sidewalks were still available for gardening activities. In contrast, the longest established city wards tended to have limited numbers of larger land plots available. Competition for land was part of this equation with possible urban gardening spaces often converted for motorbike or car parking in the longer-established northern segment of the city, while there was ample space on the wide boulevards of the newer areas for parking. This points to the dynamic and spatially specific nature of urban gardens in rapidly growing cities – often found in the Global South – and highlights again the complexities regarding access to urban gardening land.

Regarding the motivations of small-scale gardeners of food crops in Lào Cai, we found availability and access to food with regards to quantity was not the overall motivating factor, rather food safety and access to clean and safe vegetables that do not pose health risks were key priorities. This focus on food safety is most likely due to Vietnam's economic position as a politically-stable 'middle income country', but it also points to a specific context in which food scares are increasingly common and hence food safety concerns run high. As noted earlier, as Vietnam has moved through an agrarian transition, the use of chemical fertilisers and pesticides in industrial agriculture has become increasingly prevalent (Schreinemachers et al., 2017; Van Hoi et al., 2013). Important food poisoning outbreaks, repeatedly discussed in the media, also contribute to food safety concerns. These are compounded by scares and distrust of China-imported food ranging from fruit to eggs and milk, with this distrust embedded in the complex historical and rival relationship between Vietnam and China (Figuié et al., 2019). Together these factors have led to increasing consumer awareness and food safety concerns in Vietnam, and to rising interests in alternative, sustainable approaches such as growing one's own vegetables. Our case study also supports other (limited) studies in China and Vietnam's larger cities that note the importance of urban gardens for health, with enjoyment being an additional motivation (Horowitz & Liu, 2017; Kurfürst, 2019).

We did not find cases where strident definitions of guerrilla gardening might come into play, such as gardening undertaken by activists or undertaken on land for which there are contested rights of access (Hardman et al., 2018). Instead, we were struck by the degree to which urban agriculture was being undertaken on an individualistic scale in Lào Cai city. We found no collective efforts or initiatives among residents to create new social organisations or movements based on urban agriculture (for example, securing land use rights for a collective neighbourhood garden), and no support from city officials or non-government organisations. Instead, we tended to find behaviour more in line with political scientist Ben Kerkvliet's concept of everyday politics, involving "people embracing, complying with, adjusting, and contesting norms and rules regarding authority over, production of, allocation of resources and doing so in quiet, mundane, and subtle expressions and acts that are rarely organised or direct" (Kerkvliet, 2009, p. 232). That is, we found gardeners responding to the growth of the city (both in scale and population growth) and specific elements of its urban design – such as vacant lots waiting for future development, unfinished sidewalks, and wide unused spaces alongside new boulevards – by adjusting and modifying official norms and state ideals for the city, to gain access to land and 'safe' food. As such, these gardeners are subtly challenging official policies that aim to create a specific vision of a 'modern city' by instead 're-ruralizing' urban-planned space to gain safe vegetables.

9. Concluding thoughts

Growing safe and clean vegetables in Lào Cai City – what we found to be the number one motivation for urban gardening in the city – requires local residents to spend a lot of time, energy, and money. It also entails risks; most of Lào Cai's urban gardens are located in unused or liminal spaces over which gardeners have no formal land use rights, hence they can lose access to their gardens at any time. This dedication to gardening reflects nation-wide food safety concerns that have been growing for the past fifteen years (Figuié, 2003). Moreover, such motivations clearly highlight the state's failure to respond to people's need to access safe food (see also Wertheim-Heck & Spaargaren, 2016). The burden of getting safe and healthy food onto tables in Lào Cai has thus shifted from the state to ordinary people. This shift has not been formalized in policy but could be argued to reflect a more neo-liberal approach to social welfare as the country develops, more commonly seen in changes such as rising health care costs and 'extra' school fees. Along similar lines, equitable access to healthy food is becoming a challenge in urban Vietnam where lower-income households tend to rely heavily on traditional markets to access fresh food, now increasingly perceived as unsafe (Wertheim-Heck et al., 2019).

