Understanding barriers and opportunities for fresh produce access in eThekwini Metro, Durban, South Africa

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South Africa faces a triple burden of malnutrition – undernutrition, hidden hunger and increasing rates of overweight and obesity driven by poor dietary choices. We examined fresh produce access and consumption patterns in Inchanga, eThekwini (South Africa) to understand how strengthening linkages between small-scale farmers and consumers could improve local food systems. Using mixed methods, we collected quantitative data from 121 participants and conducted three focus group discussions to assess consumption patterns, procurement practices and barriers to fresh produce access. Key findings highlight significant challenges, including insufficient fruit and vegetable consumption; 29% of participants reported zero intake the previous day, largely due to financial constraints. Economic pressures are stark among low-income households, with 70% reliant on Child Support Grants, underscoring affordability barriers to nutritious foods. Participants travel over an hour to supermarkets for fresh produce, indicating potential for local markets. While nutrition knowledge was generally good, affordability rather than education emerged as the primary constraint. Insights into local food shopping behaviour underscore the potential for establishing markets that support local produce, enhancing community accessibility. Promoting African leafy vegetables emerges as a viable strategy to enhance the affordability of dietary diversity and health outcomes. The study reveals a clear opportunity to bridge the gap between local farmers seeking markets and consumers needing affordable, accessible fresh produce. Establishing local markets supported by appropriate public policy could simultaneously address farmers' economic needs and consumers' nutritional requirements, strengthening the resilience of local food systems.

Significance:

- Cost rather than knowledge is the primary barrier to adequate fresh produce consumption in low-income communities, although some misinformation on food prevails.
- Local market development could simultaneously address farmers' livelihood needs and consumers' food access challenges.
- Public policy support for farmer–consumer linkages represents a promising nutrition-sensitive intervention.
- There are intricate linkages between agriculture and nutrition, suggesting that comprehensive, multi-sectoral approaches are required to combat malnutrition effectively.

Introduction

Over the past 30 years, South Africa has undergone a nutritional transition, characterised by the triple burden of malnutrition: households are simultaneously experiencing undernutrition, hidden hunger, and overweight or obesity as a result of nutrient-poor diets.[1] This food crisis is partly underpinned by high and ever-increasing food prices, as well as less-healthy foods being cheaper than nutrient-rich foods.[2]

Approaches to address malnutrition can be described as being nutrition-specific or nutrition-sensitive. Nutrition-specific interventions target the direct causes of malnutrition while nutrition-sensitive interventions target the underlying causes.[3] Stunting, a sign of chronic undernutrition, can be decreased by 20% if core nutrition-specific treatments are expanded to reach 90% of the target population, according to research published in the Lancet 2013 Series on Maternal and Child Nutrition.[4] Micronutrient supplements (zinc, iron, calcium, vitamin A and folic acid) for children and women of reproductive age are a few examples of core nutrition-specific interventions. Other examples include the promotion of exclusive breastfeeding for the first six months of life and adequate complementary feeding from six months to two years of age.[3]

Although nutrition-specific interventions are crucial, they cannot bring chronic malnutrition down to more 'acceptable' levels on their own. Nutrition-sensitive interventions that are responsive to nutrition are therefore also required. By incorporating nutrition targets into interventions from other sectors, such as agriculture, education, health, and WASH (water, sanitation and hygiene), nutrition-sensitive initiatives address the fundamental causes of malnutrition.[3] As an example, strengthening the linkages between agriculture and nutrition may provide a pathway to creating access to nutritious food as food production has a direct impact on the amount and variety of food available.[5] However, nutrition is not just shaped by the kinds of foods that are made available in the food system, but also by how that food system interacts with a whole range of other systems that shape daily life. Various pathways need to be carefully understood if local food systems are to help address malnutrition. A part of this is to understand the awareness of good nutrition so as to stimulate demand for local production.[5]

In the greater eThekwini area, approximately 200 000 households in over 300 informal settlements are affected by food insecurity as a result of soaring unemployment.[6] The eThekwini Metropolitan Municipality has created six agroecology hubs as part of its resilience plan. Food is grown around these hubs by a large number of backyard gardeners, small-scale farmers and farming cooperatives. The eThekwini municipality and the Southern Africa Food Lab collaborated to introduce Woza Nami ('Come with Me') in 2020 at the Inchanga hub, located in a peri-urban area halfway between Pietermaritzburg and Durban.

