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Growing together: unveiling the potential of school-based community gardens to foster well-being, empowerment, and sustainability

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Abstract

Most urban community gardens in South Africa face challenges related to land tenure rights, often leading them to negotiate for land use in school gardens. This paper investigates the potential synergy between schools and school-based community gardens, exploring the mutually beneficial relationship that can be cultivated for both the community and students. The research contends that school-based community gardens can wield significant influence in enhancing food security and nutrition, catalyzing community development, and nurturing environmental sustainability. Furthermore, the research emphasizes the pivotal role of school-based community gardens in fostering well-being within communities, empowering students, and contributing to a more enduring food system. Employing a qualitative approach, through semi-structured interviews conducted across 13 school-based community gardens situated in low-income townships on the Cape Flats of Cape Town, this paper underscores the advantages and challenges associated with leveraging school land for community gardens. By fortifying food security, propelling community development, and cultivating environmental sustainability, school-based gardens stand poised to be transformative agents, particularly within distressed neighborhoods of Cape Town. The findings of this research hold the potential to shape the establishment of resilient food production and distribution networks, thereby contributing to a comprehensive strategy for addressing food security, community development, and environmental sustainability in a holistic manner.

Policy and practice recommendations

- Integrate school based community gardens into educational curricula for holistic learning experiences.
- Facilitate partnerships between schools and communities to maximize school-based urban community gardens impact.
- Implement supportive policies to secure land tenure for school-based community gardens.
- Provide resources for training and capacity building in school-based urban community garden management.
- Advocate for funding and support for sustainable urban agriculture initiatives.

Science highlights

- School-based community gardens empower communities, fostering well-being and sustainability.
- Land tenure challenges in urban community gardens can be overcome through school partnerships.
- School-based gardens nurture food security, community development, and environmental sustainability.
- Integrating school land for gardens catalyzes resilient food systems in distressed areas.
- Community gardens in schools drive empowerment and foster enduring food systems.

Keywords Land tenure, Cape Town, School-based urban community gardens, Urban agriculture in the global south

Introduction

Cities in the Global South confront numerous challenges, including urban sprawl, inadequate sanitation, poor air and water quality, and the impacts of climate change. These issues can significantly impede progress towards sustainable development (Arku and Marais 2022). In response to these challenges, scholars such as Azunre et al. (2019) and McGuire et al. (2023) have explored how urban community gardening can serve as a potential solution. Indeed, there has been a resurgence of interest in urban community gardening in recent years as a means to better understand and address the various socio-economic and environmental challenges faced by cities (McGuire et al. 2023).

Urban community gardens are collective cultivation spaces that serve various purposes, including the development of social capital, food provision, health promotion, environmental education, and fostering collective action (Ilieva et al., 2022; Modibedi et al. 2021; Zheng et al. 2023). These gardens may have different objectives, such as generating income or providing food to schools, shelters, or vulnerable community groups (Zheng et al. 2023). They can be established in diverse settings, including vacant plots, prisons, nursing homes, shelters, and school premises (Pudup, 2008). Despite their growing popularity as a response to urban challenges in cities across the global North, there remains a significant gap in the literature on how these gardens specifically address and mitigate these challenges in global South cities.

While the benefits of urban community gardens are increasingly recognised, there remains insufficient analysis of how they can be effectively utilised to tackle the unique issues faced by urban areas in the global South. These challenges include food insecurity, limited access to nutritious food, social fragmentation, and environmental degradation (Kanosvamhira 2024). By fostering local food production, promoting community cohesion, and enhancing environmental stewardship, these gardens could offer a multifaceted approach to improving urban resilience and sustainability.

Through a qualitative research approach, I examine the potential of school-based community gardens to serve multiple functions and explore the possibility of their expansion and networking to create a more sustainable food system. Such a network could enable the aggregation of outputs, increasing the overall impact on food security, nutrition, and community development. This research makes an empirical contribution to the literature as most of the research on urban community gardens has been unevenly distributed in favor of the global North countries (Zheng et al. 2023). This is despite the prevalence

of rapid urbanization in global South cities and subsequent socio-economic and environmental challenges (Randolph and Storper 2023). Urban community gardens are particularly widespread in South Africa, where both the state and civil society actors have actively promoted them for their ability to enhance household food security and nutrition (Olivier and Heinecken 2017a; Kanosvamhira 2023; Suchá et al. 2020). However, many of these community gardens are situated on school land due to challenges related to property rights (Kanosvamhira & Tevera, 2023, Suchá et al. 2020). This is because negotiating lease agreements on school property is often easier compared to state or private land. While the use of school land for community gardens has its advantages, such as the availability of space and the potential for involving students in gardening activities, it also presents certain challenges, such as limited access during school hours and the need for coordination with school administrators. Despite these challenges, the potential of school-based community gardens in addressing broader urban issues cannot be overlooked.