Concurrently, in line with a specific vision of modernity that the Vietnamese state has been promoting over the past decade (Henein et al., 2019), urban development across Vietnam – with Lào Cai being no exception – is embedded in a specific environmental discourse, namely to strive for and create 'Green, clean and beautiful' cities (*Xanh, sạch, đẹp*) (Coe, 2015). Although urban agriculture in Lào Cai fits this state discourse to some degree, since one can argue it is green and to some extent clean, it is certainly not deemed beautiful in the state's imaginary. Officials to whom we spoke did not perceive urban gardens as contributing to the modern and 'developed' image that they wanted to portray of the city, as they strive to reach Class 1 City status. Instead, urban gardens were seen as 'someone else's problem' and a temporary, informal measure. Moreover, sustainable urban food systems are not yet part of Vietnam's urban planning discourse, at least certainly not as it has reached officials in this small city. Thus, to help create and contribute to a local and safe food system that is accessible to all, residents in this small city are taking on the task themselves in innovative ways. How long local officials will continue to turn a blind eye as they squabble amongst themselves over whose jurisdiction these gardens come under, is an unknown. For now, one can only hope that officials in Lào Cai city either start to support these local initiatives or continue to generally ignore them, given the continuing food anxieties of local residents and on-going uncertainties over food safety in the country as a whole. Extending this research to other small cities in Vietnam would also help create a comparative lens through which to better understand these growing concerns and trends beyond one upland case study site; a project we are initiating now.

CRediT authorship contribution statement

Thi-Thanh-Hiên Pham: Conceptualization, Data curation, Project administration, Visualisation, Writing - orignal draft, Writing - review & editing. **Sarah Turner:** Conceptualization, Data curation, Writing - orignal draft, Writing - review & editing.

References

Adams, D., Hardman, M., 2014. Observing Guerrillas in the Wild: Reinterpreting Practices of Urban Guerrilla Gardening. Urban Stud. 51 (6), 1103–1119. https://doi.org/10.1177/0042098013497410.

Anh, M.T.P., Ali, Mubarik, Anh, H.L., Ha, T.T.T., 2004. Urban and Peri-urban Agriculture in Hanoi: Opportunities and Constraints for Safe and Sustainable Food Production. AVRDC – The World Vegetable Center: Technical Bulletin No. 32, AVRDC Publication, Taiwan, pp. 04–601.

anninhthudo.vn, 2015. Growing vegetables on median strips and along roads: cleanness turned toxics (Trồng rau trên dải phân cách, ven đường: Tưởng "sạch" hóa nhiễm đầy chất độc!). anninhthudo.vn. Retrieved from. https://anninhthudo.vn/doi-song/trong-rau-tren-dai-phan-cach-ven-duong-tuong-sach-hoa-nhiem-day-chat-doc/643823.antd.

Ayambire, R.A., Amponsah, O., Peprah, C., Takyi, S.A., 2019. A review of practices for sustaining urban and peri-urban agriculture: Implications for land use planning in rapidly urbanising Ghanaian cities. Land Use Policy 84, 260–277. https://doi.org/10.1016/j.landusepol.2019.03.004.

Battersby, J., 2013. Hungry Cities: A Critical Review of Urban Food Security Research in Sub-Saharan African Cities. Geogr. Compass 7 (7), 452–463. https://doi.org/10.1111/gec3.12053.

Bell, D., Jayne, M., 2009. Small cities? Towards a research agenda. International Journal of Urban and Regional Research 33 (3), 683–699.

Boudreau, J.-A., Gilbert, L., Labbé, D., 2016. Uneven state formalization and periurban housing production in Hanoi and Mexico City: Comparative reflections from the global South. Environ. Plann. Economy Space 48 (12), 2383–2401. https://doi.org/10.1177/0308518X16660086.

Chambers, R., Conway, G., 1991. Sustainable rural livelihoods: Practical concepts for the 21st Century. Retrieved from Brighton. .

Coe, C.A., 2015. Civilized city': how embedded civil society networks frame the debate on urban green space in Hanoi, Vietnam. Asian J. Commun. 25 (6), 617–635. https://doi.org/10.1080/01292986.2015.1023321.

