

# Food flows: building resilience against compound risks in Nairobi and Cape Town

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**Disclaimer:** This report reflects the view of the authors solely, not of TMG Research.

## Glossary

Food flows	The journey food takes to reach from production to consumption. Food flows and compass processing, transporting, and different forms of value addition.
Value chain	All activities of a retailer to deliver a good or service to a consumer or buyer.
Food	Food comprises all substances humans consume, including non-alcoholic beverages, to maintain life, grow, and stay healthy.
Compound risk	The risk that emerges from multiple events coinciding, often reinforcing each other. Some compound risks have the potential to collapse a sector.
Resilience	The ability of an individual, social organization, or an ecosystem to absorb shocks and adapt to changes while transforming systemic structures to prepare for the future.
Informal settlement	An urban neighbourhood with inadequate access to water, sanitation, electricity, and health services. Insecure or no land titles and therefore at risk.
Sustainable diet	A concept referring to food that is ecologically sound and produces social, economic, and cultural benefits from production to consumption. Sustainable diets contribute to nutrition security and human health.
Political economy	A field of a study investigating the relations between interests, investments, production patterns, trade, and consumption. Political economy takes a specific interest in the distribution of wealth and inequality.
Nature-based solutions	A concept referring to actions to support sustainability, restoration of natural processes, and biodiversity conservation while supporting human well-being.
True-cost accounting	A form of accounting that considers the value of a product or service and calculates the impact on natural resources and society.
Regenerative agriculture	An approach to agriculture emphasising the conservation and rehabilitation of natural resources. It takes a whole farm approach supporting sustainable food systems.
Agroecology	A science that studies ecologically, social and political processes are to improve the sustainability of farm and food systems. It is also seen as a practice and a social movement.
Rural-Urban linkages	The web of relations between towns and cities with their hinterland and rural areas.
Circular economy	Markets and business relations that support the protection of natural resources and provide value to reusing materials. It also refers to the circulation of financial resources, information and power.

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## List of Acronyms

ADB:	African Development Bank
BMZ:	German Federal Ministry for Economic Cooperation and Development
CAN:	Community Action Networks
CBD:	Central Business District
COVID-19:	Coronavirus of 2019
CSPI:	Certified Specialists in Poison Information
DSD:	Department of Social Development
ECD:	Early Childhood Development
FEWSNET:	Famine Early Warning Signs Network
GUFFI:	Gugulethu Urban Food Forest Initiative
HLPE:	High Level Panel of Experts
IDR:	Import Dependency Ratio
KFC:	Kentucky Fried Chicken

KNBS:	Kenya National Bureau of Statistics
LMICs:	Low- and Middle-income countries
NGOs:	Non-governmental organisations
OECD:	Organisation for Economic Co-operation and Development
Stas SA:	Statistics South Africa
SUN:	Sustainable Urban Neighbourhood Development
TEP:	Thematic Entry Point
TMG:	TMG Research gGmbH
UNECA:	United Nations Economic Commission for Africa
UN-HABITAT:	United Nations Human Settlements Programme
UNICEF:	United Nations Children's Fund
UPA:	Climate Resilient Urban and Peri-Urban Agriculture Programme
VAT:	Value Added Tax
VPUU:	Violence Prevention through Urban Upgrading
WHO:	World Health Organization

## Foreword

Food flows are the lifelines connecting farmers and consumers. Through food flows, people channel and transport food, process, and add value to food at a cost. Without robust food flows, consumers in towns and cities would not access raw or processed food satisfying their bodily needs. However, how food flows function between rural areas and cities influences the sustainability, fairness, and resilience of these producer-consumer connections. Food flows are resilient when they maintain essential functions in the light of disturbances. These disturbances have intensified in recent years.

While food flows connecting producers and consumers are relevant to all income groups, they are essential to residents in low-income settlements in rapidly urbanising towns and cities. Especially urban areas in East Africa have been rapidly expanding in recent years. The cities undergo structural changes directly affecting food flows between producers and informal settlements. Understanding what threatens these flows and what leverage areas could support sustainable diets are essential to meet two central goals. One is to provide food and nutrition to people in precarious livelihood conditions. Two is to ensure these food flows remain functional during economic crises and harvest losses in food-producing regions.

The Urban Food Futures Programme studies and co-designs solutions to improve food system sustainability and resilience in informal settlements. Funded by BMZ and implemented through a multi-actor partnership under TMG Sustainability Think Tank, the programme supports actions research in Cape Town and Nairobi.

Its purpose is to work with residents to improve urban food systems, nutrition and health for vulnerable populations in low-income settlements. Although implemented in only two African cities, the programme develops lessons from these study sites for similar contexts across Africa. The programme started in 2021 and will run for five consecutive years.

This working paper reports the results of an early-stage scoping phase. This scoping study explored with partners the central food system challenges the programme shall address through action research in future. For this reason, researchers and community members took a deep dive into food system dynamics in settlements in Nairobi and Cape Town. TMG and partners organised the scoping into four Thematic Entry Points (TEPs). Each entry point provides a unique perspective on essential food system challenges in Nairobi and Cape Town.

