8 Sustaining Urban Food Gardens for Community Resilience: A Case Study of the Langa Agrihub, Cape Town, South Africa

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Abstract
In an era marked by compounding risks and cascading systemic failures, community-level initiatives offer important insight into adaptive responses that build resilience from the ground up. This chapter contributes to the volume's focus on decision making and risk mitigation under climate uncertainty through a case study of the Langa Agrihub in Cape Town, South Africa. Positioned within a township historically shaped by racialised spatial planning and ongoing socio-economic exclusion, the Agrihub supports a network of over 250 urban farmers comprised of more than 30 food gardens. It provides access to inputs, infrastructure, knowledge exchange, and market connections, but more importantly, serves as a platform for civic participation, social cohesion, and local agency. Although community food gardens are often promoted as food security solutions, this chapter shows that their primary value lies elsewhere: in enabling communities to mitigate and adapt to intersecting stresses including economic marginalisation, environmental degradation, and infrastructure shortcomings such as water scarcity and energy insecurity. Based on three years of participatory implementation, evaluation, and reflection, the chapter documents the Agrihub's contributions to economic livelihoods, mental and physical wellbeing, biodiversity, climate adaptation, and democratic engagement. The Langa Agrihub illustrates how decentralised, place-based interventions can generate distributed resilience and complement formal risk governance systems. It challenges traditional, technocratic approaches to adaptation by foregrounding social infrastructure, informal networks, and lived experience as central to effective decision making. In contexts of high uncertainty and constrained institutional capacity, such models offer an important corrective to top-down planning paradigms. The chapter argues that urban agriculture, when supported through embedded community infrastructure like Agrihubs, should be recognised not only as a green or food policy tool, but as a strategic mechanism for strengthening community agency and resilience in the face of climate crisis.

Introduction

Cape Town (South Africa), like other global cities, faces a severe and diverse set of shocks and stresses that create uncertainty and dynamic environments for urban actors (UN Habitat, 2022). Its resilience and vulnerability are influenced by chronic stresses triggered by poverty

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and extreme inequality (McDonald, 2008; World Bank, 2018) at a national and local level.

These issues, together with poor economic growth and resultant unemployment, limit food access. Inflation and cost of living volatility from oil price increases, global conflicts, climate change (drought and flooding) and infrastructure shortfalls (e.g. electricity outages) affect food affordability. Conflicting household spending priorities pit food against others such as school fees, transport and energy, further influencing food access. Perversely, even though South Africa and the Western Cape grow surplus food for export, food insecurity is a pernicious risk to Capetonians (City of Cape Town, 2019). On the one hand, food is available, but on the other it is unaffordable and therefore inaccessible. As an underlying stress, food insecurity creates high vulnerability and links resilience to many other shocks and stresses that will be tested in the future by greater frequency and intensity – and by polycrisis events. For these reasons, food insecurity is a key measurement of resilience and a focus area for local government intervention.

Food gardens are widely promoted across stakeholders as an intervention to promote food security, in addition to economic opportunities. In practice, however, the South African Urban Food and Farming Trust (SAUFFT) has found that urban food gardens do not make significant direct contributions to addressing food insecurity. Still, food gardens can be valuable as supplemental strategies for food growers and their households to help mitigate some of the impact. This is particularly evident when food gardens within a community are supported collectively by an Agrihub.

Further, through the social networks of food growers established and strengthened by an Agrihub, urban food gardens also help meet a range of resilience objectives at a community scale and beyond, including mitigating climate risk associated with resource-intensive commercial production by producing food locally, conserving resources through social innovations that promote sustainable consumption and production, catalysing climate and environmentally sensitive approaches (Ley, 2019) such as water-sensitive development, activating public spaces to build social cohesion and networks, facilitating participation and engagement in governance processes and strengthening social infrastructure.

The Langa Agrihub case study illustrates ways that these objectives have been met, particularly in relation to building community resilience to climate change in a way that contributes towards preparing cities for an ever-changing and unpredictable future. Further, it has demonstrated the value of food growing as part of social infrastructure, an outcome strongly supported during crisis response to the shock of the COVID-19 pandemic.

Whether 'resilience' is perceived as ecological or urban – or both – social infrastructure is an important factor, with a municipality's ability to weather a disaster found to be dependent upon the size of social networks in its neighbourhoods and on the interconnection between the social networks (Resilient Cities Network, 2023).

Context

Cape Town, South Africa's oldest and second-largest city, is located on the coast in the Western Cape Province. The city's population of 4.67 million (City of Cape Town, 2022) live in a 2461 km^2 area. Well known as a top international tourism destination, it boasts two UNESCO World Heritage sites and is responsible for 9.6% of national economic output.

Cape Town's resilience is affected and influenced by socio-economic challenges. It's economy, largely driven by finance, is also strongly influenced by agriculture. In fact, in 2021, the Western Cape agriculture, forestry and fishing sector grew by 8.9%, making it the largest contributor to the city's broader economic growth (Western Cape Government, 2022).

Despite sector growth, socio-economic issues persist. The City of Cape Town (the City) estimates unemployment at between 26% and 35% (City of Cape Town, 2023). National government further estimates that 45.9% of Capetonians live in poverty (COGTA, 2020). This is significant because of the linkage between unemployment and poverty (Ngubane *et al.*, 2023) and that between poverty and food insecurity (Battersby, 2011a). Despite 30 years

of democracy, all three continue to manifest spatially in South African cities.