Crane, A., Viswanathan, L., Whitelaw, G., 2013. Sustainability through intervention: a case study of guerrilla gardening in Kingston, Ontario. Local Environ. 18 (1), 71–90. https://doi.org/10.1080/13549839.2012.716413.

Dân Trí, 2019. Fresh food is still risky (Thực phẩm tươi sống còn nhiều mối nguy, in Vietnamese). Retrieved from. https://dantri.com.vn/suc-khoe/thuc-pham-tuoi-song-con-nhieu-moi-nguy-20181029183340671.htm.

De Bon, H., Parrot, L., Moustier, P., 2010. Sustainable urban agriculture in developing countries. A review. Agron. Sustain. Dev. 30 (1), 21–32. https://doi.org/10.1051/agro:2008062.

Drechsel, P., Dongus, S., 2009. Dynamics and sustainability of urban agriculture: examples from sub-Saharan Africa. Sustain. Sci. 5 (1), 69. https://doi.org/10.1007/s11625-009-0097-x.

Ehlert, J., Faltmann, N.K., 2019. Food Anxiety: Ambivalences Around Body and Identity, Food Safety, and Security. In: Ehlert, J., Faltmann, N.K. (Eds.), Food Anxiety in Globalising Vietnam. Palgrave Macmillan, Singapore, pp. 1–39.

Figuié, M., 2003. Vegetable Consumption Behaviour in Vietnam. Retrieved from. .

Figuié, M., Moustier, P., 2009. Market appeal in an emerging economy: Supermarkets and poor consumers in Vietnam. Food Policy 34 (2), 210–217. https://doi.org/10.1016/j.foodpol.2008.10.012.

Figuié, M., Moustier, P., Bricas, N., Loc, N.T.T., 2019. Trust and Food Modernity in Vietnam. In: Ehlert, J., Faltmann, N.K. (Eds.), Food Anxiety in Globalising Vietnam. Palgrave Macmillan, Singapore, pp. 139–165.

Gerber, J., Turner, S., Milgram, B., 2014. Food Provisioning and Wholesale Agricultural Commodity Chains in Northern Vietnam. Human Organ. 73 (1), 50–61. https://doi.org/10.17730/humo.73.1.x2676830041m5072.

Gibert, M., 2018. Alleyway Neighborhoods in Hồ Chí Minh City. In: Padawangi, R. (Ed.), Routledge Handbook of Urbanization in Southeast Asia. Routledge, London and New York, pp. 420–432.

Government of Vietnam, 2009. Decree 42/2009/ND-CP 7th May, 2009 on the classification of urban areas.

Hamilton, A.J., Burry, K., Mok, H.-F., Barker, S.F., Grove, J.R., Williamson, V.G., 2014. Give peas a chance? Urban agriculture in developing countries. A review. Agron. Sustain. Dev. 34 (1), 45–73. https://doi.org/10.1007/s13593-013-0155-8.

Hardman, M., Chipungu, L., Magidimisha, H., Larkham, P.J., Scott, A.J., Armitage, R.P., 2018. Guerrilla gardening and green activism: Rethinking the informal urban growing movement. Landscape Urban Plann. 170, 6–14. https://doi.org/10.1016/j.landurbplan.2017.08.015.

Henein, Y., Pham, T.-T.-H., Turner, S., 2019. A small upland city gets a big makeover: local responses to state 'modernity' plans for Lào Cai, Vietnam. Urban Stud. 56 (16), 3432–3449. https://doi.org/10.1177/0042098018814725.

Horowitz, S., Liu, J., 2017. Urban Agriculture and the Reassembly of the City: Lessons from Wuhan, China. In: WinklerPrins, A. (Ed.), Global Urban Agriculture. CABI, Boston, MA, pp. 207–219.

Jansen, H.G.P., Midmore, D.J., Binh, P.T., Valasayya, S., Tru, L.C., 1995. Peri-urban vegetable production in Ho Chi Minh City, Vietnam. Retrieved from. .

Kanai, J.M., Grant, R., Jianu, R., 2018. Cities on and off the map: A bibliometric assessment of urban globalisation research. Urban Stud. 55 (12), 2569–2585. https://doi.org/10.1177/0042098017720385.