The aim of the paper is to explore the multifunctional role of urban school-based community gardens in distressed neighbourhoods, specifically in the Cape Flats region of Cape Town. The research seeks to understand how school-based community gardens, beyond providing fresh produce, contribute to addressing broader urban challenges such as food and nutrition security, education, community development, and social cohesion. This paper makes a critical contribution to the field of southern urbanism scholarship with a particular focus on food security by demonstrating the capacity of school based urban community gardens to act as a network of sustainable green infrastructure that can contribute to the well-being of schools and community development more generally. The results of this research could inform the development of sustainable networks of food production and distribution across schools and communities in distressed neighbourhoods in Cape Town, addressing issues of food security, community development, and environmental sustainability. The structure of this paper is outlined as follows: Sect. 2 examines the connection between Food and Nutrition Security, school gardens and school-based community gardens, while Sect. 3 focuses on the study area and situates the study within its spatial and socio-economic context. Section 4 presents the methodology, followed by a results section and subsequent discussion. The paper concludes by offering key insights and suggesting potential avenues for future research.

Food and nutrition security, school gardens and urban school-based community garden

School gardens have gained worldwide recognition for their potential to improve access to fresh food, promote healthier dietary choices, and create nourishing school environments (Gonsalves et al. 2020). Importantly, these gardens also have the capacity to enhance children's nutrition. Research from the Global South indicates that engagement with school gardens can lead to improved nutrition and healthier food preferences among children (Fischer et al. 2019). However, the integration and sustainability of these gardens are often constrained by significant challenges, including inadequate funding, limited staffing, restricted space, and insufficient stakeholder support. The widespread implementation of school feeding schemes globally, with various approaches, offers valuable insights for designing more effective strategies (Destaw et al. 2022; Hunter & Lauridsen, 2020). Notably, Southern African countries like Lesotho and Namibia

leverage school-based gardens for procurement, delivery, and monitoring, augmenting their longstanding school feeding experiences (Devereux et al. 2018).

In South Africa, the National School Nutrition Programme (NSNP) is a significant government initiative aimed at nourishing school children, especially those from disadvantaged backgrounds (Mostert 2019; Laurie et al. 2017). While the NSNP primarily focuses on feeding, the promotion of school food gardens emerges as a practical and impactful strategy to enhance fruit and vegetable consumption, establish nutrition education "outdoor classrooms," and facilitate sustainable food production (Devereux et al. 2018:12). Despite its potential, less than half of NSNP schools currently host food gardens, limiting their reach (Devereux et al. 2018:12). Educational institutions are motivated by the Department of Basic Education (DoBE) to cultivate food gardens, providing both educators and students with valuable insights into vegetable and fruit cultivation[1].

This context sets the stage for a compelling synergy between urban community gardens and schools in South Africa. Given land tenure challenges, many urban community gardens find a home on school premises (Philander and Karriem 2016; Kanosvamhira & Tevera, 2023). In this context school-based community gardens emerge. School-based community gardens here are defined as is a collaborative community garden located on school grounds, typically within primary or secondary schools, where community members come together to cultivate plants, including fruits, vegetables, and herbs with the approval of the school and sometimes with the support of students and teachers (Mosimege et al. 2016). As such these differ in scope from a school garden because while both types of gardens are located on school grounds and may share similar activities, a school-based community garden has a broader community focus and involvement, whereas a school garden is more narrowly focused on student education and school-based activities. This research asserts that fostering school-based community gardens can significantly bolster fruit and vegetable consumption among children, concurrently delivering vital nutrition education and sustainable food practices. Integral to the National School Nutrition Program (NSNP), school-based community gardens can emerge as pivotal agents in nurturing healthy dietary behaviors and leaving a lasting positive impact on children's well-being, with potential spill-over benefits for the wider community. Thus, advocating for and supporting school-based community gardens represents a strategic pathway to amplify the success of the NSNP, enriching the health and welfare of children while resonating throughout the broader societal fabric.

Study area

The term "Cape Flats" refers to a flat and sandy expanse situated on the outskirts of Cape Town's central business district. De Swardt et al. (2005) characterize it as a sandy terrain that acts as a dividing line between the prosperous northern and southern suburbs. Within the Cape Flats are several townships established during the apartheid era, which persist to this day. The population makeup is predominantly Coloured (59%) and Black (34%) racial groups. The area historically faced limited housing development due to its unfavourable soil composition, but this changed under apartheid's spatial planning policies. The landscape features sparsely vegetated dunes, often buffeted by strong south-easterly winds in the summer and occasional winter flooding (Lukas-Sithole 2020).

[1] https://www.education.gov.za/Programmes/NationalSchoolNutritionProgramme.aspx.

These townships are marked by inadequate social and recreational facilities, limited commercial and industrial centers compared to wealthier areas, and pressing challenges in food security, community development, and environmental sustainability (Fig 1).

Urban agriculture is prevalent throughout Cape Town, with a particularly notable presence in the Cape Flats region due to the municipality's proactive stance in countering food insecurity through such activities (Battersby & Marshak, 2013; Paganini, Lemke, & Raimundo, 2018). This support extends from both provincial and local governments, as well as civil society (Battersby & Marshak, 2013; Kanosvamhira 2019, 2021). Collaborative efforts involving the municipality, provincial government, and Non-governmental Organizations have been undertaken to implement food production initiatives within the city. Recognizing the need for enhanced coordination, the city devised a dedicated policy to amplify urban agriculture endeavors citywide.