One of the four TEPs addresses food flows in urban settlements. This working paper reports lessons from studies, field visits, and conversations conducted in Nairobi and Cape Town. The key lessons from this scoping activity will guide action research design in cooperation with communities from April 2022 onwards. Towards that end, the lessons from all these studies will be aggregated into three central workstreams. These workstreams cover resilient food systems, food commons and governance. The insights presented in this report will contribute to the three workstreams.

We hope that this working paper provides opportunities to improve food flows and their ability to deliver nutrition and health to residents in formal and informal settlements. Doing so supports implementing the right to adequate food and improving food justice amid compound risks.

## Executive Summary

This working paper reports the results of a scoping study of urban food flows in Mukuru, Nairobi. It also shares insights from Cape Town presented in boxes. These boxes offer a deep dive into the food retail, urban gardens and food kitchens in Gugulethu, Cape Town. This scoping is part of the Urban Food Futures program implemented by TMG Research and partners, funded by BMZ in Germany. The program aims to find ways to improve food and nutrition security, income and agency of people in settlements occupied by low-income populations in rapidly urbanising cities. Such action research shall offer communities, civil society partners, the private sector and governments data to enable change. It helps communities take measures supporting food systems to become more resilient to shocks such as pandemics and climate change. The scoping research helps to identify major entry points within these complex urban food systems.

### **a. Food system transformations are likely to change food flows in informal settlements.**

In recent years, food systems to which informal settlements are linked have transformed rapidly. Some drivers of this transformation are supply-driven, and others demand-oriented. Amongst the supply-oriented drivers are geopolitical changes, supply chain disruptions, increasing energy prices, and rising transport and fertiliser cost. Climate change and weather variabilities directly affect the supply of foods within a region and have immediate consequences for the type, quantity and quality of food flows going into cities and informal settlements.

There are also several critically demand-oriented drivers. The most prominent is the increasing demand for foods from a growing urban population. As urbanisation continues, the ratio between the number of people producing and consuming food will drastically change. More people in cities and informal settlements will draw on fewer people growing food in rural areas. There are also signs of significant nutrition transitions. Ease of access and increasing consumption of foods high in saturated fat, sugars, and highly

processed foods with a low nutrient density drive obesity and overnutrition.

At the same time, malnutrition and micronutrient deficiencies remain at high levels, especially among children below five years. Children who drop out of schools lack school feeding. And the unstable employment conditions of parents result in regular shortfalls of cash. This drastically reduces the purchasing power for some time in a year. And where people lack access to emergency credits, the only option they then have is to reduce the size of plates, frequency of eating, and food quality. All of these contribute to micronutrient deficiencies in children.

The combined effect of these supply and demand-based drivers will change food flows in the future. Commodities and products for which there is no market will gradually disappear. Examples could include certain legumes and small grains such as millet. Although more nutritious than many other cereals on the market, millet is also more expensive and often unaffordable to people with little income. Other value chains will grow and dominate food flows between production and informal settlements. The predominance of maize on markets and the high price of sorghum and millets are examples of where food availability has changed significantly in the recent past. As we will explain in this working paper, the shape and habitus of food flow are part of a larger political economy. And this political economy influences reforms to improve sustainable diets linking rural producers and urban consumers. Without changing the political economy, including tariffs, taxes and subsidies, current food flow trends are likely to become more pronounced. But this could also mean that risks for consumers and value chain actors increase. Therefore, any reform process must critically examine the political economy that supports or hinders changes in food flows. We believe such a conversation is especially important for formal and informal settlements in low-income neighbourhoods of rapidly urbanising towns and cities.



Food value chains linking rural areas and informal settlements are diverse and complex. In Nairobi, for example, the average food passes through five to seven hands until it reaches the plate. Each food flow or supply chain is different, and generalizations are difficult to make. Hence, this scoping study takes a view of food flows in general from the perspective of informal food vendors in informal settlements.

#### **b. Compound risks threaten the functioning of food flow.**

This scoping study is concerned with compound risks and their potential impact on food flow. Compound risks are caused by events that could collapse part, or entire food flows in the future. When compound risks kick in, often worst-case scenarios become a reality. COVID-19 related lockdowns in Nairobi and Cape Town offer illustrative examples of aspects of such compound risk impacts. The disruption of traffic and supply chains between rural areas and Nairobi quickly diluted food stocks, especially in high-density areas. Covered with sharp losses and no alternatives to raise income, vulnerable households increased dramatically within a few days. The same happened to food vendors and their ability to maintain business. Food assistance at a large scale was necessary to back consumption shortfalls of household members.

#### **c. Improve political and financial capacity to adapt and recover.**

Not all risks are avoidable. by value chain actors. Therefore, measures would be necessary to cope with unavoidable risk exposure and partial failure of food flows.

- Test and scale digital supply chain management and client relations via social protection.
- Improve personal relations between buyers and sellers.
- Improve infrastructure to reduce transport costs.