Woza Nami has established a flagship demonstration site based at Inchanga, serving as a working farm with crop planting, soil rehabilitation programmes, poultry, an organic seedling nursery tunnel and different types of composting methods. The project supports a range of farmers, predominantly women, currently working with ten co-operatives (approximately 110 individuals), with between five and ten farmers intensively farming vegetables on almost a hectare of land. Woza Nami also works with 25 'One Home One Garden' farmers who grow backyard vegetable gardens that supplement household diets with vegetables, especially green leafy vegetables. The hub hosts market days for its farmers, and anticipates partnering with Early Childhood Development (ECD) centres.

Beyond advancing an understanding of agroecological farming, the project aims to raise public awareness of nutrition among farmers and consumers, and increase accessibility to a variety of reasonably priced, nutrient-dense food through a range of local markets. Fresh produce such as fruits and vegetables are key components of a healthy, sustainable diet that is health-promoting and disease-preventing. Healthy diets provide adequacy without excess, of nutrients and health-promoting substances, from nutritious foods and avoid the consumption of health-harming substances.[7] The importance of vegetables and fruit as part of a healthy diet is emphasised in the South African food-based dietary guidelines which, among others, encourage South Africans to "Eat a variety of vegetables and fruits"[8]. The World Health Organization recommends a daily intake of more than 400 g of fruit and vegetables to reduce the risk of non-communicable diseases and ensure adequate intake of dietary fibre.[9] Raising awareness on healthy food choices and creating a demand for locally produced produce will therefore not only provide a market from which the farmers could build, but will also have potential health benefits for both farmers and consumers. Creating a link between local farmers and consumers requires an understanding of current procurement and consumption patterns, as well as their understanding of healthy food choices.[5]

The purpose of this study was to understand barriers and opportunities for improving fresh produce access by examining current patterns of procurement and consumption of fresh produce (vegetables and fruit), factors influencing food choices, and knowledge and understanding about food that contribute to healthy diets, and gaining a deeper understanding of the attitudes and intentions of consumers of fresh produce. This understanding will inform strategies to strengthen linkages between small-scale farmers and consumers in the local food system.

Methods

As described above, the Woza Nami project is linked to the Inchanga Agroecology Hub. This site was strategically and purposively selected based on criteria agreed by the project facilitators working with officials from the eThekwini Municipality Agro-Ecology Unit. It was agreed that the Woza Nami project would activate a market – at community level – for the farmers and the hub. As part of a baseline assessment, data were collected on household procurement and consumption of fresh produce using a structured questionnaire. In addition, focus group discussions were used to gain a deeper understanding of knowledge as well as attitudes and intentions of consumers of fresh produce.

Household questionnaire

The study sample consisted of 121 participants (people who grow, buy, prepare and influence food choices) purposively selected by targeting small-scale farmers and mothers/caregivers with a focus on women of reproductive age (18–49 years). An agricultural extension officer and retired community health worker who were well known in and knowledgeable on the community, assisted with the identification and recruitment of eligible participants. Only one participant per household was included. Participants who did not consent or who were unable to speak the local languages (Zulu or English) were excluded. A structured fieldworker-administered household questionnaire was used to collect information on the consumption and procurement of vegetables and fruit, growing vegetables and fruit, factors influencing food choices, and knowledge on and sources of nutrition information.

