


Article

Temporal Dynamics and Motivations for Urban Community Food Gardens in Medium-Sized Towns of the Eastern Cape, South Africa

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Abstract: Urban agriculture is said to be increasing with global urbanization. However, there is little examination of the temporal or spatial dynamics of urban agriculture. We investigated the benefits and challenges experienced by community gardeners in four towns in South Africa, along with GIS analysis of the number, area, and location of urban food community gardens over the last three decades. Common reasons for practicing community gardening were cash poverty (37%) and the need to grow food (34%). The most common benefits reported by respondents were a healthy lifestyle (58%) and consumption of the food produced (54%). Theft of garden infrastructure or produce was a noteworthy challenge to continued motivation and engagement in urban community gardening. There were declines in the number and area of urban community gardens, and more central location over the last three decades. Only 16% of the gardens present in the 1980s were still operating in the 2000s. Clearly community gardening is temporally and spatially dynamic, which requires context-sensitive policy initiatives.

Keywords: benefits; constraints; crime; food security; garden area; poverty

1. Introduction

The production of food within what are deemed urban areas is and always has been a common activity throughout the world. However, growing concerns globally around increasing urban poverty, food insecurity in urban areas, and the distances that many common foodstuffs travel between farm and consumption sites have led to increasing calls in support of urban food production as an integral part of any modern and sustainable city [1]. Thus, movements advocating for food justice and sovereignty have fostered renewed interest in locally grown food within cities among both planners and city officials, as well as by residents [1–3].

Although a global phenomenon, the multifunctionality of urban agriculture means that reasons why people engage in urban food production, and the benefits they obtain or prioritize, vary in relation to local context and personal motivations [4,5]. For example, it is often presented that in poorer countries urban food production is usually a survivalist or subsistence strategy, but in more developed and affluent countries it acquires more recreational, health or social undertones [1,6,7]. Similarly, Taylor and Lovell [1] report how the prevalence of food gardens was higher in less dense neighborhoods of Chicago than the denser suburbs, while different ethnic groups of immigrants engage in urban agriculture to different degrees [7].

While local context and personal motivations have been acknowledged in shaping the nature and extent of urban food gardening there has been little investigation of how the spatially and temporally dynamic nature of towns and cities, of the urbanization processes themselves, have influenced different aspects of urban food gardening. The innovative work of Tranel and Handlin [8] shows

how community gardens impacted several neighbored attributes over a decade, but not changes in the gardens themselves. Thus, most pictures and narratives are snapshots of a particular situation at a single period. However, most urban areas in the developing world are places of rapid and significant change [9], in which spaces and opportunities open in particular locations at some point, only to be closed sometime in the future, or moved to a different location. This is particularly so in small and medium-sized towns in developing countries which are where most urban growth is occurring [10]. Yet, poverty levels are higher in these towns than in the big cities while the capacity of local governments to provide basic infrastructure and services is often lower.

Food production in urban areas takes many forms and occupies a range of spaces and places within the urban setting [1,7,11], as opposed to the peri-urban one [12]. These are a function of different combinations of where it occurs, land tenure arrangements, the number of people involved, the nature and extent to which they cooperate (formally or informally) with one another, the primary reasons for food production and whether the activity has been sanctioned by the local authorities for that particular space. It ranges from the cultivation of a small area by a single person or household on land immediately adjacent to their own residence or dwelling, representing a home or kitchen garden, through to large areas cultivated by a collective of many people who have formal agreements around inputs and distribution of the food produced for personal consumption, sale or charity [1,13]. Urban agriculture not only benefits the individual or community but also the natural environment [7] and provides opportunities for people, both gardeners and broader communities, to interact with it [5,14]. It is frequently argued that urban agriculture adds to the sustainability of cities by incorporating social, economic, and environmental aspects [13,15].

Spaces for food production that are shared by a collective of like-minded people are generally termed community, collective or allotment food gardens. Urban community food gardens can be found in both developed and developing regions, in small towns through to large cities [5,16]. Following Okvat and Zautra [17] urban community gardens are “plots of land used for growing food by people from different families, typically urban dwellers with limited access to their own land”. According to Ferris et al. [16] “what distinguishes a community garden from a private garden is the fact that it is in some sense a public garden in terms of ownership, access, and degree of democratic control”. The shared space may be managed as a single unit with members agreeing on the division of labor, responsibilities and the resultant produce, or individual members may be allocated a smaller plot within the larger whole, on which they work and reap the produce. In the latter model, members benefit from cooperation around common issues such as fencing, security, bulk buying, sharing of equipment, water sources, marketing, and knowledge.

A pervasive narrative is that urban community food gardens are a widespread and crucial coping strategy for the urban poor as one means among several of dealing with low cash income, perhaps excess household labor due to unemployment, high food prices and changing conditions in rapidly urbanizing situations [18–20]. Poor urban households often spend more than 50% of their cash income on food purchases [20,21]. Own food production also serves to buffer the poor against rapid changes in food prices or other misfortunes, thus assisting poorer households to reduce their risks and vulnerability [22]. Consequently, it is claimed that urban agriculture and community gardens are increasing globally [1,7]. Not unsurprisingly therefore, there are calls and policies from international, national, and down to local agencies and civic groups to promote urban community food gardening as an important strategy for poverty alleviation and resilience. For example, the recent international Milan Urban Food Policy Pact, or the urban agriculture policy of the city of Johannesburg in South Africa as part of their campaign for “A City Where None Go Hungry” [23]. However, urban agriculture policies at the local level are often reactive, with much urban agriculture occurring in towns and councils irrespective of any supportive or facilitative policies or programs [24].