A 2021 national food security survey found that food inflation and rising living costs also negatively impact food access, and agency. It found that 15% of South African households have inadequate food access and 6% have severely inadequate access. The bulk of these households are in Johannesburg and in Cape Town, where 12.4% of households with children aged 5 years or younger reported experiencing hunger (StatsSA, 2023).

It follows that socio-economic factors underpin vulnerability and influence resilience to shocks and stresses, including drought, flooding and pandemics.

The 2015–2018 Western Cape drought, referred to as 'Day Zero', was caused by low rainfall across all Western Cape Water Supply System (WCWSS) catchments. Water availability for households and businesses, including food growers and producers, was severely constrained. Small businesses and poorer households who could not afford alternative water options such as boreholes were most negatively affected.

The 2020–2022 COVID-19 pandemic shone a bright light on food insecurity and the role of the informal food economy – including community kitchens, hawkers, spaza shops (informal, micro-convenience shops) and food gardens. Pre-pandemic, 80% of Cape Town's low-income households used the informal food economy to access food (Battersby, 2011b). Initial lockdown regulations in South Africa prohibited informal food trade (Skinner and Haysom, 2020). This prevented food access for households and curtailed traders' income causing food insecurity. Despite regulation changes that permitted food trading (and benefitted traders), food insecurity became a major crisis.

The scale and type of humanitarian response during the pandemic was unparalleled compared to other major shocks. Non-governmental organisations (NGOs) and community networks (including farmers) embedded in communities became critical for finding funding and providing humanitarian relief in partnership with governments, NGOs, community groups and international donors (South African Food and Farming Trust, 2020). At this time, the contribution of farmers was elevated, noting that 'farmers' also refers to 'growers', food growers', 'food gardeners' and 'market gardeners'.

During 2023, flooding caused significant crop and infrastructure damage in rural areas and to homes and livelihoods in urban areas, including Cape Town. Flooding is, however, not unusual in Cape Town. Poor spatial planning and urban stormwater management combine with natural groundwater fluctuations causing flooding and flood exposure. Informal settlements and farmers are often located in flood risk areas, where they also experience extreme heat days and heatwaves (de Wit *et al.*, 2023).

Governance shortcomings in policy, planning, strategy and accountability emerged during the management of these climate-related shocks and are apparent in other basic service sectors, such as electricity. Poor governance allowed the 'capture' of South Africa's national electricity utility in 2008. This enabled high levels of corruption and theft, affecting maintenance and infrastructure development that left the utility unable to provide sufficient electricity to meet the country's full demand (Daniels, 2023).

Supply was managed using planned outages, known locally as load-shedding. Load-shedding escalated and, in 2023, Capetonians experienced it on 335 days. Estimates in 2022 suggest resultant gross domestic product (GDP) contraction of between 2 and 3% (World Bank, 2023). In addition to job losses and reduced income, load-shedding and the prohibitive cost of energy alternatives has changed household food-related choices towards foods that require little or no cooking or refrigeration. These foods are often unhealthy, processed or ultra-processed (Haysom and Pulker, 2023).

As demonstrated, shocks and stresses significantly affect socio-economic factors that create new and exacerbate existing vulnerability to climate and infrastructure-related shocks and stresses – including food insecurity.

The City's policy response to food insecurity is twofold. On the one hand, it is addressed in the Resilience Strategy (2019) (the Strategy; City of Cape Town, 2019), and on the other, via the Climate Change Strategy (City of Cape Town, 2021a) and Climate Change Action Plan (City of Cape Town, 2021b).

The consolidation of food systems and climate change within one department, the Risk and Resilience Department, makes possible the important shift from understanding urban agriculture as a strategy for promoting food security (which is ineffective) to understanding it as a strategy for climate change mitigation and adaptation, which the UN considers 'a necessary response' and key strategy (FAO *et al.*, 2020).

As per the Resilience Strategy, a Food Systems Programme (the Programme) was developed using a food systems approach. It takes cognisance of these research findings: (i) food gardens do not produce enough food for household food security, and (ii) they do not generate enough food-growing income to transition out of poverty. These findings are contradictory to the City's Urban Agriculture Policy (City of Cape Town, 2014) and the Food Gardens Policy in Support of Poverty Alleviation and Reduction (City of Cape Town, 2013). These policies are not embedded within a City department and consequently have not been implemented for some time. Other policies, such as the Green Infrastructure Programme, consider food gardens more broadly as part of a 'green' network. The latter aligns with the Programme's approach that recognises food gardens' value in providing dietary diversity and fresh produce, in addition to heat adaptation, groundwater management, social cohesion and social infrastructure for community resilience.

Non-government actors, including civil society organisations and NGOs such as SAUFFT, play important roles supporting government. SAUFFT is based in Cape Town and works both independently and in partnership with the City to strengthen urban communities' resilience through food and farming.

SAUFFT's journey commenced in 2012 with the establishment and management of the Oranjezicht City Farm, a non-profit community food garden (South African Food and Farming Trust, 2019). The farm demonstrates the green infrastructure potential of food gardens and is a model of how community food gardens can positively impact the lives of their farmers and the surrounding community (International Civil Society Centre, 2020) including through social cohesion, human presence in places, healthy natural systems, collective agency, nutrition and food security.