The Urban Agriculture Policy (UAP) of 2007, endorsed by the Cape Town municipality, aimed to streamline coordination among its departments regarding urban agriculture, with the establishment of the Urban Agriculture Unit falling under the Directorate of Economic and Human Development. The UAP underwent revision in 2013 to deepen the comprehension of urban agriculture and underscore its multifaceted advantages (Haysom et al. 2017). Interestingly, the UAP was not officially enacted; instead, the municipality passed the Food Gardens Policy in 2013. The Food Gardens Policy is oriented towards poverty alleviation and mitigation, striving to combat food insecurity by establishing food gardens in economically disadvantaged areas (CoCT, 2013). The Western Cape Government provides funding to promote and support community farming initiatives, aiming to enhance food security within the province.

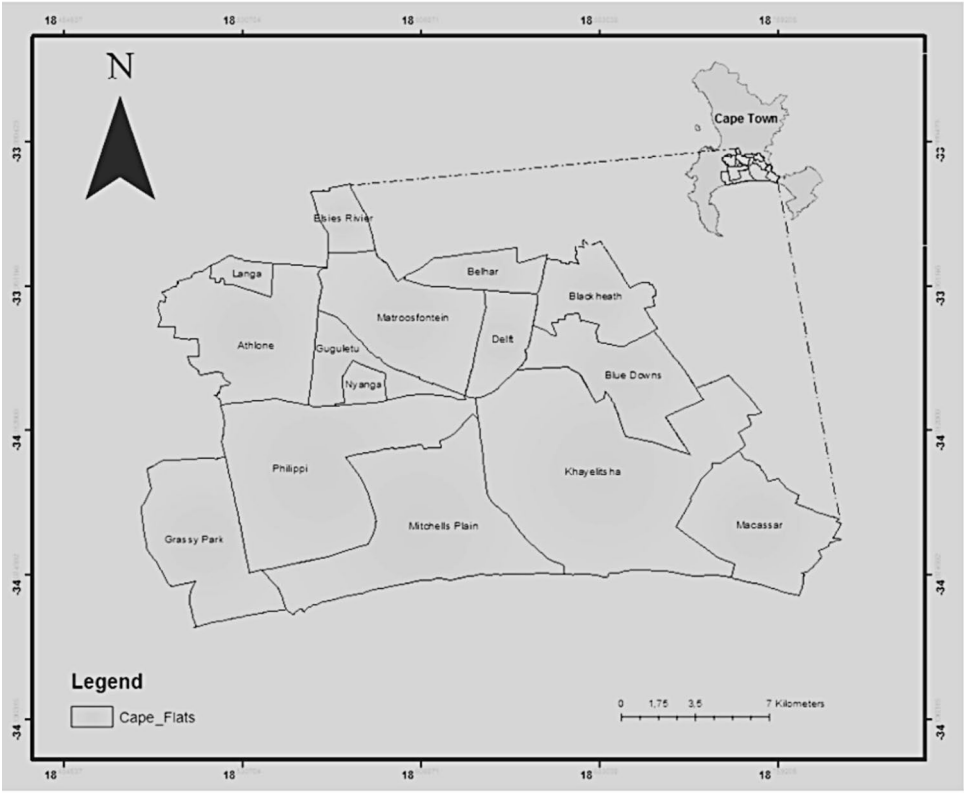

Fig. 1 Location of the Cape Flats in Cape Town

Civil society organizations play a significant role in promoting urban agriculture activities within Cape Town (Kanosvamhira 2019, 2021). These organizations encompass a diverse range, including Non-Governmental Organizations, Non-Profit Organizations, Community-Based Organizations, Activist movements, and Churches, among others. Notably, Non-Profit Organizations (NPOs) operate by leveraging donor funds to subsidize inputs, enhance infrastructure, and create market avenues for urban gardeners (Karaan & Mohamed, 1998; Olivier and Heinecken 2017b; Tembo & Louw, 2013). Dependency on donor funding renders NPOs vulnerable to challenges when faced with inconsistent or terminated funding streams. In the Cape Flats, the study's focal area, a significant proportion of urban gardeners rely on NPOs to access subsidized inputs, improved infrastructure, and market opportunities (Kanosvamhira and Tevera 2020; Paganini et al., 2018). While earlier literature reported a limited number of NPOs in the Cape Flats, the current landscape witnesses several NPOs actively supporting urban agriculture initiatives (Kanosvamhira 2019; Engel and Anja 2019). Moreover, these organizations exhibit varied objectives and operational approaches, leading to a deeper consciousness among urban gardeners that extends beyond mere food production.

Despite the engagement of multiple stakeholders, criticism has arisen due to the inadequate coordination among the supporting entities within the sector (Kanosvamhira 2019; Paganini and Lemke 2020). A primary concern is the constrained synergy resulting from conflicting interests among these various supporting organizations (Paganini and Lemke 2020). An additional aspect of contention pertains to the significant reliance of urban gardeners on civil society actors for critical resources like inputs and market access (Kanosvamhira & Tevera, 2020). As posited by Paganini and Lemke (2020), this asymmetrical power dynamic introduces challenges in establishing a sustainable food system within low-income communities. Current approximations suggest the presence of around 6,000 small-scale and micro-farmers within the Cape Flats (Paganini et al. 2021). However, specific data regarding the number of community gardens in this locale remains absent. Notably, a discernible pattern emerges, indicating that over 100 urban gardeners actively engage in cultivation within this area, predominantly utilizing school land due to challenges pertaining to property rights (Paganini et al. 2021; Kanosvamhira & Tevera, 2023).