Current debates in South Africa tend to echo these positions. Urban agriculture is common, albeit not as widespread as in countries immediately to the north [25,26], and often takes the form of community food gardens [22,27]. Many of the studies in South Africa surmise that participation

in community gardening is largely by the urban poor, and their primary reason is to supplement food supply due to income poverty. Being part of the livelihood portfolio of the urban poor requires scrutiny considering the high levels of undernutrition and child stunting and wasting among the urban poor in South Africa [28] associated with low intake of fresh vegetables and fruits [29]. However, relatively few studies in South Africa have included more affluent urban suburbs [25] and hence the conclusion that poverty is the major driver is based on a constrained range of household incomes. Secondly, there is some commentary that the extensive state social welfare system in South Africa, atypical for sub-Saharan Africa generally, has reduced, although not eliminated, engagement in urban agriculture due to poverty [25,30]. Other social and environmental benefits have been reported by several studies [27]. As with the urban agriculture literature generally, there is little knowledge of its spatial and temporal dynamics in South African towns and cities.

Within this context, the objectives of this study were to determine (i) the nature of community food gardening in several medium-sized towns in the Eastern Cape, the poorest province in South Africa and (ii) how the prevalence, and distribution vary through time. Given the prevailing continental and national narratives on the importance of urban food gardening, we considered two hypotheses, namely (i) the primary reasons for engagement in urban community food gardens would be poverty related and (ii) with widespread poverty in the country that the number of community food gardens will have increased through time.

2. Study Area

The Eastern Cape province is situated on the south-eastern seaboard of South Africa and is the poorest and second largest province in the country [31]. The province is home to approximately 6.6 million people, about 13% of the national population [31]. It is characterized by arid areas in the northern parts, the Drakensberg mountains in the northeast, while the southern and eastern parts of the province are bordered by the Indian Ocean. The province is situated in the transition zone where the Mediterranean winter rainfall region of the Western Cape changes to the subtropical summer rainfall region common across most of the country. At a provincial level there is mainly winter rainfall in the west, year-round rainfall along most of the coastal areas and adjacent interiors and summer rainfall in the east and hinterland. The Eastern Cape is characterized by low literacy rates, high unemployment levels (>35%) and poverty [32], with these being higher in the more rural municipalities and lower in the larger towns and cities [33].

Four medium-sized, Eastern Cape towns, experiencing reasonably similar climates, were selected for this study, namely, Fort Beaufort, King Williams Town, Butterworth and Mthatha (Figure 1). The mean annual rainfall is approximately 500–700 mm for each town, with the mean temperature being between 18 °C and 22 °C (Table 1). The altitude ranges between 400 m.a.s.l. at King Williams Town to 760 m.a.s.l. in Mthatha. Food insecurity is highest in Butterworth at 85%, followed by 76% for Fort Beaufort and Mthatha (Table 1), which reflects the high unemployment rates and consequent low mean monthly household income of R2400 or less (US\$160). These, in turn, reflect the low levels of formal education, with less than one-third of adults (except in King Williams Town) having completed secondary or tertiary education.

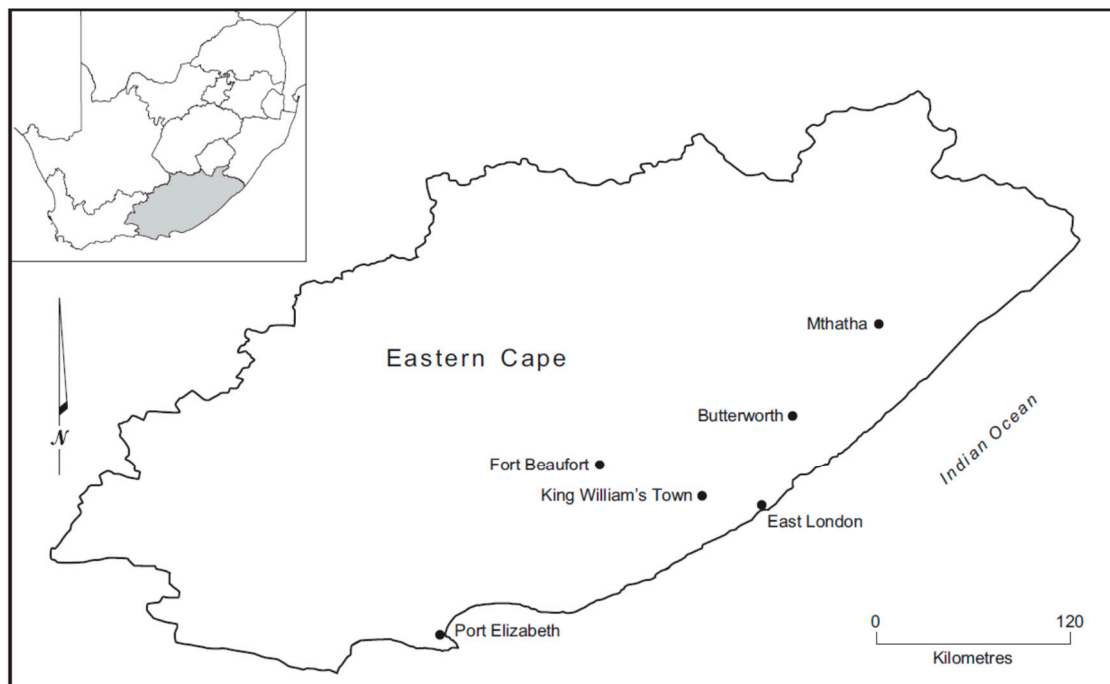


Figure 1. Location of study sites in the Eastern Cape.