We present areas in food flows connecting producers and consumers where we see weak points and probabilities for the collapse in the face of compound risks. We dare frame these weak areas against specific threats such as security, demand, supply, and operational risks. We are also concerned with profound political and macroeconomic changes. These include an overdependence on wheat for bread, chapatis, mandazi. But also, low organisation of food vendors makes them vulnerable to takeovers and changes of institutions by public administration.

#### **Building resilience through action research**

Through the scoping study, we identify three broad clusters of categories through which we think the resilience of urban food systems improves.

#### **Minimise exposure to risks and uncertainties.**

This first measure implies too carefully assessing each of the food flows regarding compound risks. Subsequently, supply chain actors experiment with waste to reduce risk exposure and uncertainties.

- Monitoring food flows for hazards and risks.
- Improve the flow of information on markets and pricing.
- Create a network of food supply chains to buffer supply risks.

**Transform structures and institutions to prepare for the future.** While the first two clusters of measures respond to immediate risks, this third prepare for longer-term value chains and informal settlements changes.

- Improve rural-urban linkages to increase the resilience of growers and consumers.
- Focus supply on regenerative agriculture to deliver healthy and affordable food.
- Building climate alliances between cities and core food production areas.
- Support peri-urban farming and strategic land use planning around cities.
- Upgrade food environments to prepare for future risks and uncertainties.

None of the three bundles of measures are mutually exclusive. They must be tested and further developed with communities to make

them work. The overarching emphasis, therefore, is to support communities and local governments in improving their capacities for agile management of risks. Agile

management builds on social innovation, which we believe is a pivotal mechanism to build the resilience of food flows against compound risks.

# 1. Background

As countries and cities expand in Africa, so do informal settlements in these urban areas ((UN-HABITAT, 2018) Residents in these settlements typically depend on food produced and processed outside their neighbourhoods. Food flows connect them with the areas where food originates. Large cities like Nairobi and Cape Town have an enormous demand for food. Some cities and their populations require farmers in peri-urban areas to produce food. Often these are perishable products such as vegetables, cabbages, and dairy. But then there is demand for cereals and meat that come from far, sometimes from neighbouring countries and often overseas. Cities have a huge food import bill, and much that comes with food is hardly accounted for. This includes energy and water harboured in food and central environmental services such as carbon left in the soil.

## A. Post-COVID: Food emergencies remain a concern in urban areas.

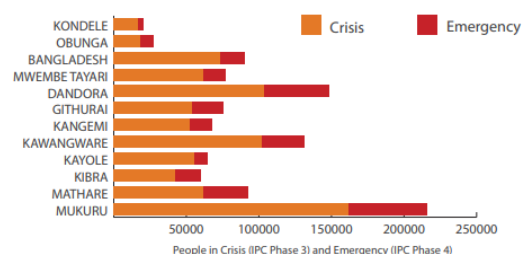
While some progress has been made in social protection and safety nets to mitigate the effects of shocks, resilience remains at stake in many low-income settlements across Africa. The COVID-19 pandemic and weather changes have made weaknesses of resilience visible in urban settlements. Each shock, such as a flood, an eviction or a pandemic affects food supplies, purchasing power and people's ability to access foods. hunger and malnutrition associated with COVID-19 may kill or debilitate more people than the disease itself, especially in regions of the world with weaker social safety nets ((Fanzo et al., 2020; HLPE, 2020). Urban African residents source most of their food via the market ((Frayne, McCordic, & Shilomboleni, 2014). For example, recent research in Kisumu, Kenya, found that only 14.5 percent of sampled households sourced food from their production in the city (Opiyo & Agong, 2018). Access to food is primarily determined by access to markets and financial resources to purchase food from these markets.

Government responses to COVID-19 in Africa have fundamentally impacted

economic, physical, and social access to food. Economic access to food has been reduced due to three main factors. The first has been the widespread reduction in income. For example, research conducted in five low-income areas of Nairobi in April 2020 found that 36 percent of participants had experienced a complete loss of job or income, and a further 45 percent had experienced a partial loss (UNECA 2020). The second factor has been increased food prices. Disruptions in supply chains and the closing of informal markets have meant that food prices have risen precisely when incomes have fallen. The research in low-income areas of Nairobi referenced above found that 78 percent of sampled participants reported increased food prices due to COVID-19 lockdown conditions (UNECA, 2020)

In the case of food, collapses of supply chains will cause food shortages and political tensions and can lead to conflict (Table 1).

**Figure 1. Share of food insecurity in informal settlements in Kenya during the COVID-19 pandemic (August – September 2020)**



**Source:** (Integrated Food Phase Classification, 2020)

In South Africa, ongoing food basket monitoring has found that low-income families spent 30 percent more on food in May than two months earlier (Pietermaritzburg Economic Justice & Dignity Group, 2020). The third factor is reduced access to school feeding systems, which means that all meals need to be provided at home, thereby adding to household food expenditure. This has had a particular impact in Africa, where 47 percent of the population is under eighteen years old (UNICEF, 2017)

The World Food Programme estimates that 56 million children in Africa are missing out on

school meals due to school shutdowns (World Food Programme, 2020b). However, many countries are now working to provide mealtime assistance while schools are closed. For example, schools send rations home in Cameroon (World Food Programme, 2020a). All these are essential measures to build urban food system resilience in settlements.