Focus group discussions

Qualitative information was collected using focus group discussions (FGDs). The aim of the FGDs was to identify participants' understanding of healthy food choices and their attitudes on their ability to implement the South African food-based dietary guidelines: "Eat a variety of vegetables and fruits."[8] The same participant/s who completed the household questionnaire were invited through in-person recruitment and telephonic follow-up by a research assistant to participate in the FGDs. Three FGDs were undertaken – two with five participants each and one with seven participants at a central, convenient location. The consultant and research assistant explained the aim of the FGD, identified who was collecting the information, and explained what would be done with the information. Permission was requested to record the discussions. Participants were assured of the anonymous nature of the discussions. The consent form was explained and signed. The consultant and research assistant gave a short introduction by explaining the aim and objectives of the project. A discussion guide was developed and used to facilitate the FGDs.

Management of data and data analysis

The quantitative questionnaire data were captured into a Microsoft Excel spreadsheet. Exploratory data analysis was undertaken to detect errors or strange values. The cleaned data were exported to the Statistical Package for Social Sciences (SPSS) version 27.0 for analysis. Descriptive statistics were generated to determine the frequencies and percentages.

Quality control and trustworthiness of the qualitative data were ensured through rigorous data capturing as well as analysis processes. Audio recordings from the FGDs were professionally transcribed. A separate electronic file was created for each FGD. The transcriptions were entered into the Atlas TI software program to enable labelling segments of text with code headings to aid reporting. Two researchers established the codes after careful reading and re-reading of the text. If agreement could not be reached on a specific code or codes, an additional researcher was consulted. Main themes were established around the key concepts explored in the FGDs.

Results

The quantitative questionnaire data, supported by qualitative data from the FGDs, are reported per topic. The fieldworker-administered questionnaire was completed for 121 participants. Participants were mostly the household head (67%), the daughter of the household head (11%), or the wife/partner of the household head (8%). Just over half (52%) of the participants had more than 10 years of schooling (>Grade 10), and 27% were employed (either full time, part time, seasonally, or self-employed). The household size ranged from 1 to 16 members, and 70% of households were recipients of the Child Support Grant.

Household consumption and procurement of vegetables and fruit

Participants were asked to recall all fresh vegetables and fruit eaten the day before. In total, 61% had eaten vegetables (mostly cabbage, carrot, pumpkin leaves, and spinach) and 51% had eaten fruit (mostly apple and banana) the day before, while 29% had eaten no vegetables or fruit. For 40% of the participants who had eaten vegetables the day before, some, but not necessarily all, vegetables were from their own garden. Most (88%) households consumed green leafy vegetables when available.

Consumption of green leafy vegetables was further explored in the FGDs. Results reveal that a variety of green leafy vegetables were consumed, including pumpkin leaves, sweet potato leaves, *amadumbe* leaves, beetroot leaves, mulberry leaves, carrot leaves, turnip leaves and spinach:

> *Pumpkin leaves with peanuts no oil added.* [FGD1, P3]

> *There is this green leafy plant that grown in puddles/ponds called "*ntephe*". It is nice if you cook it with tinned fish.* [FGD1, P4]

> *At my house I got them used to the spinach although I don't personally like it. I really like pumpkin leaves, and I grow it. And I also grow* imbuya. [FGD3, P4]

Study participants reported that cost was the main barrier to the frequent consumption of both vegetables (75%) and fruit (74%), followed by the produce not being available in the area (vegetables 17% and fruit 20%). More than half of the participants reported that it is not easy to get affordable fresh vegetables and fruit (vegetables 58%, fruit 64%).

Participants of the FGDs mentioned that cost was a barrier to the consumption of fruit in particular:

> *The reason I don't get fruit daily is the cost as they are expensive.* [FGD1, P2]

> *I try have maybe 2-3 fruit per week. I think the hurdle with fruits is they are expensive. Sometimes one is not able to buy enough.* [FGD2, P6]

Also, because some households go to town to shop only once a month, they run out of fruit:

> *We go once into town at the end of the month, then you stock up with fruit according to your financial means and storage at home. …We do eat them* [fruit] *but there comes a point where they run out.* [FGD2, P7]

Vegetables and fruit were procured mostly on a weekly basis (vegetables 65%, fruit 55%), and to a lesser extent monthly (vegetables 34%, fruit 43%). As shown in Figure 1, vegetables and fruit were bought mostly at a supermarket (more than an hour away) or at nearby spaza shops (5–15 min away). More than 40% of the respondents never purchased vegetables or fruit from street vendors. Own production was a usual source of vegetables to some extent, but not fruit (Figure 1).