SAUFFT and other NGOs have stepped into the City's food gardens policy and organisational vacuum. Success includes training 5000 farmers in poor communities, with hundreds of community food gardens (Paganini *et al.*, 2019) evincing interest through ongoing activity. While these food gardens have the potential to contribute to the resilience of their communities, there is a high attrition rate, particularly in under-resourced and vulnerable communities like Langa, the study area for this chapter. A food garden's range of influence is further limited to its immediate neighbourhood and does not reach a community scale.

Provincial strategic work in 2017 first focused on rural smallholder farmer-focused Agrihubs (Southern Africa Food Lab, 2017) and secondly explored the relevance of Agrihubs for their urban, informal food garden context (South African Food and Farming Trust, 2019). The emergent Agrihub concept addressed limiting issues by providing an infrastructure-based facility, with a farmer-centred, farmer-led cooperative network for innovation.

The outcome of the exploration was the separation of the roles of Agrihubs and food hubs into different but supporting roles. An Agrihub primarily supports the 'farming' or production aspects of farming, whereas food hubs primarily support the 'marketing' or sales and distribution aspects (Table 8.1).

The Agrihub approach (Table 8.2) has five objectives and promotes a farmer-centred approach based on farmer agency. It leverages off farmer collaboration and cohesion, forming a focal point for their needs within a geographic area.

By supporting urban farmers, particularly non-commercial or informal farmers, Agrihubs help with household and community resilience to shocks and stresses. The farmers participating in the Agrihub form a network that provides benefits beyond the more transactional functions supporting food production. This social infrastructure at a community scale plays a pivotal role in building multi-dimensional resilience and providing support during crises. However, government does not recognise the role of food gardens as social infrastructure, or their contributions to resilience and crisis response. Agrihubs play a potentially catalytic role in unlocking the value of food gardening

Table 8.1. Functions of an Agrihub compared to a food hub. Based on Southern Africa Food Lab, 2017.

Agri-food hub function								
Agrihub					Food hub			
Foster knowledge generation & innovation	Input services	Value addition for farmers	Coordination: Market agent function	Coordination: Aggregation, distribution & marketing	Better market partnerships	Assistance to meet buyer requirements	Branding & marketing strategies	
Share best local practices in farming	Nursery, Extension support, Tool hire, Farming inputs	Sorting facilities, Pack houses, Processing infrastructure	Availability and order fulfilment to assist with market access	Locally produced foods from multiple producers to multiple markets	Working with producers as business partners instead of suppliers	Providing technical assistance or assistance or finding partners to provide it	Identity preservation, group branding, specialty product attributes, certifications, price assurance for producers	

Table 8.2. Agrihub objectives. Author's own table.

Objective	Rationale
To create increased economic opportunity for local farmers in under-resourced communities	• Reliable, accessible, affordable inputs → lower cost, higher yield • Improved knowledge and skills for food growing and access to further learning → improved efficiency and reduced risk/losses • Improved market access → more predictable, higher income • Reduced risk → increased investment → increased yield/ improved quality → increased income/margins
To create improved local access for community members to healthier food choices	• Shorter time from harvest, harvested riper (local transport only) → more nutritious • Less waste risk → easier to keep in stock for local retailers and local restaurant use • Local production → consumer knowledge and trust • More community members growing their own food for personal/household consumption
To increase economic opportunity and improved livelihoods for community members and local businesses	• More resources (locally grown produce, organic waste) • Market access (local) – knowledge, support, market needs, trust • Recirculation of locally spent money • Local livelihood opportunities in the food economy
To increase the agency of community members to shape their local food economy	• Choose locally produced food, bought locally • Choose to 'import' food when necessary, from 'good' sources (regeneratively farmed, local/peri-urban/regional, direct from farmers or farmer cooperatives, etc.) • Engage in entrepreneurial opportunities (informal and formal) • Collective governance
To establish a sustainable, self-governing, independently operating Agrihub	• No dependency on outside funders and resources • Members determine priorities → relevant and valued • Local governance → greater accountability to local community

by providing support and services, which aligns with and complements local government's efforts to improve resilience.

This case study will take a deeper look at the ways an Agrihub has done this in practice, based on three years of establishment and operations. The first Agrihub was launched in the community of Langa as a pilot to (1) support a network of existing community food gardens and (2) test emerging theories and assumptions as informed by experience from the Oranjezicht City Farm (and others) and from the pandemic. While three additional Agrihubs have since been established in Cape Town, the outcomes of the Langa pilot are central to determining the potential of Agrihubs to further build and support community resilience in Cape Town as well as inform future policy.

This chapter proceeds with the Langa Agrihub Case Study, followed by challenges, outcomes and business case, before concluding.

Case Study: Langa Agrihub

The Langa Agrihub is in Langa, Cape Town's oldest formal township, which was established under the Native (Urban Areas) Act of 1923. Through the Act, black South Africans were segregated into designated locations. This isolated them from the broader economy and created labour reservoirs for menial work in white-owned industries and white households (Teagle and Sanchez, 2023). Today, Langa is still home to predominantly black African, Xhosa-speakers (StatsSA, 2013), most of

Fig. 8.1. Map of food gardens in Langa (green place markers) with location of Agrihub (red circle). Base image source Google Earth 2024.

whom maintain socio-cultural links to traditional Xhosa areas in the Eastern Cape province which remain predominantly rural villages with subsistence farming practised extensively.