Table 1. Characteristics of the four study towns within their district municipality [31].

	Fort Beaufort	King Williams Town	Butterworth	Mthatha
District municipality	Nkonkobe	Buffalo City	Mnquma	King Sabata Dalindyebo
Coordinates	32°47'00'' S 26°38'00'' E	32°53'00'' S 27°24'00'' E	32°20'00'' S 28°09'00'' E	31°34'00'' S 28°46'00'' E
Population (no. persons)	25 668	34 019	44 039	96 114
Town area (km ²)	82.8	80.8	26.3	54.8
Mean annual temperature (°C)	18.3	18.0	21.3	17.5
Mean annual rainfall (mm)	498	600	596	693
Food insecurity (%)	76	57	85	76
Average monthly income (R)	1 200	2 400	2 400	2 400
Unemployment rate (%)	18.1	36.3	16.7	21.8
% adults completed school or tertiary education	22.2	39.3	20.7	28.4

3. Materials and Methods

3.1. GIS Analysis of Changes over Time

Mapping of urban agriculture can be achieved via different means, but if large areas are involved, then GIS and remote sensing approaches are usually more efficient in the absence of a grounded database or inventory of each site, such as the use of aerial photography [34], satellite images [35,36] or Google Earth images [1,37]. These may be manual or automated. For our study the change in garden number, distribution and size over approximately the last 30 years was determined via GIS analysis of digital aerial photos (1:10,000) obtained from the national geo-spatial information (www.ngi.gov.za) directorate of the national Department of Rural Development and Land Reform. The number, size and distribution were mapped using ArcGIS. For Fort Beaufort and King Williams Town aerial photo analysis was over the years of 1985, 1995 and 2009. For Butterworth, the analysis was over the years of 1985, 1998 and 2009, and for Mthatha aerial analysis was over the years of 1980, 1995 and 2013. A 250 m

square fishnet grid was laid over each town to help guide the search for gardens, with every cell grid being systematically searched for gardens. Community gardens were identified as being areas within the town boundary that were cultivated and that the cultivated area was made up of several, smaller, contiguous discernible plots. For smaller gardens zooming in was usually necessary. It was possible to conduct an internal test for accuracy by plotting the GPS coordinates of extant gardens onto the latest photos to verify if they had already been mapped as community food gardens. There was a 100% correspondence. The periphery of each town was determined by the EC_towns polygon. Garden size was determined by drawing polygons around each community food garden for each period and calculating the hectares. The total area of gardens was calculated for each town. The distribution of the gardens was analyzed by measuring the distance of the center of the garden to the closest boundary of the town polygon, and how that changed through time. The percentage of community food gardens that remained from one survey period to the next was determined.

3.2. Field Data Collection

The location of all community food gardens within each town was first determined through contact with officials of the local municipality, with additional snowball sampling at each garden. Once a list of operational community food gardens had been compiled, four were randomly selected per town (however, during field work in the towns we did come across additional gardens which were not part of the original list, which indicates the need for a better inventory and records by the local municipalities). On site at each selected garden the size of the whole garden and area per member were measured, along with notes on the proportion of the garden actually under cultivation, the distribution of crops and general appearance and status of the garden. A questionnaire survey was administered, through a translator, to at least half of the members per garden, with a total of 69 respondents interviewed (representing 55% of the members of the sampled gardens). If there were not enough members at the community garden on arrival, arrangements were made regarding another suitable date. The questionnaire focused on the history of the garden, management, primary reasons for joining, benefits and challenges experienced, produce cultivated and primary use of produce. The interview took approximately 30–60 min.

3.3. Data Analysis

Data from the questionnaires were summarized using Excel, and statistical analysis conducted in Statistica v12. A non-parametric Kruskal-Wallis test was used to see if there was a difference in the number of members per sampled garden across the four towns for each period (1980s, 1990s, and 2000s).

4. Results

4.1. Community Garden Changes Through Time

There was a clear decline in most community food garden attributes throughout the three decades of assessment (Table 2). The number of gardens per town, the total area of all gardens combined and the mean size per garden all decreased between the 1980s to the 1990s and again from the 1990s to the 2000s. Simultaneously, the distribution of community gardens within towns (other than in Mthatha) became more central, i.e., further from the town periphery as the town expanded. The longevity of individual gardens was relatively short, with only 43% of those present in the 1980s still visible in the 1990s, of which, in turn, only 38% survived into the turn of the millennium. Thus, across the entire sample, approximately only 16% of the 1980s gardens remained in the 2000s, i.e., one in six. The rate of retention was particularly low in King Williams Town and Mthatha in the second decade. The area of gardens lost was highest in King Williams Town, falling from 199 ha in 1985 to 45 ha in 2009, a loss of 77%.

Table 2. Change in community garden attributes across three time periods.