Growing vegetables and fruit

Of the total sample, 78% of the participants reported being involved in agricultural activities such as planting vegetables in their own gardens, mostly as a household food source. None of the households planted fruit.

Participants in the FGDs mentioned various challenges that they experienced when planting vegetables. Animals such as goats, cows and chickens were a problem:

> *…the cows come in because there is no fencing around the place.* [FGD2, P7]

Adverse weather conditions and floods in the area affected vegetable gardens:

> *We were also growing seedlings for carrots and beetroot but during the recent KZN floods, a wall fell and whatever seedlings we had been growing were washed away.* [FGD1, P1]

> *…I had to take out the pumpkin leaves because they were dying because of hailstorm it got destroyed.* [FGD2, P6]

Some participants mentioned that they would like to plant, but that lack of capacity and lack of space prevented them from doing so:

> *I do have a field to plant, but the land is a problem – it needs a lot of manpower, I don't know if it needs to be ploughed by a tractor to just till it. The ground is very hard.* [FGD2, P5]

> *I don't want to lie – we don't have a garden. There's no space.* [FGD1, P7]

Factors influencing food choices

Factors that influenced the participants' choices when food shopping are shown in Table 1. When food shopping in general, the price of food items

Figure 1: Sources for usual procurement of vegetables and fruit, expressed as a percentage of the total sample (n=121).

influenced food choices for 80% of the participants. Shelf life, ease of preparation, and nutrient content were each considered by 20–30% of the participants. For both vegetables and fruit, cost was the main factor influencing the participants' decision not to buy a specific food item, while for vegetables, availability was also a reason for 31% not to buy.

Nutrition literacy, specifically related to food choices and preparing meals, are shown in Table 2. Two-thirds (67%) of participants sometimes made unhealthy meals because they lacked money to buy healthier options. Most (75%) said shopping took too much time. Participants usually budgeted for food shopping, knew food prices, and compared costs before buying.

Table 1: Factors that influence the participants' decisions on whether to buy vegetables or fruit

		Decide not to buy		Decide to buy	
	When food shopping %	Vegetable %	Fruit %	Vegetable %	Fruit %
Price / cost	80	76	84	51	54
How well it keeps	26	9	8	23	21
Ease of preparation	24	1	1	22	14
Nutrient content	22	5	5	46	37
Safety (hygiene)	15	7	3	15	10
Availability	7	31	6	12	10
Health considerations	7	–	1	10	10
Taste	6	1	5	6	11

Table 2: Nutrition literacy, specifically related to food choices and preparing meals

Prioritise time and money for food	Disagree	Neutral	Agree
Compared with other daily decisions, my food choices are not very important	72	1	27
Making healthy meals takes too much time	74	6	20
I sometimes make unhealthy meals because I do not have money to buy something healthier	27	6	67
Food shopping takes up too much time	21	4	75
Planning food intake	Never/rarely	Sometimes	Usually/always
How often do you plan meals ahead (e.g. for the day or the week)?	32	5	63
Do you make a budget on how you will spend money on food?	3	5	92
Do you or any of your family take food with them from home to eat at school or work?	28	24	47
Do you or any of your family buy food to eat when they are away from home, like at school or work?	59	35	6
Making food decisions based on nutrition and taste, with available time and money	Never/rarely	Sometimes	Usually/always
Do you buy food for a healthy diet even if you have limited money?	2	22	76
Do you compare prices before you buy food?	4	6	91
Do you ever buy a new food that you have heard about but not eaten before?	47	49	4
	No	Neutral	Yes
Do you know the general price of foods you usually eat?	6	12	82
If some food you usually get is too expensive that week, will you still buy it?	11	4	84
Making a meal using what is available	Never/rarely	Sometimes	Usually/always
Are you able to prepare fresh vegetables in different ways?	12	15	73
	No	Neutral	Yes
Can you prepare meals without using recipes?	4	4	92
Do you ever use recipes to cook something new or something in a different way?	10	5	85
Do you have the knowledge you need to plan healthy meals?	3	21	76
Do you have the skills you need to cook healthy meals?	3	13	83

Participants said that they never (47%) or sometimes (49%) buy a new food that they have heard about but not eaten before.