Langa's residents face numerous persistent day-to-day challenges. These include low average monthly household income, estimated (January 2024) to be R2144, with 72% living below the poverty line and 51% of residents reporting that they have insufficient food to eat. Approximately 40% are unemployed and just 7% of residents have completed secondary education (Pulker, 2016). Across Langa, high levels of violence, crime and social unrest are experienced (Mzamo, 2013), with the effects on young residents in particular linked to high levels of protest and unrest in the community (Nleya *et al.*, 2011).

The Langa Agrihub (the Agrihub) is centrally located on Lerotholi Street (Fig. 8.1). The land is leased from the owner, the Red Cross Society, by the Masakhe Foundation, a non-profit local community development organisation. The lease is for 10 years and the leased portion measures 20 × 30 m. It forms part of a precinct that includes a community hall (separately managed by the Red Cross Society), food garden, art gallery and coffee shop.

In early 2019, SAUFFT began to work with a food garden in Langa. During this time, it expanded the food garden network by reaching out to other organisations supporting growing sites, as well as several independent food gardens. The pandemic, however, interrupted progress, but by March 2022, the network had 23 members (University of Cape Town, 2022). Through networks established during the pandemic, SAUFFT sourced international funding for the Agrihub implementation, alongside provincial government funding for infrastructure, enabling construction to commence as lockdown restrictions eased at the start of 2022. The success of the approach has included the selection of a SAUFFT team who understand the cultural and social context. It follows that the team are qualified farmers, mostly black African, and first-language Xhosa speakers.

Farmer collective

A group of 107 farmers from 23 community food gardens located in Langa established the farmer collective. Active recruitment and

promotion in the community was via a two-day Open Day series of meetings and site visits hosted by SAUFFT and the farmers. It included a display of photos and maps and information about how people could get involved, what the expected benefits would be and contact details. The original farmer cohort grew to 273 farmers from 34 farms by the end of November 2023, in response to the Open Day and other promotional activities. The current cohort represents over 1% of the households in Langa, marking a 48% increase in farms and a 155% increase in farmers.

Economic aspects were prioritised because farmers were already spending money on inputs, and the Agrihub could supply their needs more conveniently, cheaply and at higher quality (Chamberland, 2022). Beyond providing practical value to farmers, the Agrihub needed a sustainable business model not reliant on volunteering or donations. Knowledge exchanges, extension services, access to tools, access to market and other benefits enhanced the value to the farmers. The approach centred the agency on the farmers themselves (e.g. Battersby and Marshak, 2013; Paganini *et al.*, 2019), who drew from experience informed by participation in church groups, street committees, savings groups and other collective social structures, and resulted in the decision to form a steering committee. The steering committee, elected from collective members, is responsible for directing operations and governance.

With a farmer collective directing operations and controlling governance, the tension between Agrihub needs and individual farmer can be managed by the farmers themselves, reducing the risk of it being run as a for-profit business (including concerns raised in Tornaghi and Dehaene, 2020) or of SAUFFT becoming a gatekeeper. The initial appeal was financial and transactional around inputs, but the ultimate benefit comes from the combination of all the products and services, which, together, strengthen the food gardens' resilience.

Establishment

In 2020, a food garden and Agrihub landscape masterplan and vision were developed with the farmers. Its purpose was to illustrate a collective vision that imagines a beautiful and functional space, while also guiding development and attracting potential investors.

The Agrihub layout (Fig. 8.2) draws from the original landscape masterplan. It is a U-shaped arrangement of small structures around a multipurpose central courtyard, including dry storage (A), a facilities control room (B), an office (C), cold storage (D), a kitchen (E) and an ablution block with shower (F). Initial infrastructure improvements provided a well point, pump, storage tanks and (temporary) chemical toilets. In 2023, the site was cleared, compacted and levelled and a perimeter fence and gates installed along with a security camera system.

During construction, activities were enabled using temporary infrastructure such as shade structures, tables and a refrigerated trailer. In this way, it was possible to host promotional 'pop-up' market days to build the customer base. Paying and non-paying customers included local restaurants, informal street traders, informal spaza shops, shops, caterers, feeding scheme coordinators, community kitchens and food retailers. Even though the infrastructure was incomplete during construction, it was still possible to host farmer training workshops and to receive and distribute bulk inputs.

Current status

All buildings were externally complete in early 2024. The cold store and kitchen internal fit-outs were nearing completion, but all others were complete, allowing Agrihub activities to take place as planned. The current focus is on regularising day-to-day operations and completing the implementation of secondary infrastructure such as seedling tunnels and irrigation (Fig. 8.3).

Existing funding will sustain SAUFFT's support of the Agrihub's development for at least another 2 years. They will help the steering committee towards governance and management independence, help Agrihub operations become financially self-sustaining and strengthen the knowledge and skills within the farmer network.