## **B. Food flows are part of the critical infrastructure in food systems, cities and countries.**

There is increasing recognition that agriculture and food belong to the critical infrastructure. This infrastructure requires special attention, especially in areas at risk of conflict, natural catastrophes, and economic turmoil. Food flows are part of such food systems, and altogether they belong to what we call critical infrastructure. If critical infrastructure fails, large sectors and their services will collapse.

At particular risk are countries and cities that are already fragile. And within these cities, households in informal settlements are the most vulnerable to consumption shortfalls.

Critical infrastructures such as food flows are maintained by people. These require special protection during crises. Although food flows have changed rapidly in the new millennium, informal food vendors remain a backbone in informal settlements. Often, they manage the last mile of food that flows from rural areas into cities. Without the informal food sector in informal settlements, many towns and cities in Africa would be without food.

## **C. Food vendors are a heterogeneous group of micro-enterprises.**

Informal food vendors hold microenterprises that operate under specific institutional frameworks. Also, they represent a highly heterogeneous sector and actors. Informal food vendors are a diverse group (retailers, kitchens, hotels etc.) who operate under varying tax, regulatory, and food safety (Resnick, 2020). They differ in clients, outreach and opening hours. In Kenya and the capital city of Nairobi, many informal food vendors operate outside public tax regime (KNBS 2016). This is one reason that keeps alive a debate about the formalization of

informal food vending and the food flows they manage.

At first sight, food vendors appeared to be in a privileged position. They broker food and sometimes add value to the food they sell in informal settlements. Yet, informal food vendors face challenges. They are concerned with food availability, affordability, price fluctuations, food safety management, and foods near uncollected rubbish (Ahmed, Simiyu, Githiri, Sverdlik, & Mbaka, 2015). Food vendors operate in a volatile environment that is inherently fragile. This context in which food vendors operate translates into fragile food flows. Hence, any attempts to improve the resilience of food flows must address the resilience of food vendors operating in settlements.

Food flows managed through informal vendors in urban areas have different degrees of resilience to shocks and crises. Knowing the degree to which a particular supply chain is vulnerable to shocks and understanding related fragilities is critical to strengthening food flows in the future. This study investigates food flows from the perspective of informal vendors. It explores product qualities and stages these foods pass through from production to consumption.

Despite the advantages of informality in the urban food economy, policy trends direct people towards increased formalisation of food vending and food-related businesses. Coupled with skewed or no representation of communities in townships or impermanent houses, these trends further disempower and lower the agency of urban residents. Consequently, the rights to adequate, healthy and affordable food and respective claims remain out of sight for many.

### **1.1. Trends affecting food flows.**

Transforming urban food systems to benefit low-income populations requires a thorough understanding of significant trends and sources of risks to food flows. Some of these drivers constitute the framework conditions under which changes in food flows have to take place. Others offer opportunities for changing food flows by altering the direction or intensity of drivers. Some drivers respond to changes suggested in the form of new governance, incentive structures, and human

agency. Others are more static and can only be influenced indirectly or in the long run.

#### 1.1.1 Urbanization increases the demand for food and the quantity that flows through supply chains.

Although the share of the urban population in Africa remains comparatively low, urbanisation is one main driver of food flows. Many African towns and cities grow at a pace twice as high as rural areas. Nairobi, for example, expands at 4 percent per annum. Cape Town has an urbanisation rate of 1.93 percent per year (World Population Review, 2022). The increasing population requires access to essential services such as health and schools, education and an expanding food footprint. Therefore, any intervention to support urban food systems must do so in light of shifts in relations between rural and urban areas.

Africa's population is still well below the 50% urban threshold (Githira et al., 2020; UN-Habitat, 2014). This implies that a significant reconceptualization of its approaches to urban development can still be undertaken. Given the rapidly changing global conditions, especially those associated with environmental and climate change, looming resources scarcity and the dire need to move towards a greener and more sustainable development options, Africa has the opportunity to take a global lead in innovations toward a greener, healthier and more sustainable urban societies (UN-Habitat, 2014).

Sub-Sahara Africa is also experiencing massive rural to urban migration. This has resulted in the formation and expansion of informal urban settlements (UN Habitat, 2020; Wilunda, Ng, & Stewart Williams, 2015).

It is also important to note that an estimated 46% of Africa's urban population lives in informal settlements, areas lacking adequate housing and services. The majority of new urban population growth occurs in these places (UN-Habitat, 2014).

#### 1.1.2 Demographic change and juvenilizing societies alter food preferences.

Nowhere else are societies as young as in Africa. Demographic changes and an increasing number of young people with a

basic education but limited employment and job opportunities create high competition in urban labour markets. This competition and cash flows dependent on casual labour under insecure employment or labour contract arrangements prevail despite positive developments in the social protection legislation of countries. These developments have direct and often negative implications for food procurement and the sustainability of diets.