Knowledge on healthy eating

The participants were aware of a range of health benefits related to eating fresh vegetables and fruit, as demonstrated in Table 3.

Overall, FGD participants were familiar with the benefits of healthy eating:

> *Healthy eating increases the immunity.* [FGD1, P8]
>
> *…..vegetables build up our bodies and they protect us from various illnesses.* [FGD1, P2]
>
> *I love carrots and I always say it helps my eyesight be better.* [FGD3, P2]

FGD participants had a good understanding of both healthy and unhealthy food choices:

> *And when we talk of healthy food I think of my plate with boiled beetroot, boiled potato with skin on, a piece of boiled meat, and boiled spinach.* [FGD1, P2]
>
> *When we speak of unhealthy eating I think of fried chips with a lot of sauce and vetkoeks and oily foods where the oil is visible on top.* [FGD1, P2]

Table 3: Participants' perceived benefits of eating vegetables and fruit (top 8 listed)

Benefits of eating vegetables	%	Benefits of eating fruit	%
Good eyesight	49	Preventing illness / less ill	30
Intake of vitamins	40	Healthy skin	29
Preventing illness / less ill	27	Intake of minerals	27
Keeping one from getting fat	17	Intake of vitamins	26
Makes one stronger	14	Gives more energy	22
Healthy skin	13	Makes one stronger	14
For children to grow	13	Keeping one from getting fat	10
Gives more energy	12	For children to grow	9

FGD participants were familiar with the role of water as part of a healthy diet, and were aware that salt in the diet should be limited:

> *…when I think of being healthy, I think of drinking water.* [FGD1, P6]
>
> *….we need to use less salt in our healthy plate. It* [a lot of salt] *increases the BP* [blood pressure]. [FGD2, P6]

However, they also had several misperceptions (inaccurate knowledge) about eating certain fruits and vegetables:

> *…. too much of oranges can make you get jaundice.* [FGD3, P8]
>
> *Tomatoes have seeds, the seeds can get stuck on the intestines, and you end up getting ulcers, you can eat but you need to take out its water/fluid and the seeds before cooking it as is.* [FGD3, P3]

Sources of information on healthy eating

The main sources of information on healthy eating were nurses, radio, and TV / Internet (60–80%), followed by doctors, books, magazines and advertisements (Figure 2).

FGD participants mentioned that they received information at the clinic from the nursing sister and the doctor:

> *As a nursing sister she would tell me I needed to eat certain kinds of foods for good health. I would tell her some days I do have it* [healthy foods] *and some days I don't. But am grateful for the health* [knowledge] *that I have received.* [FGD3, P4]
>
> *I went to the clinic and the doctor said how are you with the salt? I then said I liked it. He said tell me what you do. I told him I add it to the food, then I add additional salt after cooking. I also add Knorrox and soup powder. Then he said gogo you need to stop that rubbish.* [FGD2, P4]

FGD participants further said that they get information from a variety of media sources, such as TV, the Internet, newspapers, magazines, and radio:

> *We get from the TV you come across a channel to do with food, that explain how the food is and when you cook it – you should do it like this.*