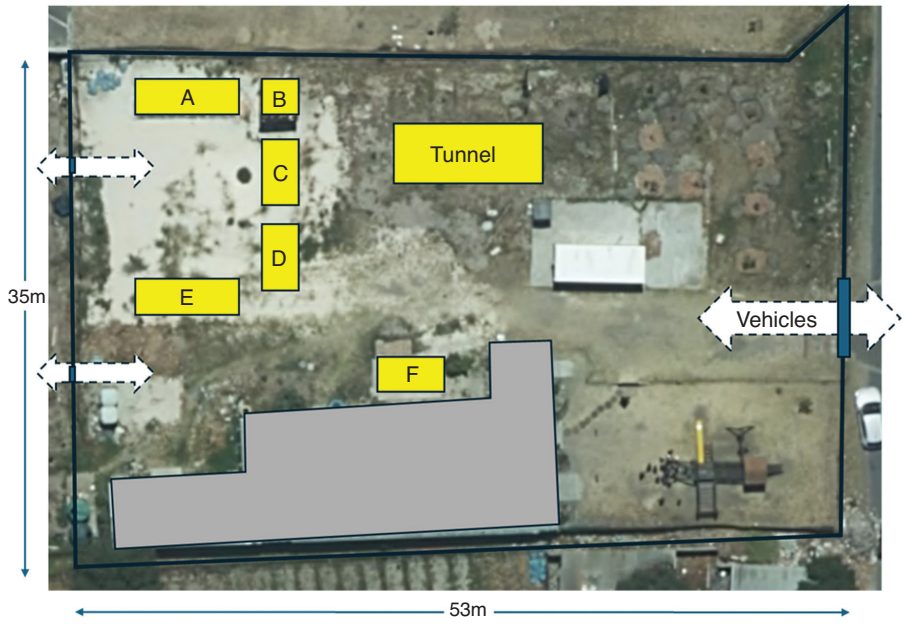

Fig. 8.2. Agrihub layout (2022 aerial photograph base layer). From Leslie, 2023.

Fig. 8.3. Photo of Langa Agrihub from the east (September 2024). Author's own image.

(Further details on the business model are provided below.)

In August 2023, SAUFFT commissioned an external evaluation of the Agrihub to assess if the implementation was meeting the needs of farmers, and to support evidence-based decision making to improve programme delivery. Focus groups from seven food gardens participated in the evaluation process, which includes surveys, interviews and focus group discussions (Leslie, 2023).

Key survey results:

- More than 87% of respondents claimed to be getting more money from their food garden.
- 87% of farmers ($n = 26$) perceived increased yields since receiving support.

- 93% of farmers (n = 28) perceived that support had improved their food garden's performance.
- 78% of farmers who received products (n = 21) said that Agrihub products were better than those supplied by other places.
- 60% of surveyed farmers (n =18) stated that their food garden is performing well enough to meet their goals.
- Average farmer rating of the Langa Agrihub was 7.2 out of 10 (SD ± 2, n = 30).
- 100% of respondents said that they would recommend food gardens to other urban farmers.

The following two sections – challenges and outcomes – articulate key points from the evaluation report.

Challenges

Challenges are contextualised within the broader context of shocks and stresses experienced by Cape Town residents, as well as those specific to Langa. These are over and above the challenges of being a farmer in a vulnerable, under-resourced community.

Farmers identified dumping, relationships, communication with Langa Agrihub, insufficient extension training, poor soil quality, lack of tools, cultivation and water challenges, lack of soil inputs, infrastructure challenges, theft in food gardens, lack of seedlings, lack of space and market access as challenges (Fig. 8.4).

While the extent of challenges varied across food gardens, all respondents believed that the Agrihub could support their food gardens better (Leslie, 2023). Agrihub operation and communication across the network of farmers, particularly between farmers and the steering committee, were specific areas identified for improvement.

The external evaluation was supported by internal evaluation by the SAUFFT team, who practise reflective learning by capturing challenges and lessons learned in learning briefs for quarterly project reports. These include challenges not uncommon to NGO development work in vulnerable communities and those associated with working at nature's pace according to seasonal and annual cycles.

Outcomes

This section discusses outcomes thematically and draws on the evaluation report as well as observations and data collected by SAUFFT fieldworkers through formal and informal interviews with farmers, analyses by researchers, engagements with partners and other stakeholders, amongst others. SAUFFT and the Agrihub steering committee use these data to gain a diversity of insights and perspectives on how the project is effecting changes in the lives of the farmers and the community of Langa, as well as how the project is achieving its stated goals.

Economic well-being

Levels of benefit derived from the Agrihub were measured at a farmer, household, food garden and community level.

> Ohh yes, [the Agrihub] definitely worked for me because I was just farming. So, the money was coming very slow. But now at the market [day], I gain a lot which helps me to even buy food at home, and even buy a T-shirt for myself. (Langa Agrihub farmer)

Farmers have accessed cheaper inputs and markets, and generated income (Leslie, 2023). SAUFFT fieldworkers estimate that the out-of-pocket costs of inputs (seeds, seedlings, compost and manure) are 67% lower on average. In addition, there is a cash return on inputs of approximately R10 for every R1 invested.

Despite these favourable returns, delays in planting seedlings cause them to perish if not planted within 2 weeks. Consequently, 51.2% of available seedlings are not harvested, reducing yields and contributing towards a 'harvest gap'. Pests, theft and poor cultivation methods are other issues that affect harvest success. It follows that addressing these issues could increase harvests by roughly half.