Town	Period	No.	Mean Distance from Town Periphery (m)	Total Area (ha)	Mean Size of Garden	% of Gardens Remaining from Previous Period
Butterworth	1985	14	200 ± 150	41	3.2 ± 1.5	n/a
	1998	12	275 ± 150	36	2.9 ± 1.6	21
	2009	8	350 ± 125	19	2.3 ± 0.8	58
Fort Beaufort	1985	23	950 ± 675	42	2.5 ± 1.5	n/a
	1995	18	975 ± 800	37	2.1 ± 1.1	56
	2009	15	1 075 ± 675	18	1.9 ± 1.2	72
King Williams Town	1985	19	425 ± 425	199	10.4 ± 8.2	n/a
	1995	15	550 ± 475	169	11.8 ± 10.1	42
	2009	12	525 ± 500	45	4.1 ± 2.3	13
Mthatha	1980	14	800 ± 475	25	1.7 ± 1.4	n/a
	1995	11	625 ± 425	21	2.1 ± 1.9	50
	2013	8	775 ± 650	12	1.5 ± 0.7	15
Means (± sd)	1980s	17.5 ± 4.4	594 ± 343	76.8 ± 81.9	4.5 ± 4.0	n/a
	1990s	14.0 ± 3.2	606 ± 288	65.8 ± 69.2	4.7 ± 4.7	42 ± 8
	2000s	10.8 ± 3.4	681 ± 315	23.5 ± 14.7	2.5 ± 1.1	40 ± 16

4.2. Participation, Benefits and Constraints

The number of members per community garden ranged between five and fourteen, with a mean of 7.8 ± 2.5 . There was no significant difference between the mean number of members per garden between the four towns ($H = 1.98$; $p = 0.58$), despite the greater numbers in Butterworth (9.3 ± 3.6) compared to the other three towns (Fort Beaufort = 7.4 ± 2.8 ; King Williams Town = 7.3 ± 1.0 and Mthatha = 7.0 ± 1.4). The average age of the respondents was 56 ± 18 years. There was almost an equal gender representation in community garden members, with 51% being male, and 49% female. The mean number of years of formal education was 7.7 ± 3.8 , ranging between none and a post-schooling teaching diploma. The mean household size was 6.1 ± 2.6 persons. Almost half (48%) of the gardeners reported that there was nobody on their household with permanent employment. The mean number of adults employed per household was 0.8 ± 1.1 . Seventy-one percent of the households received one or more government social grants with a mean of 1.4 ± 1.3 grants per household across the entire sample.

The most common crops grown in summer were potatoes, maize, and gourds such as pumpkins and butternut, all grown by more than half of the respondents. Nearly all (87%) also collected spontaneously growing edible indigenous leafy vegetables such as *Amaranthus* and *Bidens*. In winter most cultivated a variety of vegetable crops, with the five most common ones (cultivated by more than 50% of the respondents) being spinach or Swiss chard, cabbage, beetroot, carrots, and onions. Most (84%) used the produce for home consumption but also sold any excess to provide some income, while 16% reported gardening solely for the purpose of selling the produce. Across those willing to share details of income generated from sales, the mean was a gross of $R917 \pm 641$ per month (range was R75–R2000; median = R1000); but many emphasized that it was highly variable.

Thirteen of the gardens had regular meetings of members (mostly fortnightly or monthly but two reported to meet only when a member requested a meeting) to discuss any issues of interest or concern and coordinate activities within the garden. In most of the gardens (13), decisions were made by consensus of all members, or by a vote if consensus could not be reached. In the remaining three gardens, one had an elected executive committee structure and for the other two it was reported that the chairperson made most decisions but after consultation with members.

The three most common reasons provided by the respondents for participating in urban community food gardening were because there was “too little money at home” to purchase either sufficient or preferred food (54%), followed by “as a hobby” and “to grow food” (each 49%) (Figure 2). The more social reasons were mentioned by fewer respondents. The ‘other’ category included reasons such as helping the community with food donations, food donations to funerals, trying to involve the youth in useful activities, and food security.

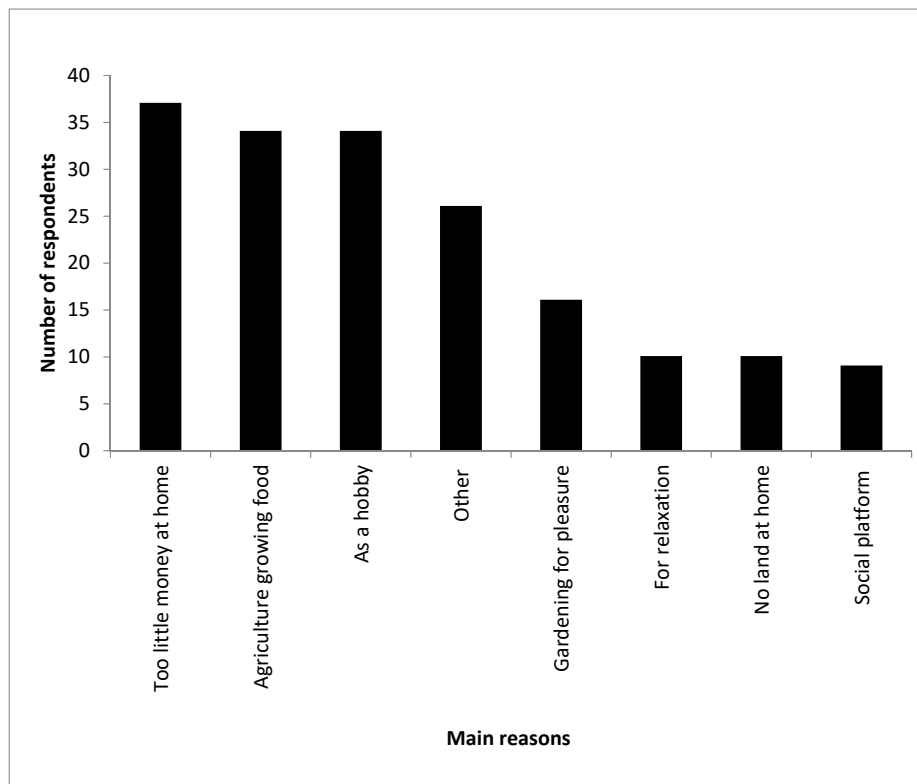


Figure 2. Primary reasons of respondents engaged in urban community agriculture.