Most urban poor living in settlements are informal workers, meaning they must show up to earn daily wages, and this daily income is used for subsistence (Mberu, Ciera, Elungata, & Ezech, 2014).

#### 1.1.3 Modernisation comes with processed food, junk food and corporate power.

Compared to Cape Town, processed food and junk food are not as prevalent. While in Cape Town informal settlement, residents have direct access to fast food restaurant chains like KFC, this is not the case in Nairobi. But also in the Kenyan capital city, signs of food habit changes have become visible. Foods that indicate such changes are the increasing availability of instant noodles and fried potato chips along the roadside. While the first is industrial and packaged, the food vendors prepare the potato fries themselves. Both, however, indicate the increasing importance of convenience and changes in taste amongst some Mukuru residents.

Residents in Mukuru have a high demand for saturated fats to produce and cook foods. Sugar consumption increases as well. Sugar is vital when people lack access to affordable foods while working physically. According to a study by Salon & Gulyani (2010), walking is the primary mode of transport among low-income populations. Heavily sugared tea then is one of the energy sources to get people through the day. Related practices are also standard in day-care centres when parents or caretakers lack food and offer black tea with sugar to infants.

#### 1.1.4 Food waste increases, and recycling and upcycling of food and food residues offer opportunities.

Although garbage collection exists in affluent neighbourhoods, there is no systematic and



public effort to manage garbage in informal settlements. Trash, therefore, ends up at local dump sites or along river shores. Large fractions in this trash are plastic in the form of bottles. But also, organic material finds its way to the dumpsite. The organic fraction of such debris comprises kitchen waste, food residues on open-air markets, and spoiled produce before being sold. Garbage separation at the source does not exist. Hence, it is the informal garbage collectors who separate waste into fractions and subject glass and plastic to upcycling in the neighbourhoods of Mukuru.

There isn't interest in urban farming. However, it also got the organic waste into community debates. On the one hand, fermenting organic waste contributes to greenhouse gas emissions and climate change. On the other hand, the biomass wasted below glass and bottles are an important source for composting schemes. Most of the compost produced in informal settlements is also being sold or passed on free of charge within their respective neighbourhoods. But there is also an emerging composting business in different parts of Nairobi. Most compost goes into the backyard gardens in affluent neighbourhoods and open spaces where ornamentals grow.

As interest in small livestock keeping increases in Mukuru, livestock feeds become important. While undernutrition declines, malnutrition remains at high levels.

Many LMICs face a double burden of malnutrition: the persistence of under-nutrition, a rapid rise of over-nutrition and non-communicable diseases such as diabetes, hypertension and coronary heart disease (Bygbjerg, 2012; Popkin, Corvalan, & Grummer-Strawn, 2020). This double burden of malnutrition has resulted from various factors, including: a marked transition in dietary patterns over recent decades (e.g., shifts to energy-dense diets high in saturated fat, sugar, and refined foods, and away from plant-based diets); inadequate access to healthy food choices; declining levels of physical activity; and inadequate access to health care services as a result of poverty and broader social determinants (Kimani-Murage et al., 2015; Popkin, Adair, & Ng, 2012).

#### 1.1.5 The elephant in the room: Food safety risks and declining public health in towns and cities

While food security outcomes have improved in many African cities, nutrition-related human health challenges have increased. Several conditions such as diabetes and overweight are directly related to changing food preferences which determine food intake (Spinelli & Monteleone, 2021). Food safety remains a concern, especially foodborne diseases such as cholera and mycotoxins in cereals and milk (Fung, Wang, & Menon, 2018; Leroy, 2013; WHO, 2018, 2020).

There is growing evidence that the urban poor, especially those in Africa, are particularly vulnerable to food and nutrition insecurity, resulting from the combination of a myriad of factors, ranging from the nature of foodscapes in urban areas and accompanying social/lifestyle changes resulting in unhealthy behaviours, to availability and accessibility of quality, affordable and nutritious food, and challenges of reduced productivity brought on by climate change, environmental degradation, and access to land, among others (Crush, Nickanor, & Kazembe, 2019; Dake, 2021).

Addressing food safety in the informal sector is probably the greatest food safety challenge faced locally (Cambaza dos Muchangos, 2015). Street foods are a particular concern, as they “often do not meet proper hygiene standards, in large part because of weak regulatory systems, inadequate food safety laws, lack of financial resources to invest in safer equipment, and lack of education for food-handlers” (CSPI, 2005). Studies from Nigeria (Umoh & Odoba, 1999), Burkina Faso (Barro et al., 2006), Uganda (Muyanja, Nayiga, Brenda, & Nasinyama, 2011) and Zimbabwe (Gadaga, Samende, Musuna, & Chibanda, 2008) have confirmed that street food has a high risk of contamination. Typical issues include inadequate access to water and sanitation, insufficient refuse removal and exposure to flies, which can all result in contamination of food. Similarly, a study of poultry meat sold at markets in Maputo, Mozambique, found that all the samples purchased were contaminated with faecal matter and could cause diarrhoea (Cambaza

dos Muchangos, 2015). The authors concluded that: “Poultry meat is contaminated at all levels of the market chain from farm to sale” (Cambaza dos Muchangos, 2015).