Even with the harvest gap, the 54% of farmers who sell their harvest through the Agrihub have seen the value of their harvest increase by 38.9% on average. The price received when sold through the Agrihub is 217% higher than if they sold independently to neighbours, local business or community

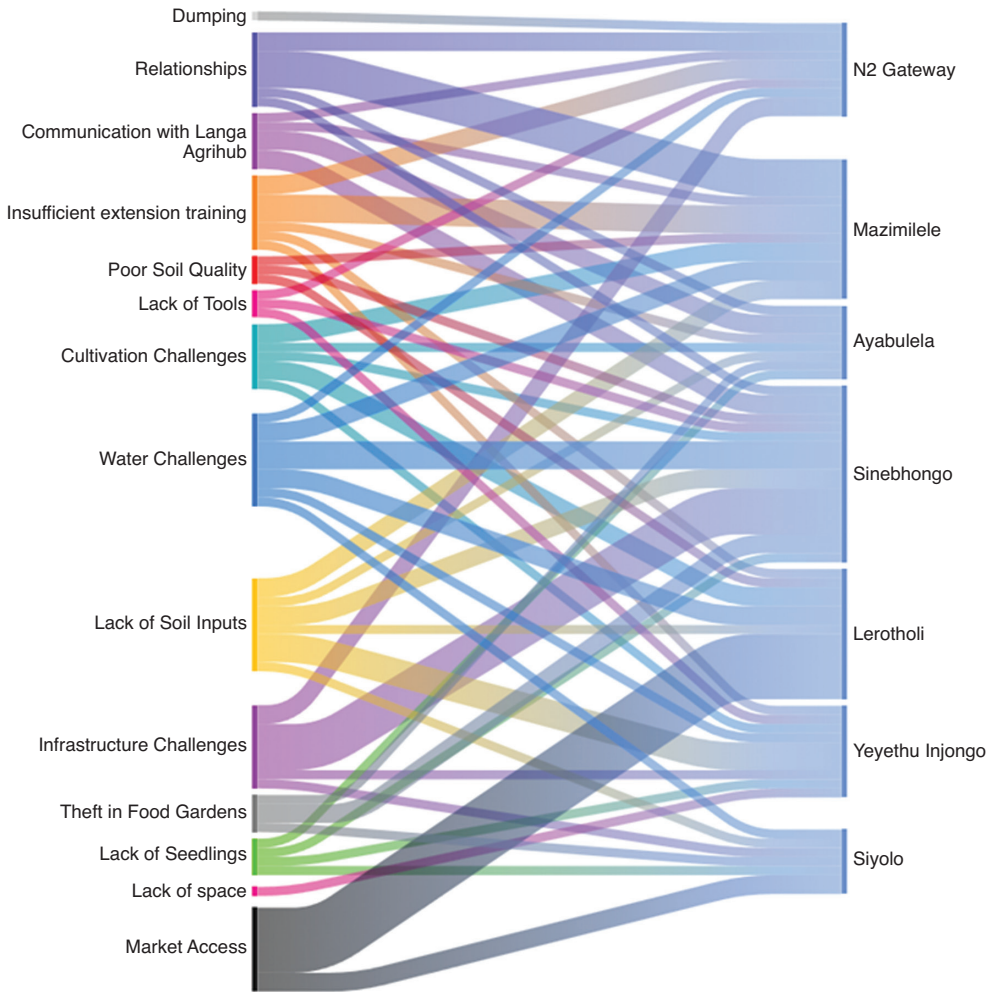

Fig. 8.4. Langa Agrihub challenges (left) identified by the farmers at each of the surveyed collective food gardens (right). Note: The width of the connecting lines indicates the amount of relevant information shared, not the significance of the information. From Leslie, 2023.

kitchens. The average harvest value per active farmer per month is R510, while the cash income is R119. The additional income represents 23.7% more to a farmer's household in a combination of savings on food expenses and cash income.

Other ways that harvests are directed are own consumption or household processing, donation to others, donation to community kitchens and school feeding schemes, and/or independent sales.

Social well-being

Urrego Diaz *et al.* (2025) found that even though farming is a means to many ends, it is mainly a coping strategy or mechanism with social benefits related to local challenges such as food price increases on the one hand, and general issues such as the COVID-19 pandemic and climate change on the other. Social wellbeing is nurtured through Agrihub activities, including the steering committee, workshops and site

visits. These activities promote connecting and sharing between farmers with common interests that may be related to successful production, identifying trustworthy neighbours or developing new collectively beneficial initiatives such as a seedling garden.

In this way, farmer social networks have been built around the Agrihub. Community cohesion and resilience is measured in part by knowing your neighbours' names (Arup, 2023). The social networks developed around the Agrihub contribute towards these objectives and provide coping mechanisms for local challenges, such as food access that is improved by enabling optimal farming through the supply of affordable inputs that results in affordable produce and thereby improves access. Optimised farming also increases production outputs and enables greater potential farmer support of community events, e.g. funerals, by contributing meals cooked from self-grown produce (Leslie, 2023).

Farmers who live a distance from their farms have by necessity become acquainted with the neighbours living adjacent to their farms to solicit their oversight, illustrating how the networks built to support food gardens have resulted in positive interactions and outcomes for farmers (Heming and Mgcoyi, 2022) that also promote social wellbeing. Farmers have also noted shifts in community perspectives on gender norms (Heming, 2022).

Physical and mental health

Farmers recognise the diverse physical and mental health benefits associated with farming. A more nutritious diet with vegetables, and reconnecting with indigenous practices and herbal medicine (Urrego Diaz *et al.*, 2025) are a few that they have identified. Ablutions and showers at the Agrihub also help with physical hygiene while providing comfort and dignity.

Growing food makes farmers feel hopeful because of the potential income and improved health. The farmers have identified a wide range of other associated mental health benefits, from coping with isolation and stress (Urrego Diaz *et al.*, 2025), brain fog, fatigue and memory loss (Landsman, 2023) to managing depression and anxiety (Heming, 2022).