The primary benefits of gardening mentioned by the respondents did not correspond directly with the reasons for engaging in community gardening. The three most cited primary benefits were “a healthy lifestyle” (57%), “food production” (54%) and “doing something useful” (38%) (Table 3). Other reasons included crime prevention, social interaction, getting outdoors, earning some supplementary income, cheap and fresh vegetables, and donating to the community. The main constraints highlighted by respondents were “theft and vandalism of garden infrastructure or crops” (36%), “insufficient funds” and “lack of access to reliable water supplies” (Table 3). The means of water supply varied between gardens, but most made some use of bulk supply from nearby taps or rainwater tanks. There is no cost for water from communal taps supplied by the local municipality, but prolonged water outages were common. Several also manually collected water from nearby streams or rivers.

Table 3. Respondents’ perceptions of benefits from and challenges to urban community gardening.

Benefit	%	Constraints	%
Healthy lifestyle	58	Theft or vandalism of crops or equipment	36
Food produced	54	Insufficient funds	33
Doing something useful	41	Insufficient access to water	29
Crime prevention	26	Inputs are too costly	28
Social interactions	14	Hard work	23
Community involvement	10	Livestock damage the crops	20
		Not all members are committed	16
Other (<10% respondents each): cultural opportunities; being outside; providing greenery in town; income from sale; cheap and fresh vegetables; donating food to community		Other (<10% respondents each): insufficient equipment; no tractor; no fencing; drought; conflicts between members	

5. Discussion

Our study revealed that the number of community gardens in the four study towns is decreasing through time, contrary to the narrative that urban agriculture and community gardening is increasing around the globe [2,5]. Several authors have stated that urban community food gardens have increased over time, but these studies have taken place in developed countries such as the USA and Canada [17,38,39]. Although the number of urban food gardens may be increasing globally, according to a national survey conducted in America, only 32% of the 6018 community gardens had been operational for more than 10 years [40], suggesting relatively short longevity per garden. Similarly, the survey by Taylor and Lovell [1] reported a loss of approximately 9% of gardens in a single year between 2010 and 2011. Our results show the community food gardens were distributed along the urban periphery and through time became located more centrally as the towns expanded, but with no new ones created on the new periphery. Mirroring the decrease in the number of gardens, the total area of gardens decreased with time. According to Cameron et al. [41], rapid urbanization is having negative impacts on the size of community food gardens because of housing densification and infrastructure development to accommodate increasing populations. The decrease in size and number of community gardens may result in increased poverty and food insecurity among some of the urban poor. Given that dietary diversity and nutrition is already low among poor households in South Africa [28,29], any decline in food production can be viewed with concern. Why the number and size of gardens are declining was unclear and requires further research. Possibilities include one or combinations of: unsupportive planning and zoning regulations, absent or ineffective urban agriculture policies at national and local level which may be at odds with the projection of South Africa as a modern economy, problems of theft of infrastructure and produce [6], increasingly widespread social welfare grants to buffer the poor [30], insecure land tenure on public lands and declines in non-government organization (NGO) funding and coverage in South Africa [42].

The current policy context may well be one contributor. While passing reference can be found to urban agriculture in various national policy documents (such as the National Development Plan), there are no explicit policies at a national level focused on urban agriculture, and the current five year strategic plan (2015/15–2019/20) for the responsible department (Dept of Agriculture, Forestry and Fisheries) does not list any to be promulgated during this period. Thus, at the national level, there is a policy lacuna [43,44], although the national Dept of Health promotes urban food production at many health clinics. Several national and sub-national NGOs advocate for and implement or assist with urban agriculture projects, especially for food security. These efforts have been recognized by most of the larger metropolitan councils (such as Cape Town, Durban, and Johannesburg) where supportive policies and some budget allocation can be found. However, this is rare in smaller towns, such as in this study, who lack expertise and finances to promote or assist urban agriculture.

Whether or not the decline in community gardens has been balanced by an increase in home-based kitchen or backyard gardens requires investigation, because there is some evidence from rural villages in the province that declines in field cultivation have been counterbalanced to some degree by increases in home-garden cultivation [45,46]. However, in the poorer urban areas, the design of low-cost housing estates affords relatively little area for planting trees or having home gardens [47].

There is increasing acknowledgment internationally of the importance of urban community gardens and their contribution to the livelihoods of the urban poor. It was found that the primary reason respondents participated in community food gardening was because they did not have enough financial capital to sustain their livelihoods. Thus, food production for home consumption was a key element that attracted respondents to engage in community gardening, as well as for some income generation through sale of produce. According to Kingsley et al. [14] the primary drivers of the increasing number of community food gardens worldwide are firstly, the need to provide food for consumption and secondly, to provide income from the sale of garden produce. Additionally, involvement in a community food garden was something that the respondents enjoyed doing in their spare time and was seen by many as a hobby. Kaplan (1973), cited in [17], found that besides the tangible benefits gained from community

food gardening, the desire to be outdoors and the sense of accomplishment working in the gardens was highly valued. Additionally, community gardening offered a means for community members to interact with and learn about environmental issues as well as get to know their neighbors [39,40], which can also be achieved through a model of gardening clubs or other formal or informal associations on an individual's land but sharing of knowledge and produce between members or neighbors [48].