Kerkvliet, B., 2009. Everyday politics in peasant societies (and ours). J. Peasant Stud. 36 (1), 227–243. https://doi.org/10.1080/03066150902820487.

Kurfürst, S., 2017. From cheap commodity to prestige item – Hanoians longing for clean and safe vegetables. ZANTHRO - Zurich Anthropology Working Papers. pp. 2.

Kurfürst, S., 2019. Urban Gardening and Rural-Urban Supply Chains: Reassessing Images of the Urban and the Rural in Northern Vietnam. In: Ehlert, J., Faltmann, N.K. (Eds.), Food Anxiety in Globalising Vietnam. Palgrave Macmillan, Singapore, pp. 205–232.

Lào Cai Provincial People's Committee, 2018. Approval of the Master Plan for 2040 and visions for 2050. Retrieved from. http://www.laocai.gov.vn/ubnd-laocai/4/469/38236/327562/Quy-hoach-do-thi/Quyet-dinh-so-1020-QD-UBND-ngay-13-4-2018-cua-UBND-tinh-Lao-Cai-phe-duyet-Dieu-chinh-quy-hoach-chung-thanh-pho-Lao-Cai-va-vung-phu-can-den-nam-2040–tam-nhin-2050.aspx.

Lào Cai's Bureau of Statistics, 2016. Annual Statistics. Province of Lào Cai, Vietnam. .

Lee, B., Binns, T., Dixon, A.B., 2010. The dynamics of urban agriculture in Hanoi, Vietnam. In: In: Leimgruber, W., Nel, E., Matsuo, Y., Binns, T., Chand, R., Cullen, B., Lynch, D., Pradhan, P.K. (Eds.), Geographical marginality as a global issue Vol. 5. International Geographical Union, Commission on Marginalization, Globalization and Regional and Local Response, pp. 42–52.

Leroy, J.L., Ruel, M., Frongillo, E.A., Harris, J., Ballard, T.J., 2015. Measuring the Food Access Dimension of Food Security: A Critical Review and Mapping of Indicators. Food Nutr. Bull. 36 (2), 167–195. https://doi.org/10.1177/0379572115587274.

Mackay, H., 2018. Mapping and characterising the urban agricultural landscape of two intermediate-sized Ghanaian cities. Land Use Policy 70, 182–197. https://doi.org/10.1016/j.landusepol.2017.10.031.

Mackay, H., Mugagga, F., Kakooza, L., Chiwona-Karltun, L., 2017. Doing things their way? Food, farming and health in two Ugandan cities. Cities Health 1 (2), 147–170. https://doi.org/10.1080/23748834.2017.1414425.

Masvaure, S., 2015. Coping with food poverty in cities: The case of urban agriculture in Glen Norah Township in Harare. Renew. Agric. Food Syst. 31 (3), 202–213. https://doi.org/10.1017/S1742170515000101.

McClintock, N., Mahmoudi, D., Simpson, M., Santos, J.P., 2016. Socio-spatial differentiation in the Sustainable City: A mixed-methods assessment of residential gardens in metropolitan Portland, Oregon, USA. Landscape Urban Plann. 148, 1–16. https://doi.org/10.1016/j.landurbplan.2015.12.008.

Mergenthaler, M., Weinberger, K., Qaim, M., 2009. The food system transformation in developing countries: A disaggregate demand analysis for fruits and vegetables in Vietnam. Food Policy 34 (5), 426–436. https://doi.org/10.1016/j.foodpol.2009.03.009.

National Institute of.f Architecture, U., and Rural Planning (NIAURP), 2012. Thuyết minh tổng hợp Điều chỉnh Quy hoạch chung xây dựng Thành phố Lào Cai [General explanation of the Adjusted Master Plan of Lào Cai city]. Center for Architecture Consultancy and Construction Investment, Hanoi.

Naziri, D., Aubert, M., Codron, J.-M., Loc, N.T.T., Moustier, P., 2014. Estimating the Impact of Small-Scale Farmer Collective Action on Food Safety: The Case of Vegetables in Vietnam. J. Dev. Stud. 50 (5), 715–730. https://doi.org/10.1080/00220388.2013.874555.