Materials and methods

This research investigated the potential of urban school-based community gardens in distressed neighbourhoods in Cape Town, specifically in the Cape Flats region, to serve multiple functions beyond providing fresh produce. To achieve this objective, a qualitative research approach was employed to collect data between February 2020 and August 2021. The advantage of employing a qualitative research approach for data collection lies in its capacity to provide in-depth insights and nuanced understanding of complex phenomena, thereby facilitating a comprehensive exploration of the research subject.

The research relied on involved the use of semi-structured interviews to collect in-depth information from the garden representatives about the functions of the gardens and their potential to address broader urban issues. The 13 semi-structured interviews were conducted with representatives from each garden, and the questions were designed to elicit information about the challenges and opportunities associated with community gardening, including issues related to land tenure security, food and nutrition,

education, and community development. The interviews were conducted in person and lasted approximately an hour long. The semi-interviews were recorded and transcribed for analysis. The analysis involved identifying themes and patterns in the data, with a particular focus on understanding the potential of urban community gardens in distressed neighbourhoods to address broader urban challenges. The analysis aimed to identify commonalities and differences across the various gardens, highlighting the unique features and challenges of each garden.

Additionally, semi-structured interviews were conducted with state officials from the two members of City of Cape Town and two members from the Provincial Department of Agriculture, as well as one non-state organisations supporting gardens in the area, to understand their support for urban community gardens. In addition, the research relied upon garden records to collect information of general data about the gardens, such as the size of the gardening space and the number of people involved in the gardening activities.

The research was conducted in compliance with ethical and covid protocols, ensuring anonymity, data confidentiality, participant consent, and safety throughout the research[2]. Overall, the qualitative research approach used in this research provided a comprehensive understanding of the potential of urban community gardens in distressed neighbourhoods to address broader urban challenges beyond providing fresh produce. Although I am not originally from the area, my role as an academic activist with close ties to urban farmers has facilitated continuous reflection and engagement. This ongoing involvement has significantly mitigated potential biases and enhanced the depth of understanding during the semi-structured interviews. My positionality underscores my commitment to integrating both academic and local perspectives in the study.

Findings

General characteristics of the school based community gardens

Figure 2 below shows the distribution of the 13 school-based community garden sites throughout the different townships under research. The highest number of school-based community gardens is in Khayelitsha, followed by Philippi Browns Farms, Nyanga, and Gugulethu. These townships are located in the Cape Flats region, which is known for its high levels of poverty and unemployment, and food nutrition insecurity (Paganini et al. 2021a, b). The distribution of the SBCGs in the Cape Flats region indicates a concerted effort to promote food and nutrition security in areas with high levels of food insecurity.

Security of tenure and agreement types

Only one of the 13 gardens had a verbal lease agreement with a school, while the rest had formal agreements with the school. Lease agreements are typically negotiated and facilitated through the principals, with approvals from the school governing body. The agreements were generally for a period of three years with the possibility of renewal. This is important as it provides the gardeners with some degree of security of tenure, which is crucial for the long-term sustainability of the community gardens. It enables prospective gardeners to plan effectively and cultivate crops with longer growth cycles. It is also

[2] The University issued an ethical clearance certificate (Reference Number: HS19/9/2) before the data collection process commenced. Strict compliance with the ethical certificate and covid protocols ensured that issues such as anonymity of the research participants, data confidentiality, participant consent and safety of participants were upheld throughout the research.