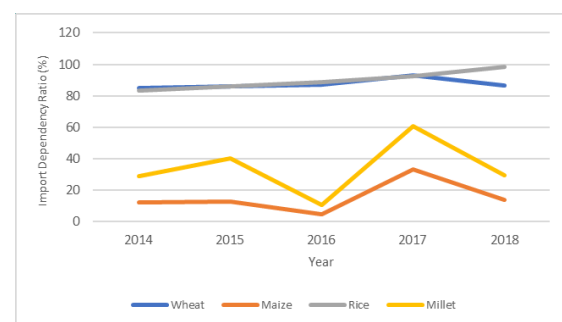
Muinde & Kuria (2005) observed that the preparation surfaces used by street vendors in Kenya had remains of foods prepared earlier. The risk of cross-contamination was high since various food types were prepared on the same surface. Training of street food vendors on hygiene and sanitation is critical. Some, but not all, local governments enforce hygiene standards among informal traders (Muyanja et al., 2011). Even where local government does attempt to enforce health standards, this enforcement is often only partial. For example, in Abeokuta, Nigeria, food vendors must obtain an annual certificate from health authorities, but a survey found that only 31% of vendors had these (Omemu & Aderaju, 2008). Most recommendations for ensuring food safety focus on hygienic practices by food handlers (e.g., (WHO, 2020), and stakeholders in urban governance need to raise awareness of this and ensure implementation (for example, through inspection and penalties). Still, it is also important to ensure that the necessary infrastructure and facilities are available. A study of street food vendors in Tshwane, South Africa, found that vendors generally followed “good basic hygiene practices” but that the overall environment where they cooked and sold food resulted in food contamination (Ogututu et al., 2015). “Unavailability of potable water and lack of proper infrastructure for the production of safe food has led to the quality of street-vended ready-to-eat chicken being contaminated by faecal and environmental contaminants and pathogenic organisms” (Ogututu et al., 2015). Providing potable water, sanitation, and adequate protection from the elements for markets and informal traders is therefore important for helping to ensure food safety.

#### 1.1.6 Food and energy prices have increased in recent years.

Africa spent \$64.5 billion on food imports in 2017, this is projected to rise to \$110 billion

by 2025 (African Development Bank, 2019). Kenya is a net importer of consumer-oriented food products, e.g., maize, wheat, rice, and agricultural commodities. The Import Dependency Ratio (IDR) measures the magnitude to which a country is dependent on imports over what is available for domestic use (KNBS, 2019). The IDR for selected food commodities is presented in Figure 1. In 2016, there was massive importation of maize, which was meant to cushion consumer from maize shortage that was occasioned by drought in the country (KNBS, 2019). As such, the country relies mainly on regional and global food markets. The more volatile these markets are, the more detrimental they are to the food situation in Kenya.

**Figure 2: Import dependency ratio for selected commodities in Kenya over the period 2014-2018**



Source: (KNBS, 2019)

Food prices and, to some extent, energy directly respond to changes in the macroeconomic environment, geopolitical challenges and harvest forecasts. Also, the export quota of neighbouring countries like Tanzania and Uganda impacts food prices such as maize. Although food prices during COVID-19 lockdowns remained relatively stable, they have gradually increased over the past six months. One primary driver of that increase has been the increase of the value-added tax (VAT) by the Kenyan government.

According to Kenya National Bureau of Statistics (KNBS) data, between January 2021 and the same month in 2022, the prices for maize flour, wheat flour, Irish potatoes, kale and cooking oil rose at an average of 20%. Russia's invasion into the Ukraine and ripple effects on food markets were observable. About a third of Kenya's wheat is imported from Russia and Kenya imports above 90% of its soya from Ukraine (KNBS data). Fuel prices

have increased, and the price for vegetable oil doubled within a week. With business as usual scenario in Europe, green markets are likely to raise commodity prices significantly. These price increases will directly affect the production and preparation of *Ugali*, bread, *chapati* and *mandazi*. These are sensitive to changes in the energy, cooking oil and cereal markets.

Finally, food prices are also affected by the cost of inputs. Although mineral fertiliser application rates in Kenya are comparably low, farmers depend on fertilisers to maintain their production levels. Fertiliser prices increased by 70% within a year.

#### 1.1.7 The share of people who depend on food aid remains high

In February 2022, 3.1 million Kenyans depended on food aid. This represents 6.5 percent of the total population. These food emergencies are partially the result of the third consecutive below-average growing season according to the Food Security Outlook (FEWSNET, 2022). The late arrival and the distribution of rains contributed to this food crisis.

#### 1.1.8 Food inequality widens, especially in large cities like Nairobi

In cities like Nairobi, food availability is not a significant concern. The amount of food being shipped into the city and made available in open-air markets, supermarkets, restaurants and street food vendors is sufficient to satisfy the calorie demands of citizens. Unless they are major supply chain disruptions, food buffers as sufficient to support urban diets over a couple of days. The challenge in Nairobi instead is a widening inequality of affordability of food.