One of the primary benefits of community food gardening identified by the respondents, was that they would like to live a healthier lifestyle and grow their own food. According to Alaimo et al. [49] "community gardens are public health promotion enterprises which can simultaneously provide good nutrition and physical activity to those that are a part of them". Alaimo et al. [50], found that in Michigan the fruit and vegetable intake of those who were a part of a community garden, was much greater than for those who were not. This was linked to the respondents feeling that there was a limited availability of affordable fresh produce. In Johannesburg, South Africa, Wills et al. [51] reported that pre-packed fruits and vegetables at the local supermarkets were too expensive for many of the urban poor and therefore community food gardens provided a cheaper alternative. Furthermore, grocery stores in low income urban neighborhoods are often viewed as well below standard with limited offerings of nutritious and affordable foods [50]. Additionally, not only do the urban poor have greater access to the nutritious foods via food gardening, but their dietary intake is improved as they are less dependent on foods such as wheat and maize which are of lower nutritional value [17,52,53].

A common reply among respondents was that community food gardening was favored because it kept the youth busy and away from undesirable activities such as crime and drugs. However, the extent to which this was achieved was not gauged in our study. Similarly, Allen et al. [54] found that community food gardening was a way to keep the local youth busy in productive activities that will have lasting positive impacts on their lives. The intention of community gardening is often to improve the social environments of children by demonstrating to them the social processes of collective action and cooperation [39]. Thus, many community food gardeners believed that they are not only growing food plants but are also contributing to the growth of the youth in their neighborhood [39]. This is countered to some degree by the relatively mature age of the respondents in our study.

The main challenge faced by community garden users as perceived by most of the respondents, was crime and theft of the garden assets such as produce and equipment. Even though this was a major challenge, numerous authors claim that developing and maintaining community food gardens can be seen as a strategy to reduce crime in urban areas [17,40,54,55]. According to Kurtz [39] "community gardens are commonly regarded as safe havens in the city". However, crime is currently particularly high throughout most of South Africa, and therefore it is unlikely that urban food gardens would be exempt unless they are well embedded in and accepted as part of the broader community. This is easier for gardens that contribute some produce to community feeding schemes at schools, health clinics or via community-based organizations. Additionally, lack of equipment for and fencing of the community gardens was highlighted as a problem by several of the respondents. Lack of fencing is viewed as a problem by participants who perceive it to underpin the crime and theft from the community gardens. However, Okvat and Zautra [17] suggest that having no fencing around community gardens can be a positive attribute. They highlight that putting up of fences can be seen to indirectly exclude residents who are not official members of the garden group. However, not fencing community gardens is impractical in countries and locations where livestock might roam free in urban areas, such as most towns of the Eastern Cape. Yet, according to Schukoske [40], the difficulty of obtaining access to the necessary resources needed for community food gardening, including fencing, is a common problem across the globe.

6. Conclusions

This study has highlighted the temporally precarious nature of urban community gardens through time as a result of changing local socio-economic and development contexts and participation. The findings have several policy implications for the promotion of urban community food gardens in

settings such as South Africa. First, the multifunctionality of community gardens needs to be emphasized and appreciated by planners and officials because they provide a range of benefits to participants. With increasing urbanization and densification, it is important that urban planners and officials recognize the benefits and seek strategies to promote them through providing and securing space during the urbanization process. Agricultural extension services are limited in most urban areas of South Africa, and typically fall under the remit of municipal social services, which is perhaps an area for policy revision if urban agriculture is to be sustained. Second, the fear of high levels of crime as a disincentive for community gardening requires appropriate models and initiatives of community mobilization and support to reduce the likelihood and effects of crime. Third, it would make targeting of support and sharing easier if local authorities developed and maintained an inventory of community food gardens within the municipal boundaries. Last, precisely why urban community gardens were declining in the Eastern Cape is not yet clear, but the results show that they are spatially and temporally dynamic, matching the dynamism of the urban environments in which they are located. More work is required to elucidate whether this decline is unique to this part of South Africa, to South Africa as a whole, or is actually more common than current literature portrays. Nonetheless, if community food gardens are deemed to provide a wide range of benefits to a meaningful number of urban dwellers, then suitable, context-sensitive policy instruments and incentives, at local and national scales, may be required to reverse the decline to sustain the flow of those benefits. This is particularly germane in countries such as South Africa characterized by high rates of urbanization, widespread poverty, significant burdens of food insecurity and low dietary diversity.

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References

1. Taylor, J.R.; Lovell, S.T. Mapping public and private spaces of urban agriculture in Chicago through the analysis of high-resolution aerial images in Google Earth. *Landsc. Urban Plan.* **2012**, *108*, 57–70. [[CrossRef](#)]
2. Guitart, D.; Pickering, C.; Byrne, J. Past results and future directions in urban community gardens research. *Urban For. Urban Green.* **2012**, *11*, 364–373. [[CrossRef](#)]
3. Clendenning, J.; Dressler, W.H.; Richards, C. Food justice or food sovereignty? Understanding the rise of urban food movements in the USA. *Agric. Hum. Values* **2016**, *33*, 165–177. [[CrossRef](#)]
4. Orsini, F.; Kahane, R.; Nono-Womdim, R.; Gianquinto, G. Urban agriculture in the developing world: A review. *Agron. Sust. Dev.* **2013**, *33*, 695–720. [[CrossRef](#)]
5. Pourias, J.; Aubry, C.; Duchemin, E. Is food a motivation for urban gardeners? Multi-functionality and the relative importance of the food function in urban collective gardens of Paris and Montreal. *Agric. Hum. Values* **2016**, *33*, 257–273. [[CrossRef](#)]
6. Battersby, J.; Marshak, M. Growing communities: Integrating the social and economic benefits of urban agriculture in Cape Town. *Urban For.* **2013**, *24*, 447–461. [[CrossRef](#)]
7. Eigenbrod, C.; Gruda, N. Urban vegetable for food security in cities. A review. *Agron. Sust. Dev.* **2015**, *35*, 483–498. [[CrossRef](#)]
8. Tranel, M.; Handlin, R.B. Metromorphosis: Documenting change. *J. Urban Aff.* **2006**, *28*, 151–167. [[CrossRef](#)]
9. Schlesinger, J.; Drescher, A.; Shackleton, C.M. Socio-spatial dynamics in the use of wild natural resources: Evidence from six rapidly growing medium-sized cities in Africa. *Appl. Geogr.* **2015**, *56*, 107–115. [[CrossRef](#)]