The Agrihub also has mental health benefits. Participation in steering committee meetings and planning discussions has been found to reduce farmers' sense of isolation, as has having their concerns heard and advice sought. Older farmers expressed hope for the future, emanating from the belief that the Agrihub will continue and attract young farmers (Leslie, 2023).

Safety

Langa experiences high levels of violence, crime and social unrest (StatsSA, 2013) that cause personal and farm safety concerns. Incidents, typically theft, attempted theft or damage to farm property, usually occur at night when farmers are absent. Produce and seedling theft occurs, but is less of an issue than infrastructure and materials (electrical wires, pumps, metal tools, sections of fencing, etc.) theft.

The Agrihub, in contrast to most of the food gardens that have limited security, is secured with a 2.1 m high perimeter fence and gates that provide security and access control. A security system was also installed with cameras to monitor the perimeter and an alarm system for deterrence and activation of a security response. These were installed and a security company appointed after a major theft of building materials in a targeted incident. Farmers further mitigate the risk of theft by storing expensive tools in a secure tool 'library' where they can be 'checked out' and 'in', because even though theft from farms is uncommon, in a resource-scarce context, damage to small items, like an irrigation pipe fitting, can cause substantial problems.

Because daytime personal safety is less of an issue, farmers feel comfortable bringing children, grandchildren, friends and visitors to their farms without concern, including welcoming visits from school groups. When more structured events are organised, such as large groups of visitors, the local 'Langa Safety Forum' monitors are engaged. The forum provides security through their presence, which signals to the community that the visitors have taken care to come to Langa in a respectful way that also brings some form of benefit to them.

Civic engagement

Langa Agrihub's network of more than 250 farmers recently linked with other Agrihubs that include hundreds more farmers. Through these interactions, many have started to understand themselves as being part of a collective, and that this can manifest in a collective voice for the farmers, which could speak, and even advocate, on their behalf. This shift in self-understanding is consistent with research indicating that the Agrihub has decreased barriers and increased opportunities for farmers, thus increasing their 'aspirational window' and, as a result, their capacity to aspire (Chamberland, 2022), and in contrast to a former reluctance to participate due to negative experiences with government, including local government.

The farmers' first exercise using their Agrihub-enabled voice was spurred by an opportunity to comment on the City's revised Urban Design Policy, which was available as part of the public participation process. SAUFFT mobilised the farmers and hosted a workshop to assist in understanding the policy process and the document (which was not available in their home language). Farmers' inputs and comments were gathered and consolidated into a document that was submitted to the City. Apparent through this process was the farmers' developing self-awareness within the regulatory and conceptual landscape that they could challenge key foundational concepts including the role of policy and of representation during the policy development process itself, even before it is circulated for public participation.

Growing interest, among some of the farmers at least, in engaging more actively in these previously inaccessible civic processes has extended to engagement in an upcoming Environmental Management Strategy review process.

As the other Agrihubs develop and link together in a larger collective, it may be that they become a centre for the voice for urban farmers in Cape Town that grows with confidence to speak to their own interests, both within official processes, and in contesting or subverting them. This outcome is consistent with Dehaene *et al.* (2016), who argue that urban agriculture can create localised seedbeds for an 'insurgent form of social change'.

Urban green spaces

The Agrihub farms comprise a total area of 10,605 m^2. Of this, 4083 m^2 is under productive cultivation and 1032 m^2 is planted borders. The balance is working space, paths and non-productive land. The planted area of the farms comprises 0.35% of the total area of Langa. It is distributed throughout the community, providing tended pockets of green such that nearly all Langa residents are within 250 m of one or more. Since the establishment of the Agrihub, it is estimated that green space has increased by 2600 m^2, which is roughly 25%.

The increase in green space access is significant because of the positive affect green space has on human health and wellbeing (Hartig *et al.*, 2014). Increasing green spaces in vulnerable and under-resourced communities like Langa therefore has the potential to reduce the inequality of health outcomes (Allen and Balfour, 2014).

Further, activated urban green spaces provide 'eyes on the street' that improve community safety. They also secure properties for food growing, protecting them from illegal dumping, informal settlement and the loss of public or other open space needed for ecosystem services.

Climate adaptation and mitigation

Both food gardens and Agrihubs, via localised food growing and supply, play roles in climate adaptation and mitigation. Adaptation benefits of food gardens include cooling; groundwater recharge and reduced flood risk; and soil biodiversity contributing towards mitigation. Agrihubs, on the other hand, can play a role in adaptation as cooling hubs, whereas mitigation can be achieved through lower carbon emissions as a result of shorter value chains and eliminating use of imported oil-based fertilizers.

City policy broadly promotes urban 'greening' and, in particular, the planting of trees for heat adaptation, as trees have a cooling effect via transpiration and irrigation that cools the earth around them. Food gardens usually have limited shade and seek to maximise sunlight for crop production. This is true for most of the Langa farms that are structured into beds for row crops and perennial herbs and enclosed with perimeter

shrub windbreaks. Other factors that contribute to low tree-planting levels in food gardens include high wind exposure that stunts growth, the preference for annuals that have a shorter investment period and low tree cultivation knowledge. Productive trees have, however, been planted at the Agrihub for demonstration and for workshops to improve tree-growing knowledge and contribute towards increasing the urban forest.