Food systems and supplies in Nairobi are divided by income. On the one hand, food has become expensive for the upper-middle class and upper class. These classes attract upmarket food, partially imported and often quality controlled. Food prices for bread come up in butter and milk but also rise, and potatoes are significantly higher than the national average and the food prices in this as in OECD countries. Despite such high food prices, groceries remain affordable to the upper-middle class and upper class. They

spent less than 50% of their monthly cash on food.

On the other hand, almost 50% of the population earns less than two US dollars a day. Food consumption expenditure of that group is way above 50%. To cover the cost of an acceptable food plate per person, people spent at least one U.S. dollar a day. Food price hikes are felt most in this segment of Nairobi's residents. Restaurants and supermarkets to those in that category are unaffordable. Food sizes are tiny, resonating with the tight budgets of consumers. Many of these consumers live in informal settlements, like Mukuru.

As food and energy prices rise, food inequality increases. One reason for this inequality is the high food expenditure share of people in residence. Social safety Nets and price support are not in place. The government of Kenya ensures that basic staples such as Maize remain within the affordability of low-income populations. But there are no mechanisms for covering the extra cost of other food items and energy. Even post-covid, Nairobi citizens are likely to experience the continued divide between Nairobi's two principal income groups.

This is not to say that food flows as part of increasingly complex urban food systems have become a challenge. Some progress has been made in the recent past to increase food awareness, right space claims and collective action amongst communities to advance food justice in urban areas. Yet, there's an increasingly noticeable tug of war between approaches, interests and policies to support urban food systems. While most of them refer to the Agenda 2030 and its goals, their programmatic underpinning and practical framing of strategies differ widely.

## 1.2. The Urban Food Futures programme

The Urban Food Futures Programme is a collective attempt of civil society, community-based organisations in Cape Town and Nairobi, and research partners within public administration to advise governments on how to improve food and nutrition outcomes of formal and informal urban settlements. A primary goal is to increase the resilience and preparedness to shocks while increasing the



sustainability of diets. Developing employment opportunities is one of the main thrusts of this project.

The Urban Food Futures programme is hands-on. It develops practical, evidence-based strategies for community partners and governance actors to shift urban food systems towards a more sustainable and resilient configuration. In the absence of blueprints, project teams employ action research with various degrees of community participation. In its best case, communities lead research as Co-researchers and get involved in data collection, analysis and the interpretation of findings. During its scoping phase, the programme also conducted Overview Studies without the direct participation of communities. The type of research depends to a large extent on the research challenge and engagement opportunities at hand.

Drawing on previous work in urban settlements, the literature and the community-led development processes that have taken place independent of the Urban Food Futures programme, the teams identified a set of food-related challenges. Yet, these challenges present themselves differently in the different cities. Therefore, the project team and partners implemented a comprehensive scoping face to identify critical opportunities in each city from the stakeholders' perspective. The scoping phase helped to narrow down development challenges and research opportunities to a few. This report presents the results of the scoping of urban food flows.

### 1.3. Study purpose and approach

This study provides a critical analysis of food flows within food systems in Mukuru to identify entry points for improving food flows to enhance the nutrition and health of consumer categories while enhancing business opportunities for informal food vendors.

This study is part of a larger food system assessment we conducted in Nairobi and Cape Town. In each of these two cities, we investigated food flows. We had a specific interest in food flows that connected production and food consumption in the informal settlements of Nairobi and Cape

Town. Each of these city-specific investigations focused on particular aspects of food flows. The Nairobi study investigated supply chains through the perspective of the food retail sector in one informal settlement. Informal food vendors dominate this food retail. Hence, we traced back food flows from these food vendors. We analysed risks and uncertainties that could result in a systemic collapse of the power of the food system or value chains. The underpinning rationale for such investigation was to identify leverage points to improve food flow resilience and investigate research to support the mitigation of compound risks in such settings.

On the other hand, Cape Town offered insights into food flows connecting urban production and food Commons in so-called townships. This detailed analysis of food flows within a confined area provides a deep dive into the potential of circular food flows within a given territory. Since the overarching purpose was not to compare the food flow dynamics of Cape Town and Nairobi, we present our findings accordingly.

### Limitations

This study is diagnostic and, to a large extent, qualitative. We neither reclaim representativeness, nor have we exhausted all possible measures to build resilience in an urban settlement. Although we use concepts such as value chains and supply chains, the study does not comply with the principles of a food value chain assessment. The purpose here was to highlight our conceptual thinking and approach to building resilience and share some central measures worth exploring further with communities through action research.

## 2. Conceptual frameworks

Various perspectives exist on food flows linking urban areas and farming in the countryside. We perceive food flows as part of a larger food system. Food flows are the lifelines within food systems, governed by policy and institutional frameworks. If we want to conceptualise food flows, it is helpful to start with food systems and ask what makes them resilient and sustainable.

### 2.1. Food systems

Food system concepts have become a central component of food security and nutrition debates and conceptual linkages to agriculture and food production in rural areas. In essence, the food system describes all factors and actors responsible for producing, trading, process and eventually consuming and recycling food irrespective of the location. Some food systems are massive because of linkages and networks between actors spent across regions in different countries. Other food systems are local. In such local food systems, the proximity between production and consumption is close. One example of a local food system is subsistence farming in the countryside. Farmers produce and consume within the same household or community food from within the locality.