10. UN-HABITAT. *State of the World's Cities 2006/7: The Millennium Development Goals and Urban Sustainability*; Earthscan: London, UK, 2006.
11. Ambrose-Oji, B. Urban food systems and African indigenous vegetables: Defining the spaces and places for African indigenous vegetables in urban and peri-urban agriculture. In *African Indigenous Vegetables in Urban Agriculture*; Shackleton, C.M., Pasquini, M., Drescher, A.W., Eds.; Earthscan: London, UK, 2009; pp. 1–34.
12. Opitz, I.; Berges, R.; Piore, A.; Krikser, T. Contributing to food security in urban areas: Differences between urban agriculture and peri-urban agriculture in the Global North. *Agric. Hum. Values* **2016**, *33*, 341–358. [[CrossRef](#)]
13. De Bon, H.; Parrot, L.; Moustier, P. Sustainable urban agriculture in developing countries: A review. *Agron. Sustain. Dev.* **2010**, *30*, 21–32. [[CrossRef](#)]
14. Kingsley, J.; Townsend, M.; Henderson-Wilson, C. Cultivating health and wellbeing: Members' perceptions of the health benefits of a Port Melbourne community garden. *Leis. Stud.* **2009**, *28*, 207–219. [[CrossRef](#)]
15. Deelstra, T.; Girardet, H. Growing cities, growing food: Urban agriculture on the policy agenda. *Urban Agric. Sustain. Cities* **2000**, *1*, 43–65.
16. Ferris, J.; Norman, C.; Sempik, J. People, land and sustainability: Community gardens and the social dimension of sustainable development. *Soc. Pol. Adm.* **2001**, *35*, 559–568. [[CrossRef](#)]
17. Okvat, H.; Zautra, A. Community gardening: A parsimonious path to individual, community, and environmental resilience. *Am. J. Community Psychol.* **2011**, *47*, 374–387. [[CrossRef](#)] [[PubMed](#)]
18. Poulsen, M.N.; McNab, P.R.; Clayton, M.L.; Neff, R.A. A systematic review of urban agriculture and food security impacts in low-income countries. *Food Pol.* **2015**, *55*, 131–146. [[CrossRef](#)]
19. Smart, J.; Nel, E.; Binns, T. Economic crisis and food security in Africa: Exploring the significance of urban agriculture in Zambia's Copperbelt province. *Geoforum* **2015**, *65*, 37–45. [[CrossRef](#)]
20. Masvaure, S. Coping with food poverty in cities: The case of urban agriculture in Glen Norah Township in Harare. *Renew. Agric. Food Syst.* **2016**, *31*, 202–216. [[CrossRef](#)]
21. Rogerson, C.M. Urban agriculture in South Africa: Scope, issues and potential. *GeoJournal* **1993**, *30*, 21–28.
22. Reuther, S.; Dewar, N. Competition for the use of public open space in low-income urban areas: The economic potential of urban gardening in Khayelitsha, Cape Town. *Dev. S. Afr.* **2006**, *23*, 97–121. [[CrossRef](#)]
23. Malan, N. Urban farmers and urban agriculture in Johannesburg: Responding to the food resilience strategy. *Agrekon* **2015**, *54*, 51–75. [[CrossRef](#)]
24. Mintz, G.; McManus, P. Seeds for change? Attaining the benefits of community gardens through council policies in Sydney, Australia. *Aust. Geogr.* **2014**, *45*, 541–558. [[CrossRef](#)]
25. Crush, J.; Hovorka, A.; Tevera, D. Food security in Southern African cities: The place of urban agriculture. *Prog. Dev. Stud.* **2011**, *11*, 285–305. [[CrossRef](#)]
26. Crush, J.; Caesar, M. City without choice: Urban food insecurity in Msunduzi, South Africa. *Urban Forum* **2014**, *25*, 165–175. [[CrossRef](#)]
27. Tembo, R.; Louw, J. Conceptualising and implementing two community gardening projects on the Cape Flats, Cape Town. *Dev. S. Afr.* **2013**, *30*, 224–237. [[CrossRef](#)]
28. Faber, M.; Wenhold, F. Nutrition in contemporary South Africa. *Water SA* **2007**, *33*, 393–400.
29. Labadarios, D.; Mchiza, Z.J.; Steyn, N.P.; Gericke, G.; Mounder, E.M.; Davids, Y.D.; Parker, W. Food security in South Africa: A review of national surveys. *Bull. World Health Organ.* **2011**, *89*, 891–899. [[CrossRef](#)] [[PubMed](#)]
30. Thornton, A. Beyond the metropolis: Small town case studies of urban and peri-urban agriculture in South Africa. *Urban Forum* **2007**, *19*, 243–262. [[CrossRef](#)]
31. Statistics South Africa Local Municipality Population. 2012. Available online: http://beta2.statssa.gov.za/?page_id=993&id=nkonkobe-municipality (accessed on 19 March 2015).
32. Thornton, A. Pastures of plenty? Land rights and community-based agriculture in Peddie, a former homeland town in South Africa. *Appl. Geogr.* **2009**, *29*, 12–20. [[CrossRef](#)]
33. Gwedla, N.; Shackleton, C.M. The development visions and attitudes towards urban forestry of officials responsible for greening in South African towns. *Land Use Pol.* **2015**, *42*, 17–26. [[CrossRef](#)]
34. Kremer, P.; DeLiberty, T.L. Local food practices and growing potential: Mapping the case of Philadelphia. *Appl. Geogr.* **2011**, *31*, 1252–1261. [[CrossRef](#)]
35. Mathieu, R.; Freeman, C.; Aryal, J. Mapping private gardens in urban areas using object-oriented techniques and very high-resolution satellite imagery. *Landsc. Urban Plan.* **2007**, *81*, 179–192. [[CrossRef](#)]