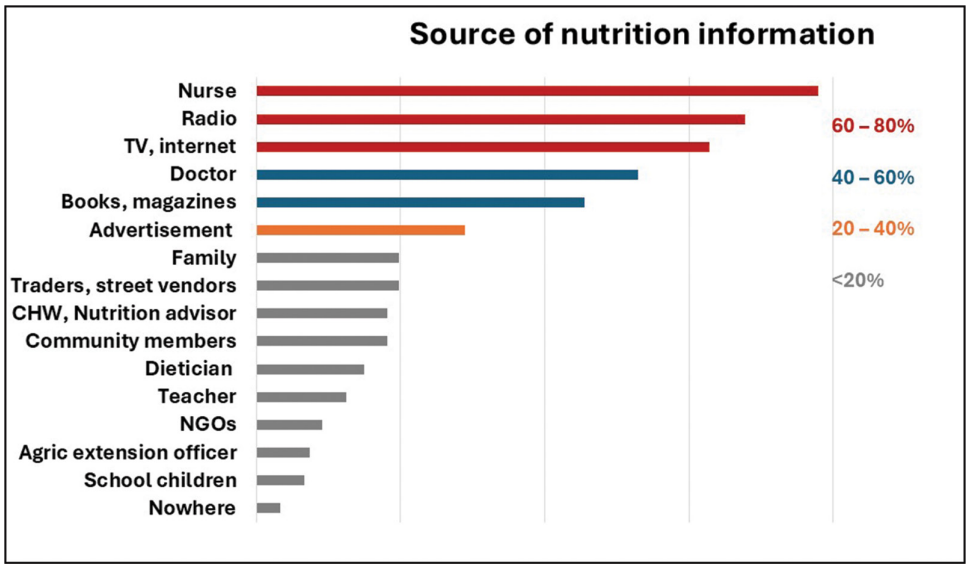

Figure 2: Sources of information on healthy eating.

There it's better because they are talking about something you can visualise. [FGD3, P3]

Even with the Internet although you can Google and do everything, but the picture of the finished product is there. [FGD3, P3]

Maybe you get some information from reading newspapers where they talk about health, where it's explained what is beneficial to the body or you hear from the radio or TV. [FGD1, P6]

And magazines I am someone who likes magazines – I like reading them often. Especially if something to do with cooking. [FGD3, P2]

Factors enabling healthy eating and practices and examples of food preparation

Participants' perceptions of factors enabling healthy eating and examples of food preparation were explored in the FGDs. The results and supporting quotes are presented in Table 4. Three main enabling factors were identified.

1. **Gradual food introduction:** When introducing new foods, tasting beforehand and slowly incorporating into familiar dishes was important.
2. **Growing own food:** Participants emphasised that growing vegetables increased consumption.
3. **Fresh food preference:** Participants preferred preparing fresh foods themselves rather than purchasing processed alternatives.

Several practices that promote healthy eating were identified. These include the preference for fresh food, knowing how to make healthy meals, not overcooking vegetables, not peeling some foods (such as potato) and baking butternut seeds.

Discussion

This mixed-methods study reveals critical insights into opportunities for strengthening linkages between small-scale farmers and consumers to improve local food system resilience. The quantitative data demonstrate the scope of challenges – particularly cost barriers – while qualitative findings provide crucial context about experiences and attitudes that inform potential solutions. The results of the quantitative data should not, however, be viewed as representative of the greater Inchanga area.

Fruits and vegetables are an integral part of sustainable healthy diets[10], and a daily intake of more than 400 g is recommended by the World Health Organization to reduce the risk of developing non-communicable diseases[9]. In South Africa, this is not achievable as the availability of vegetables and fruit is not sufficient to meet these requirements.[11] Low intake of fruits and vegetables has been consistently reported for South Africa, with a decrease in intake from 2005 to 2019[12], and is one of the leading dietary risk factors for non-communicable disease-related deaths[13]. In the current study, a third of participants had not eaten any vegetables or fruit the day before, reflecting an overall inadequate intake.