Nguyen-Viet, H., Tuyet-Hanh, T.T., Unger, F., Dang-Xuan, S., Grace, D., 2017. Food safety in Vietnam: where we are at and what we can learn from international experiences. Infect. Dis. Poverty 6 (1), 39. https://doi.org/10.1186/s40249-017-0249-7.

Nguyen, L.H., Duan, J., Liu, H.J., 2018. State Control Versus Hybrid Land Markets: Planning and Urban Development in Transitional Hanoi, Vietnam. Sustainability 10 (9). https://doi.org/10.3390/su10092993.

Le, Nguyen Phuong, Dung, Nguyen Mau, 2016. Multifunctionality of Peri-Urban Agriculture: A Case Study in Trau Quy Commune, Hanoi City. Int. J. Hortic. Agric. Food Sci. 6 (12), 229–239.

Omondi, S.O., Oluoch-Kosura, W., Jirström, M., 2017. The role of urban-based agriculture on food security: Kenyan case studies. Geogr. Res. 55 (2), 231–241. https://doi.org/10.1111/1745-5871.12234.

Orsini, F., Kahane, R., Nono-Womdim, R., Gianquinto, G., 2013. Urban agriculture in the developing world: a review. Agron. Sustain. Dev. 33 (4), 695–720. https://doi.org/10.1007/s13593-013-0143-z.

Poulsen, M.N., McNab, P.R., Clayton, M.L., Neff, R.A., 2015. A systematic review of urban agriculture and food security impacts in low-income countries. Food Policy 55, 131–146. https://doi.org/10.1016/j.foodpol.2015.07.002.

Pulighe, G., Lupia, F., 2016. Mapping spatial patterns of urban agriculture in Rome (Italy) using Google Earth and web-mapping services. Land Use Policy 59, 49–58. https://doi.org/10.1016/j.landusepol.2016.08.001.

Pulliat, G., 2015. Food securitization and urban agriculture in Hanoi. J. Urban Res. 7 Online.

Riley, L., Chilanga, E., Zuze, L., Joynt, A., 2018. No. 27: Food Security in Africa's Secondary Cities: No. 1 Mzuzu. Malawi. Retrieved from Kingston, ON and Cape Town. .

Robinson, J., 2006. Ordinary cities: between modernity and development. Routledge, London.

Roy, A., 2009. The 21st-century metropolis: new geographies of theory. Reg. Stud. 43 (6), 819–830. https://doi.org/10.1080/00343400701809665.

Saldaña, J., 2013. The Coding Manual for Qualitative Researchers. SAGE, Los Angeles.

Sautier, D., Anh, Dao Thê, Mai, Nguyen Ngoc, Moustier, P., Nghiêp, Pham Cong, 2014. Enjeux de l'agriculture périurbaine et croissance urbaine à Hanoi. In: Chaléard, J.L. (Ed.), Métropoles aux Suds: Le défi des périphéries? Karthala, Paris, pp. 273–289.

Schreinemachers, P., Chen, H.-p., Nguyen, T.T.L., Buntong, B., Bouapao, L., Gautam, S., et al., 2017. Too much to handle? Pesticide dependence of smallholder vegetable