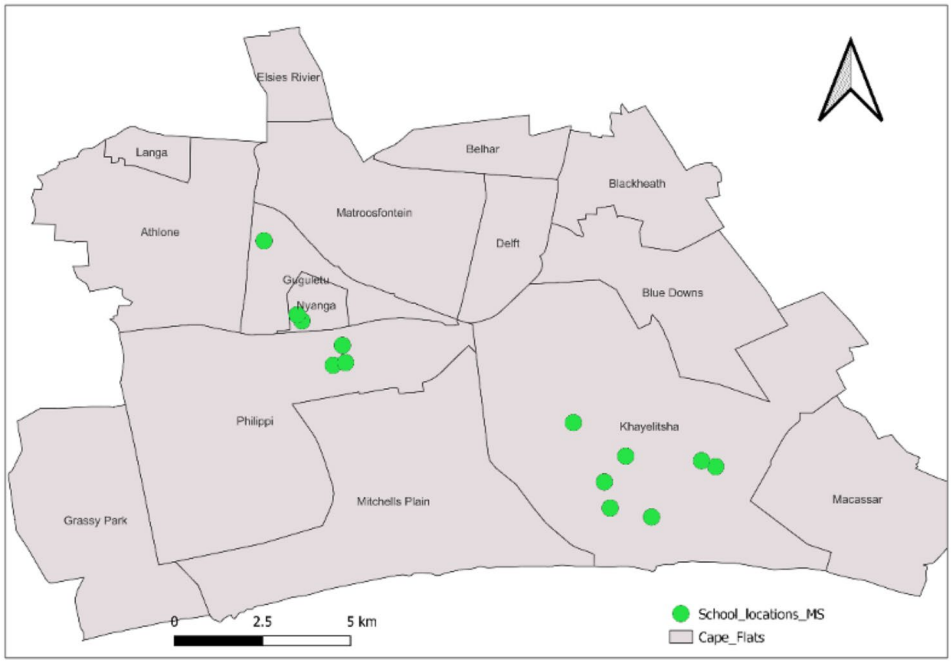

Fig. 2 The location of surveyed school based community gardens on the Cape Flats

Table 1 Showing the size of the surveyed community gardens

Garden name	Number of members	Size m^2
Garden 1	3	300
Garden 2	3	1000
Garden 3	5	300
Garden 4	3	2700
Garden 5	3	300
Garden 6	2	300
Garden 7	3	400
Garden 8	3	300
Garden 9	3	1000
Garden 10	3	300
Garden 11	3	300
Garden 12	2	300
Garden 13	2	300
Average	2.9	600

Source: Author (2023)

useful for organic farming as it allows gardeners time to build up soil health rather than using chemical fertilisers. It is also encouraging that most of the community gardens had formal agreements, as this indicates a level of recognition and support from the schools and local authorities. The informants from the City of Cape Town indicated that obtaining land for cultivation was challenging due to competing needs within the city. Hence, such arrangements provide alternative solutions to the bureaucratic processes and red tape involved in acquiring land (Table 1).

Garden size, challenges and market dynamics

The majority of the gardens sold their produce through third parties; however, the allocation of the produce varied. Typically, a portion was sent back to the school for its

feeding program, while another portion was retained by the gardeners themselves. The remainder was sold through third parties. This distribution was determined based on the garden's agreements and negotiations with the school. However, some of the gardeners themselves were aware of the challenges involved in relying on third parties to sell their produce and were looking for ways through which they could attempt to find a market for their produce. More specifically, the COVID-19 pandemic had closed their main markets, and they lost a lot of their produce. As one respondent indicated, *"The pandemic affected the gardens, especially during the first shutdown, so all markets were closed due to limited movement, and they were not selling their vegetables."* As a result some gardens were seeking of alternative ways to ensure that they could sell their produce. For instance, some of the gardens were experimenting with attempting to ensure that they could find markets for their produce directly withing their community.

The size and membership of SBCGs are crucial factors that determine the success of these initiatives in promoting food security. The research revealed that the average number of gardeners per garden was 2.9, with a range of two to five gardeners. Although some community gardens had more gardeners, most were relatively small, which limited the extent to which they could contribute to food production and distribution. The average size of the gardens was 600 m^2, with a range of 300 m^2 to 2700 m^2 (Table 1). While some urban community gardens were small, others were relatively large, but in general, most gardeners indicated that the size of the gardens was not sufficient for all their cultivation activities, particularly those who produce for market sales. This highlights the need for SBCGs to be adequately sized to meet the demand for fresh produce and allow for marketing activities to take place. In addition, the research showed that the size of the garden can impact the number of gardeners that can be accommodated, with larger gardens generally attracting more gardeners. Therefore, there is a need to consider the size of the garden when planning and implementing urban community gardens, to ensure that they are suitable for the number of gardeners and the desired cultivation activities.

Access to land and institutional support

The research findings revealed that gardeners encountered challenges when attempting to access land elsewhere. Several reasons contributed to gardeners' preference for negotiating land on school premises. One primary factor was the comparatively simplified process of securing land on school grounds in contrast to other options. However, this process is a mixed bag; sometimes the community can approach schools directly within their vicinity, but often, they are assisted by civil society organisations with whom they have previously collaborated. These organisations frequently play a crucial role in initiating the process, as they help communities secure land for gardening purposes. Thus, the process can be initiated either bottom-up from the community or through the intervention of local NGOs and civil society organisations. As expressed by one respondent, "*Obtaining land from the city is virtually impossible without an inside contact, so turning to schools is more feasible, although it still hinges on the governing body's disposition.*" Another participant highlighted the municipality's inability to allocate land due to existing claims on open spaces for housing and similar purposes, leading to project limitations. This trend suggests that the ease of acquiring land from schools might stem

from their governmental oversight and established protocols for land leasing within the communities.

Furthermore, the observations also unveiled that gardeners perceived a heightened sense of security when cultivating crops on school premises. The presence of fencing around schools in the vicinity acted as a deterrent against potential theft or vandalism, safeguarding the yield and infrastructure of the gardens. This security aspect gained significance considering the substantial time and dedication invested by gardeners in tending to their plots. Most schools in the area were equipped with boreholes, and gardeners were able to access and employ borehole water for irrigating their crops through negotiation. This resource proved indispensable, especially during periods of low rainfall in the dry season, ensuring adequate hydration for the crops.