The most significant finding is that cost, rather than lack of nutrition knowledge, represents the primary barrier to adequate fresh produce consumption. While a third of participants consumed no vegetables or fruit the previous day, this was predominantly due to financial constraints rather than education gaps. This is in line with national data which show that cost was the major factor considered when grocery shopping.[14]

Although participants demonstrated a good understanding of nutritional benefits and healthy food choices, it does not necessarily translate into healthy eating behaviours. Food choices are often driven by factors other than the healthiness of the food, such as taste, traditional and health beliefs, and past childhood experiences, and, more so in low- and middle-income settings, by various contextual factors over which the individual may have little or no control.[15] Changing dietary habits is therefore complex as food choices are influenced by individual, household and community factors as well as social, environmental, political and economic influences.[16]

With 70% of households receiving Child Support Grants – indicating very low incomes – and recent increases in food prices, households have increasingly limited resources for fresh produce purchases. Increasing fruit and vegetable intake will be challenging as these are not included in the average household food basket purchased by low-income women

Table 4: Quotations supporting the focus group discussion participants' perceived factors that enable healthy eating and food preparation practices

Perceived factors enabling a healthy diet	**Quotes**
To eat new foods, must taste first, let family taste	*I would add a little bit of it* [new food] *when I am cooking my usual food at home.* [FGD2, P4]
Must have education about healthy diets	*What can make it easy for us* [to] *get more healthy food is for us to be educated …. Sometimes it's knowing – how do we cook these vegetables of ours.* [FGD1, P6]
Growing food, we will eat more	*I have planted lettuce, cabbage, onions, and carrots. That's what I am able to go pick from the garden so that we have something to eat.* [FGD1, P3] *Last year I planted green pepper, spinach, potatoes, …..I could sell it and also eat from it.* [FGD2, P4] *We eat it more regularly if we grow the vegetables in gardens because sometimes there is sometimes no money. We eat more of it if it's easily accessible because we have grown it. And with fruit – it's easier to eat if you have a fruit tree.* [FGD1, P1]
Practices	**Quotes**
Fresh food preferred	*I love beetroot a lot – but the one I will cook myself, not the store-bought ready-to-eat one.* [FGD2, P5] *I love fruit and I always have them at home. I usually have it after a meal – maybe a banana or apple.* [FGD2, P5]
Know how to make healthy meals	*..it doesn't mean you must cook the same food day in and day out. You must vary your food.* [FGD1, P3] *I believe your plate at home should be decent and have all the colours, green, yellow – have variety so that the body gets what it needs.* [FGD2, P7]
Do not overcook vegetables	*I think we mustn't over-cook our vegetables.* [FGD2, P7]
Do not peel potatoes	*I was also going to say do not peel the potatoes and butternut.* [FGD1, P3]
Bake butternut seeds	*After scooping out the seeds* [butternut], *you can put them in the oven* [FGD1, P3]

in South Africa, and with the recent increases in the cost of the core food basket[17], households will have consistently less money available to purchase them.

Although traditional nutrition education approaches on their own may have minimal impact when the fundamental barrier is economic rather than educational, promoting healthy eating through existing structures remains important.[2] Nurses at the clinic were the main source of information on healthy eating, highlighting the importance of fostering a strong link between the local clinic and Woza Nami. It is further important that nutrition messages are consistent with those promoted by the Department of Health.

The study reveals a clear market opportunity that could benefit both farmers and consumers. Participants travel over an hour to supermarkets for fresh produce and report that shopping takes excessive time. Fruits and vegetables are perishable and cannot be stored for extended periods at room temperature. Participants reported that they often ran out of fresh vegetables and fruit. Meanwhile, 78% of participants engage in some agricultural activities, and the Agroecology Hub supports local farmers seeking market outlets. This represents a classic market inefficiency where supply and demand exist in the same geographical area but lack effective linkage mechanisms. Establishing local markets could simultaneously address the farmers' need for income-generating opportunities and consumers' need for convenient, affordable fresh produce access.[5]

In addition, promoting locally available African leafy vegetables can potentially improve households' access to more-affordable nutritious food. African leafy vegetables are rich sources of certain key micronutrients, anti-oxidants and fibre and can therefore potentially improve diet quality and health.[18] Furthermore, consumption of indigenous foods is part of a sustainable food system, increases biodiversity, and is part of local food habits and culture.