farmers in Southeast Asia. Sci. Total Environ. 593-594, 470–477. https://doi.org/10.1016/j.scitotenv.2017.03.181.
Taylor, J.R., Lovell, S.T., 2012. Mapping public and private spaces of urban agriculture in Chicago through the analysis of high-resolution aerial images in Google Earth. Landscape Urban Plann. 108 (1), 57–70. https://doi.org/10.1016/j.landurbplan.2012.08.001.
Thebo, A.L., Drechsel, P., Lambin, E.F., 2014. Global assessment of urban and peri-urban agriculture: irrigated and rainfed croplands. Environ. Res. Lett. 9 (11), 114002. https://doi.org/10.1088/1748-9326/9/11/114002.
Trincsi, K., Pham, T.-T.-H., Turner, S., 2014. Mapping mountain diversity: Ethnic minorities and land use land cover change in Vietnam's borderlands. Land Use policy 41 (0), 484–497. https://doi.org/10.1016/j.landusepol.2014.06.022.
Tuoi Tre News, 2017. Vietnamese killing themselves with dirty food. 14/11/2017, Retrieved from. Tuoi Tre News. https://tuoitrenews.vn/news/society/20171114/vietnamese-killing-themselves-with-dirty-food/42650.html.
Turner, S., 2010. Borderlands and border narratives: a longitudinal study of challenges and opportunities for local traders shaped by the Sino-Vietnamese border. J. Global Hist. 5 (02), 265–287. https://doi.org/10.1017/S1740022810000082.
Turner, S., Ngo, H.T., 2019. Contesting socialist state visions for modern mobilities: informal motorbike taxi drivers' struggles and strategies on Hanoi's streets, Vietnam. Int. Dev. Plan. Rev. 41 (1), 43–61. https://doi.org/10.3828/idpr.2018.10.
UNFPA, 2007. State of world po pulation 2007: unleashing the potential of urban growth. Retrieved from. http://www.unfpa.org/webdav/site/global/shared/documents/publications/2007/695_filename_sowp2007_eng.pdf.
Van Hoi, P., Mol, A., Oosterveer, P., 2013. State governance of pesticide use and trade in Vietnam. NJAS - Wageningen J. Life Sci. 67, 19–26. https://doi.org/10.1016/j.njas.2013.09.001.
VietNamNet, 2015. A kilometer-long vegetable garden in Hanoi. Retrieved from. VietNamNet. https://english.vietnamnet.vn/fms/vietnam-in-photos/122138/a-kilometer-long-vegetable-garden-in-hanoi.html.
VTV News, 2018. Pesticide usage: while vegetable growers try to find solutions, consumers are subject to risks of poisonning (Phun thuốc trừ sâu: người trồng rau loay hoay, người tiêu dùng vẫn có nguy cơ bị đầu độc, in Vietnamese). Retrieved from. https://vtv.vn/suc-khoe/phun-thuoc-tru-sau-nguoi-trong-rau-loay-hoay-nguoi-tieu-dung-van-co-nguy-co-bi-dau-doc-20180801000446602.htm.
Wang, X., 2016. Edible Landscapes within the Urban Area of Beijing, China. PhD), Universität Stuttgart.
Wertheim-Heck, S., Raneri, J.E., Oosterveer, P., 2019. Food safety and nutrition for low-income urbanites: exploring a social justice dilemma in consumption policy. Environ. Urban. 31 (2), 397–420. https://doi.org/10.1177/0956247819858019.
Wertheim-Heck, S., Spaargaren, G., 2016. Shifting configurations of shopping practices and food safety dynamics in Hanoi, Vietnam: a historical analysis. Agricult. Human Values 33 (3), 655–671. https://doi.org/10.1007/s10460-015-9645-4.
Wertheim-Heck, S., Spaargaren, G., Vellema, S., 2014. Food safety in everyday life: Shopping for vegetables in a rural city in Vietnam. J. Rural Stud. 35, 37–48. https://doi.org/10.1016/j.jrurstud.2014.04.002.
Wertheim-Heck, S., Vellema, S., Spaargaren, G., 2015. Food safety and urban food markets in Vietnam: The need for flexible and customized retail modernization policies. Food Policy 54, 95–106. https://doi.org/10.1016/j.foodpol.2015.05.002.
World Bank, 2016. Vietnam food safety risks management: Challenges and opportunities. Retrieved from Washington. .
Zezza, A., Tasciotti, L., 2010. Urban agriculture, poverty, and food security: Empirical evidence from a sample of developing countries. Food Policy 35 (4), 265–273. https://doi.org/10.1016/j.foodpol.2010.04.007.
Zing.vn, 2017. Hanoi Neighborhood Grows Roadside Vegetable Garden. Zing.vn. Retrieved from. https://saigoneer.com/society/society-categories/10135-photos-this-hanoi-community-is-growing-vegetables-on-the-roadside.