This sentiment was underscored by a respondent who emphasized that situating their gardens within schools alleviated concerns about equipment theft or garden damage, contributing to a more worry-free environment. As part of their gardening arrangement, respondents revealed that they generally did not pay rent for the land usage. Instead, they contributed a portion of their vegetable harvest, specifically to the school's feeding program. Notably, among the 13 gardens studied, only one reported a monetary fee for utilizing the school's land. As one participant articulated, "*Following the harvest, we predominantly allocate the produce to the school feeding scheme, retaining a portion for ourselves, and any surplus is available for sale.*" The allocation of produce was typically 10% set aside for the school.

Educational and community impact

The benefits of community gardens on school property are also experienced by the host schools. The research's findings highlighted that situating community gardens within school premises offered an informal avenue for children to gain insights into agriculture and horticulture. During their leisure time, some students frequented the gardens and received hands-on education from the gardeners about the cultivated crops. These gardeners served as inspirational figures, motivating children to delve deeper into agricultural knowledge and adopt healthier eating habits. The informal educational approach facilitated by the community gardens facilitated practical and experiential learning, potentially fostering a heightened reverence for the natural environment and enhanced comprehension of sustainable agriculture's significance. One of the respondents indicated that students were generally exposed to such soil and water conservation techniques such as composting, crop rotation, and water conservation which they could possibly apply back home. This was captured in one interviewee's comment that *"…the aim is to educate the immediate community on what is the value of the garden in the community but then we achieve this by educating the youngster and even getting children involved".*

Moreover, the close proximity of the community gardens to the schools could potentially cultivate a sense of environmental and communal responsibility in children. Witnessing firsthand the dedication and hard work required for garden cultivation, students might develop a stronger connection to their surroundings and community. A participant in an interview aptly expressed this sentiment: "*Recognizing the primary school's land as an opportunity, I aimed to cultivate nutritious food and educate children about its origins, from seed to plate. Drawing upon my culinary skills, I sought to demonstrate*

food preparation and healthy consumption". However, it's important to consider that these observations come from gardeners and officials rather than the students themselves. Direct feedback from the children would provide a more accurate understanding of the gardens' impact on their environmental and communal awareness.

Volunteerism and operational challenges

Nonetheless, a prevalent challenge for urban community gardens established on school premises is the scarcity of volunteers. Despite the potential for these gardens to bridge the gap between the garden and the community, semi-structured interviews with lead gardeners revealed limited instances of volunteering from the community within these spaces. Volunteering activity was primarily confined to college students, and other community members visiting the garden often sought remuneration for their involvement. A respondent's viewpoint is encapsulated below: *"I believe around four volunteers should be consistently present in the garden, but unfortunately, they often demand compensation, which we cannot afford. It poses a challenge."* Another respondent pointed out, "*While we could have had more volunteers, the COVID-19 situation has limited their participation. We haven't received as many volunteers as we'd hoped."* These statements underscore the insufficient presence of community volunteers, often seeking compensation for their involvement, thus hindering the garden's operations. Despite this, gardeners expressed contentment with the few volunteers who did offer their assistance whenever possible, and their contributions were genuinely valued.

The research revealed several key themes concerning school-based community gardens (SBCGs) in Cape Flats townships, where these gardens play a crucial role in addressing food insecurity. The majority of SBCGs are strategically located in areas with high levels of poverty, with formal lease agreements providing gardeners with secure tenure, which is essential for long-term sustainability. Despite the benefits, challenges remain, particularly with the limited size of the gardens, which restricts their capacity for large-scale food production and market engagement. The gardens primarily sell their produce through third parties, although some is allocated to school feeding programs and retained by gardeners. Access to land is often facilitated by civil society organisations, which play a critical role in overcoming institutional barriers. Additionally, SBCGs offer informal educational opportunities for students, fostering environmental awareness, though the impact on students remains underexplored. However, the gardens face significant operational challenges, particularly the scarcity of volunteers, which affects their ability to sustain operations and maximise community involvement.

Discussion

Previous research has demonstrated that school gardens possess the capacity to yield an ample supply of vegetables, effectively meeting the nutritional requirements of school children (Schreinemachers et al. 2017; Fischer et al. 2019; Devereux et al. 2018). However, the current study reveals a crucial limitation in the context of urban community gardens in Cape Town: the size of the garden plots is often insufficient to support all cultivation activities, particularly those aimed at producing marketable crops. While urban community gardens are undeniably valuable in advancing food and nutrition security for both school children and the broader community, this limitation poses a significant challenge. In Cape Town, where the process of acquiring land for cultivation is complex

and bureaucratic (Kanosvamhira & Tevera, 2023), the use of school land presents an attractive alternative for cultivators. This symbiotic arrangement aligns with gardeners' objectives and enhances the value proposition for hosting schools. To fully realise this potential, it is essential to prioritise the allocation of cultivation land within township schools. Leasing land from the surrounding community can bolster school feeding programs due to the in-kind payments made by gardeners in the form of a portion of their harvested produce. This arrangement allows schools to receive fresh vegetables directly from the community gardens, which can then be integrated into their feeding programs, enhancing the nutritional quality of the meals provided to students. Such a system not only supports the gardeners by providing them with land for cultivation but also directly benefits the schools by ensuring a steady supply of fresh, locally-grown produce without the need for financial transactions. This mutually beneficial setup fosters a stronger connection between the schools and the surrounding community, while also addressing the food security needs of students. However, it is important to acknowledge that the effectiveness of such initiatives may be constrained by the limited space available, requiring careful planning and potentially external support to manage the labour-intensive demands of cultivation (Rich and Ardoin 2014; Burt et al. 2019).