A change to diets that are healthier and more sustainable must include consuming more fruit and vegetables. According to economic modelling, future supply will not be sufficient in many nations to reach acceptable levels.[11]

As a result, a comprehensive public policy aimed at removing obstacles to the production and consumption of fruit and vegetables will be required. In particular, the findings strongly suggest a need for public policy support to facilitate farmer–consumer linkages. Current food system structures favour large-scale distribution through distant supermarkets, creating inefficiencies for both farmers seeking markets and consumers seeking affordable, convenient access to fresh produce. This would necessitate a range of interventions with a focus on increasing the production of fruit and vegetables, creating methods and technologies to cut waste without raising costs, and stepping up current initiatives to inform people about good eating habits.[5,11]

This provides an opportunity to create local markets for locally produced vegetables and fruit to improve the availability of and access to fresh produce within the area. Although own food production (home gardens), particularly planting vegetables, is prevalent, households experience several challenges with planting (e.g. goats, cows, chickens, lack of fencing). Initiatives focusing on increasing the production of fruits and vegetables need to strengthen current gardening practices and find solutions for problems experienced with home gardens.

Effective policy interventions would need to address multiple aspects of the farmer–consumer value chain. Infrastructure support for local market development could provide physical spaces and facilities that enable regular trading relationships between farmers and community members. Transportation and storage solutions would be essential to reduce post-harvest losses and ensure that fresh produce reaches consumers in good condition. Regulatory frameworks that facilitate direct farmer-to-consumer sales could reduce bureaucratic barriers while maintaining food safety standards.[19] Perhaps most importantly, integration of local procurement into institutional feeding programmes such as schools, clinics and Early Childhood Development centres could provide farmers with reliable, bulk purchasers while simultaneously improving institutional nutrition outcomes.[20]

Conclusions

This study demonstrates that strengthening linkages between small-scale farmers and consumers represents a promising approach to improving local food system resilience and nutrition outcomes. The key insight is that cost rather than knowledge represents the primary barrier to adequate fresh produce consumption, suggesting that market-based solutions may be more effective than education-focused interventions alone.

The research reveals clear opportunities for local market development that could simultaneously address farmers' economic needs and consumers' nutritional requirements. Success will require public policy support, infrastructure development, and coordinated approaches that address both production and market challenges.

Future interventions should prioritise establishing accessible local markets for fresh produce that serve as regular meeting points for farmers and consumers. Supporting the production of affordable, culturally appropriate vegetables – particularly African leafy vegetables – would simultaneously address cost barriers whilst promoting nutritional diversity.

Developing public policies that facilitate farmer-consumer linkages represents a key structural intervention requiring coordination across multiple government levels. Integrating local food system development with health system messaging could amplify impact by aligning nutrition promotion with improved access. Finally, addressing structural barriers to small-scale production, including infrastructure, technical support and resource access, would strengthen the supply side of local food systems.

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Data availability

The data supporting the results of this study are available upon request to the corresponding author.

Declarations

We have no competing interests to declare. We have no AI or LLM use to declare. The funders had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results. Ethical clearance and oversight was provided by the Health Research Ethics Committee at Stellenbosch University (reference number: N21/08/081). Safety protocols for the prevention of the transmission of COVID-19 and compliance with legislation at the time were strictly adhered to. All participants signed informed consent forms for the different components of the research project. Each participant received a gift voucher as a token of appreciation for their time in completing the questionnaires. The FGDs participants each received a gift bag of dry beans, four-in-one soup mix and soya mince.

Authors' contributions

S.D.: Conceptualisation, methodology, validation, formal analysis, investigation, resources, writing – original draft, writing – review and editing, project administration, funding acquisition. M.F.: Conceptualisation, methodology, validation, formal analysis, investigation, resources, writing – original draft, writing – review and editing, project administration,

funding acquisition. L.d.P.: Conceptualisation, methodology, validation, formal analysis, investigation, resources, writing – original draft, writing – review and editing, project administration, funding acquisition. All authors read and approved the final version.

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