36. Pribadi, D.O.; Pauleit, S. The dynamics of peri-urban agriculture during rapid urbanization of Jabodetabek Metropolitan Area. *Land Use Pol.* **2015**, *48*, 13–24. [[CrossRef](#)]
37. Pulighe, G.; Lupia, F. Mapping spatial patterns of urban agriculture in Rome (Italy) using Google Earth and web-mapping services. *Land Use Pol.* **2016**, *59*, 49–58. [[CrossRef](#)]
38. Irvine, S.; Johnson, L.; Peters, K. Community gardens and sustainable land use planning: A case-study of the Alex Wilson community garden. *Local Environ.* **1999**, *4*, 33–46. [[CrossRef](#)]
39. Kurtz, H. Differentiating multiple meanings of garden and community. *Urban Geogr.* **2001**, *22*, 656–670. [[CrossRef](#)]
40. Schukoske, J.E. Community development through gardening: State and local policies transforming urban open space. *NYU J. Legis. Public* **1999**, *3*, 351.
41. Cameron, R.W.; Blanuša, T.; Taylor, J.E.; Salisbury, A.; Halstead, A.J.; Henricot, B.; Thompson, K. The domestic garden—Its contribution to urban green infrastructure. *Urban For. Urban Green.* **2012**, *11*, 129–137. [[CrossRef](#)]
42. Habib, A.; Taylor, R. South Africa: Anti-Apartheid NGOs in transition. *Voluntas Int. J. Volunt. Nonprofit Organ.* **1999**, *10*, 73–82. [[CrossRef](#)]
43. Leech, M.G. Strategy for Viable, Sustainable Urban Agriculture in a Dynamic, Urbanising Society. Ph.D. Thesis, University of South Africa, Pretoria, South Africa, 2015.
44. Drimie, S. *Understanding South African Food and Agricultural Policy: Implications for Agri-Food Value Chains, Regulation and Formal and Informal Livelihoods*; Working Paper 39; PLAAS, UWC and Centre of Excellence on Food Security: Cape Town, South Africa, 2016.
45. Andrew, M.; Fox, R.C. 'Undercultivation' and intensification in the Transkei: A case study of historical changes in the use of arable land in Nompma, Shixini. *Dev. S. Afr.* **2004**, *21*, 687–706. [[CrossRef](#)]
46. Fay, D. Land tenure, land use, and land reform at Dwesa-Cwebe, South Africa: Local transformations and the limits of the state. *World Dev.* **2009**, *37*, 1424–1433. [[CrossRef](#)]
47. Shackleton, C.M.; Hebinck, P.; Kaoma, H.; Chishaleshale, M.; Chinyimba, A.; Shackleton, S.E.; Gambiza, J.; Gumbo, D. Low-cost housing developments in South Africa miss the opportunities for household level urban greening. *Land Use Pol.* **2014**, *36*, 500–509. [[CrossRef](#)]
48. Kirkpatrick, J.B.; Davison, A. Home-grown: Gardens, practices and motivation in urban domestic vegetable production. *Landsc. Urban Plan.* **2018**, *170*, 24–33. [[CrossRef](#)]
49. Alaimo, K.; Reischl, T.M.; Allen, J.O. Community gardening, neighborhood meetings, and social capital. *J. Community Psychol.* **2010**, *38*, 497–514. [[CrossRef](#)]
50. Alaimo, K.; Packnett, E.; Miles, R.A.; Kruger, D.J. Fruit and vegetable intake among urban community gardeners. *J. Nutr. Educ. Behav.* **2008**, *40*, 94–101. [[CrossRef](#)] [[PubMed](#)]
51. Wills, J.; Chinemana, F.; Rudolph, M. Growing or connecting? An urban food garden in Johannesburg. *Health Promot. Int.* **2009**, *25*, 33–41. [[CrossRef](#)] [[PubMed](#)]
52. Stocker, L.; Barnett, K. The significance and praxis of community-based sustainability projects: Community gardens in Western Australia. *Local Environ.* **1998**, *3*, 179–189. [[CrossRef](#)]
53. Wakefield, S.; Yeudall, F.; Taron, C.; Reynolds, J.; Skinner, A. Growing urban health: Community gardening in South-East Toronto. *Health Promot. Int.* **2007**, *22*, 92–101. [[CrossRef](#)] [[PubMed](#)]
54. Allen, J.; Alaimo, K.; Elam, D.; Perry, E. Growing vegetables and values: Benefits of neighborhood-based community gardens for youth development and nutrition. *Hunger Environ. Nutr.* **2008**, *3*, 418–439. [[CrossRef](#)]
55. Gorham, M.; Waliczek, T.; Snelgrove, A.; Zajicek, J. The impact of community gardens on numbers of property crimes in urban Houston. *Horttechnology* **2009**, *19*, 291–296.