The shortage of volunteers in school gardens, particularly in disadvantaged Cape Town neighbourhoods, emerges as a significant challenge that impedes the overall effectiveness and sustainability of these initiatives. This issue is not new; previous studies have consistently highlighted a general lack of community interest in urban agriculture activities (Rich and Ardoin 2014), which often requires gardeners and other stakeholders to invest considerable effort in rekindling enthusiasm and participation (Thornton 2008; Kanosvamhira 2023). The labour-intensive nature of gardening means that a steady and reliable volunteer workforce is crucial for the successful cultivation and maintenance of these gardens. However, interviews with garden representatives reveal that many community members who do engage with the gardens are primarily motivated by the prospect of compensation rather than a genuine commitment to volunteerism. This reliance on compensated labour, rather than volunteer-driven efforts, poses a challenge to the long-term viability of these gardens, as it increases operational costs and can undermine the community-oriented goals of such projects.

The need for volunteers extends beyond mere physical labour; it also encompasses the sharing of knowledge, skills, and a collective sense of responsibility towards the gardens. In environments where financial resources are limited, the lack of volunteerism can lead to a reliance on a small number of dedicated individuals, placing undue strain on them and limiting the gardens' potential impact. Moreover, the absence of a robust volunteer base can hinder the ability of school gardens to serve as educational tools, as the presence of knowledgeable volunteers is essential for mentoring and engaging students in meaningful ways. Addressing this challenge requires targeted strategies to cultivate a culture of volunteerism within the community, possibly through outreach programs, partnerships with local organisations, and creating more visible incentives that align with community values and needs. Only by overcoming the volunteer deficit can school gardens fully realise their potential as a resource for food security, education, and community building.

Consequently, there arises a critical imperative for schools to collaborate with potential urban gardeners seeking land for cultivation purposes. Such partnerships could

augment the pool of individuals available to contribute to garden operations, thereby bolstering the sustainability and efficacy of these endeavors. Furthermore, these collaborations could establish a foundation for cultivating stronger bonds between schools and the broader community, resulting in heightened community involvement and endorsement of school-based community gardens and related activities. To encourage community members' participation in garden-related activities, schools might consider offering incentives such as access to fresh produce. Ultimately, addressing the challenge of volunteer scarcity holds the potential to amplify the impact of SBCGs, contributing to the advancement of food security, nutritional awareness, and the visual appeal of schools within distressed neighborhoods in Cape Town.

At present, gardening is not mandatory as part of environmental education in Cape Town, which means that the learning children receive in this area is typically informal and outside of classroom time. Incorporating gardening into curricular activities could add value to children's education and provide a more dependable system for cultivating these spaces, especially in high schools across the communities. Formalizing this activity can also ensure that environmental education occurs at a more unified level. Moreover, urban community gardens can serve several other functions beyond promoting food and nutrition security especially in communities like Khayelithsa which experiences high rates of non-communicable diseases (Smit et al. 2015). These gardens can create opportunities for community building and social cohesion, and they can also have positive impacts on mental health and wellbeing. Community gardens can also promote sustainable agriculture practices, such as composting, crop rotation, and water conservation, which can help reduce the ecological impact of food production. In addition, these gardens can serve as a platform for educating the community on the benefits of healthy eating and the importance of environmental stewardship.

Urban gardeners frequently encounter the challenge of accessing markets for their produce. One common solution has been to utilize third-party intermediaries, which connect urban community gardens to markets through vegetable box schemes. However, this approach has proven to be largely unsustainable due to the departure of third parties, leaving urban gardeners in a precarious situation. Furthermore, research has demonstrated how this model exacerbates food and nutrition insecurity in townships due to the diversion of nutritious vegetables to wealthier neighborhoods (Paganini and Lemke 2020).

In light of this discourse, this paper asserts that the considerable levels of food and nutrition insecurity in townships make them viable markets for the produce. Consequently, a significant portion of the harvest should be channeled within the townships. Beyond informal sales, community gardens possess the potential to supply fresh, organic produce to local food outlets in townships, encompassing supermarkets, spaza shops, and vendors.

One approach to achieving this goal, as revealed in the findings, is through direct sales to these local food sources. This strategy offers urban gardeners a direct route to markets, obviating the need for third-party intermediaries. Direct sales to local food sources present an effective means for urban gardeners to vend their produce and gain access to otherwise challenging markets. By bypassing intermediaries, gardeners can secure a fair price for their produce and retain control over the distribution process. These direct sales could manifest in various forms, such as farmers markets and farm-to-table

restaurants. Farmers markets, for instance, enable gardeners to directly sell their produce to consumers in an interactive and convivial setting (Kanosvamhira and Tevera 2020). Farm-to-table restaurants prioritize locally sourced and seasonal ingredients, providing a platform for urban gardeners to supply their produce to chefs and restaurants that value fresh, locally cultivated food.