While the City's Heat Action Plan promotes 'greening' on the one hand, it also promotes cooling centres, particularly for areas where trees are difficult to grow and there are high levels of social vulnerability. The concurrent availability at the Agrihub of a support network, skilled and motivated growers, water, shade and greenery make it well-suited for this function. The central location within Langa and the farmer collective further enhance this potential role. SAUFFT have initiated conversations with farmers and will be piloting a 'cooling station' at the Agrihub in 2025, with the potential to expand to other farm sites in the community.

Biodiversity and soil biodiversity

The Agrihub actively promotes biodiversity through workshops and knowledge exchanges held across 25 gardens. In addition, 2200 medicinal and culinary plants from 10 species, six indigenous to the Cape Floristic Region, were planted at the Agrihub. The importance of biodiversity for food growing and beautification has resonated with the farmers. Of the 15 farms where biodiversity gardens were established, 12 continue to be maintained for this purpose, illustrating the normalisation of biodiversity within food gardens (South African Food and Farming Trust, 2022).

Soil biodiversity also plays an important role in addressing global climate change. It contributes to the reduction of greenhouse gas emissions and to absorbing carbon and fixing nitrogen from the atmosphere into soils. It is typically associated with the maintenance and enhancement of above-ground biodiversity, in addition to reducing threats to ecosystem services and bioremediating contaminated soils (FAO *et al.,* 2020). This is an important consideration in urban contexts where soils are frequently exposed to contaminants, such as Langa, where issues such as illegal dumping and sewer leaks are common.

Environmental quality

Green spaces have the potential to improve soil and groundwater quality as well as stabilise sandy soil.

The soil at the farms in Langa have low levels of organic material and elevated salinity. This has been improved by removing rubble and other material, watering the soil to sustain and stimulate naturally occurring and dormant microbial biodiversity and adding compost, vermicompost, manure, mulch and wood chips to increase the organic matter in the soil.

Some of the added compost used in the Agrihub farms was sourced from a City compost pilot focused on determining optimal ways to divert food waste generated by fresh produce traders away from landfill to compost. The Agrihub provided training for the compost makers on behalf of the City. Other services provided included quality assurance and coordination and distribution to farmers (South African Food and Farming Trust, 2022).

Farmers in Langa commonly irrigate using groundwater from well points. The high water table (less than 30 m deep) makes groundwater relatively accessible, but it also exposes it to contamination. Farmers have a direct interest in water quality and availability and consequently play an important management role in reporting issues to the Agrihub or City, in addition to their farming activities that support groundwater recharge.

Another environmental hazard urban agriculture has been shown to mitigate is air pollution. Research indicates that air pollutants contribute to rising temperatures and heatwaves that cause heat stress and deaths from heart attacks or strokes (WHO, 2015), especially among elderly people and those with non-communicable diseases (Kenny *et al.*, 2010). Mitku *et al.* (2023) also found that exposure to particulate matter that is 2.5 μm or less in diameter and sulphur dioxide pollution adversely affects birth outcomes. Gardens improve air quality and thereby play a role in mitigating these risks.

Community resilience

Urrego Diaz *et al.* (2025) found that the Agrihub has created a continuous platform to drive more systematic interaction for knowledge management and exchange that help farmers to cope with crises. For example, farmers were able to support one another during a week-long public transportation strike by minibus taxi operators. The strike was violent and included sporadic acts of vandalism and crime. Langa residents were unable to travel to work or school, or to access health care outside the community. The strike also disrupted logistics more broadly, including deliveries of food, medicine and other essentials (Hirsch, 2023). As scarcity of food and risks of violence increased, farmers exchanged information in person and through WhatsApp groups across the community. Through these communications, they were able to share food and help keep safe.

Business Case

The financial sustainability of the Agrihub is predicated on the capital and establishment costs being paid by donor funding, and the ongoing operating costs being proportional to the level of usage by the farmers, meaning that the passive operating costs are minimised when not in use. This is accomplished through infrastructure design, such as electricity from solar panels, water from a well point, insulation and natural ventilation in structures, and more. Repair and maintenance costs are similarly minimised by requiring only materials, skills and tools that are widely available locally. When the site is used, the associated costs are known to the steering committee, which makes the decisions regarding how much money the participating farmers need to contribute, either in terms of mark-up on inputs sold to farmers, or in terms of a proportion of income from produce sales that is retained by the Agrihub before paying out the farmers. Farmers commit to supporting the financial sustainability of the Agrihub when they join.

The Langa Agrihub is one of four that have been established in an ecosystem where each has its own specialisation based on its local context and strengths, which simultaneously contributes to the others. The Agrihub in the community of Khayelitsha has emerged as the most commercially focused, and more productive and financially motivated farmers who may be based in Langa are choosing to supply their produce to the Khayelitsha Agrihub to access markets that are larger and more frequent buyers like restaurant chains, hotels, small food production businesses and others. The Langa Agrihub's markets, by comparison, are less frequent and more locally focused. However, Langa is seeing more tourist activity and school group educational visits, which also bring income.

The Agrihub approach is not prescriptive about the ways that income needs to be generated, avoiding a 'cookie-cutter' model and encouraging local differentiation that remains valuable to the ecosystem of Agrihubs.

Conclusion

Food insecurity underpins poor communities' vulnerability to shocks and stresses – and undermines their resilience. This case study illustrates that while food gardens are not the solution to food security, they do play multidimensional roles that are enhanced by support from Agrihubs and thus play an important role in building community infrastructure and resilience.

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