Direct sales not only provide a channel for urban gardeners to sell their produce but also serve to strengthen the bonds between producers and consumers, cultivating a sense of community and shared commitment to sustainable and locally procured food (Kanosvamhira 2024). By embracing direct sales as a central facet of their approach, urban gardeners can bolster local food systems, advocate for healthy dietary practices, and concurrently cultivate sustainable livelihoods. Additionally, it allows for the circulation of nutritious produce within the townships, promoting food and nutrition security in these areas. Furthermore, community gardens can also establish food cooperatives, which provide a platform for gardeners to pool their produce and sell it in bulk to local food sources. By selling their produce directly to local food sources, urban gardeners can promote food and nutrition security in townships while also achieving market access for their produce. This approach not only benefits urban gardeners but also provides a means for local food sources to access nutritious fresh produce, promoting healthy eating habits in these areas.

The concept of community gardening transcends the confines of individual gardens, forming a network of gardeners that spans entire neighborhoods. This network offers a distinctive opportunity for individuals to pool resources, share knowledge and experiences, and collaborate in addressing the demand for fresh produce. Through this communal approach, community gardeners can establish a sustainable and ecologically sound means of diminishing their dependence on third-party distributors. The collective sale of produce not only fortifies social bonds and nurtures a sense of community but also cultivates wholesome dietary habits. In this context, community gardens wield a positive influence on the local economy by furnishing locally cultivated produce to larger food establishments like supermarkets, thus bolstering local enterprises.

Furthermore, this cooperative approach engenders a platform for education and skill exchange, providing an avenue for individuals to learn about sustainable urban agriculture and the advantages of cultivating their own food. By pooling resources and sharing knowledge, community gardens contribute to enhancing food security, advocating for sustainable methodologies, and forging more resilient and cohesive communities. In essence, the interconnection and collective vending within community gardens have the potential to champion food security, foster sustainable practices, and fortify community bonds, offering a blueprint for the cultivation of urban environments that are both robust and sustainable. Overall, the amalgamation of networking and collective selling in SBCGs holds the capacity to advance food security, promote sustainable practices, and nurture more resilient communities.

The findings from the Cape Flats region illustrate the significant potential of school-based community gardens to enhance food security and educational outcomes in areas with high poverty and food insecurity. This model, which integrates gardens into school premises, provides a practical solution for land access issues and offers valuable nutritional and educational benefits. For the Global South more broadly, these insights suggest that similar approaches could be adapted to address food and nutrition challenges

in other urban contexts. The experiences from Cape Flats highlight the need for scalable solutions and effective community engagement strategies, offering a useful framework for implementing SBCGs in comparable socio-economic environments.

Conclusion

This paper delved into the untapped potential of urban school gardens as catalysts for enhancing food and nutrition security, both within educational institutions and throughout the broader community. The potential of urban school gardens in fostering food security resonates profoundly for the entire community on the Cape Flats. The vast number of schools in townships offers a unique opportunity to harness available spaces for vegetable cultivation, effectively addressing nutritional requirements. However, the formidable challenge of securing long-term property rights for gardeners has emerged as a stumbling block, particularly in the South African context. In response, a strategic solution emerges – the prioritization of cultivation land within township schools by the DoBE could be a viable. By dedicating land for this purpose, the integration of leased plots into school feeding schemes could be a transformative step forward. Furthermore, the integration of gardening into the curriculum by the DoBE stands as a powerful proposition. This approach not only ensures the sustained cultivation of these spaces but also formalizes their role within the educational framework, especially within secondary education.

The findings from this research unveil the profound potential of urban school gardens to establish a legacy in the realm of food and nutrition security. This potential, however, hinges on the establishment of robust long-term property rights and the integration of gardening into formal education. Through this synergistic approach, urban school gardens have the capacity to transcend mere horticultural spaces and assume a pivotal role in nurturing sustainable food systems and nurturing empowered communities. Notably, the lack of sufficient volunteers and capacity poses a significant challenge. Effective long-term property rights and the formal integration of gardening into the education system are crucial for ensuring the stability and impact of these initiatives. However, without addressing volunteer shortages and enhancing operational capacity, the full benefits of these gardens may remain unrealised. Thus, while the concept holds promise for advancing food security and educational outcomes, it necessitates a comprehensive approach that includes strengthening volunteer engagement and support mechanisms to overcome these operational limitations.

As the narrative of urban development in the global South evolves, these findings contribute significantly to the scholarly discourse by spotlighting the transformative role of urban school gardens in shaping healthier, more resilient, and vibrant communities. Future research in this area could delve into effective strategies for establishing long-term property rights and governance models for gardeners, investigating the impact of curriculum integration on educational outcomes, exploring the resilience and networked potential of these gardens within urban food systems and examining their role in reducing food waste and promoting a circular economy. Such research directions using various methodologies could collectively enhance our understanding of how school based urban community gardens can contribute to sustainable development, food security, and community well-being in global South cities.

Abbreviations

NSNP National School Nutrition Programme
NPOs Non-profit organisations
SBCGs School Based Community Gardens
UAP Urban Agriculture Policy

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The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available as they contain information that could compromise the privacy of research participants.

Declarations

Competing interests
None.

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