Another way of distinguishing food systems is with regard to their formality. In some areas, food systems are highly formalised. Food policies, trade regulations and tax regimes govern the behaviour of food system actors. Food systems remain informal in other parts of the world, although they connect consumers and growers over large distances. For example, Camel milk in northern Kenya travels long distances to reach consumers in the capital city of Nairobi. Actors operate along this supply chain, yet informal and outside public regulatory frameworks. This is not to say that informal food systems are not responding to contextual changes, such as fuel price increases or changing consumer preferences. However, feedback between milk producers and urban consumers remains within the informal domain and steering mechanisms.

Any attempt by society to improve nutrition and ensure the right to food must work through a food system perspective. Only the food system perspective enables a distant observer to grasp the economic, social and political dynamics that create a collective pattern of behaviour of food system actors. This collective behaviour contributes to malnutrition, or the opposite, such as sustainable diets. In other words, the quest to improve sustainable diets is the best advice to search for the most effective and cost-efficient entry points in food systems to support the sustainable production, processing and consumption of healthy foods. The same applies to food flows or supply chains embedded in full system dynamics. We believe that food flows and the outcomes they generate can best be described through the dynamics of food systems.

### 2.2. Food flows

Food flows describe the way interacts food calls from production to consumption. Other words for food flows commonly used in the literature are value chains and supply chains. As food systems, also food flows depend on extras and their relations. Without actors and links between them, food could not be transacted, hence would not make it from production to consumers. Actors are state and non-state entities (individuals, organisations) with agency, rule-based (institutions). All these actors are subject to governance (control). The institutions these actors give themselves, or in other words, the rules of the food flow game, influence quantities, food quality, the sharing of benefits, risks and risk mitigation strategies.

If food flows exist conceptually and, in this world, researchers and businesses analyse food flows. In its simplest form, these analyses look at are import/stock/consumption/export studies (food balances, material flow analysis -MFAs, foodshed studies), help us to understand food system configurations (actors, relations, structures, processes, rules, norms), structural vulnerabilities, the political

economy around food flow management, path dependencies, e.g.

Food flow analysis provides information about the current situation of urban food provisioning (Moschitz & Frick, 2020). They can be qualitative or quantitative. Food flow analysis includes assessments of food loss/waste calculations, greenhouse gas emissions, energy and nutrient balances, and job creation resulting from changes in food flows.

Food flow studies are not that different from supply chain analyses. These typically investigate food from the perspective of its sources, value addition, trade, consumption, disposal, recycling). Investigating food flows from a risk aversion perspective has gained importance recently. For example, Karg, Akoto-Danso, Schlesinger, & Nyarko (2015), argue that diversifying food sources can be a means to minimise risks of food emergencies in cities. Miller (2021) uses food flows to argue critical resilience thresholds or regional food flows. All these matters for understanding food flows into urban areas amid compound risks.

### 2.3.Compound risks

In recent years, the term systemic risk has become an important concept to assess the viability of social systems. Systemic risk is the risk exposed by political, economic or social factors causing an entire sector to collapse. Systemic risk often relates to worse case scenarios or catastrophic events. These events jeopardise the functions of a system. Systemic risks can emerge from any component of a complex system. Quite often, risk factors remain undetected. Consequently, the preparedness of critical actors and policy remains slow. Although an emerging concept, systemic risks are increasingly used for food systems and supply chains.

Typical for systemic risks unfolding in a system are cascading effects within a system or systems that are tightly linked to the core component where threats emerge. Such cascading effects result from tight feedback that enforces a particular pattern of system behaviour. For example, at the beginning of COVID-19 and related lock towns, people in different countries expressed concerns about

food shortages. These concerns translated into panic buying and hurting of commodities end essentials. The emptier the shelves became, the higher the drive towards shops and panic purchases. These systemic risks in food systems emerged because of the interaction of food market participants.

#### - Multiple drivers of systemic risks confronting food flows

There are various ways to categorise and speak about systemic risks in informal settlements. Bernard de Raymond et al. (2021) distinguish between endogenous and exogenous risk. Also, the degree of interdependence between risk factors is helpful to differentiate and categorise risks. This categorization of risk factors is beneficial to speak about risks in food flows connecting production and informal settlements in urbanising towns and cities.

#### - Endogenous factors with high interdependencies.

Such factors should be a top priority for anyone tasked with risk management in food systems and supply chains. They emerge from within the food system and are highly connected, with a high potential for cascading and transformation. Examples include biodiversity depletion, erosion of soil and land, climate variabilities, extreme weather, events yield losses, food scandals and dietary behaviour change.

#### - Exogenous factors with low interdependency.

Although such factors cannot be safely ignored, they have limited influence on food systems and supply chains. They originate outside the system and are of low interdependency and often limited in cascading potential. Examples include tax and tariff regime changes.

#### - Endogenous factors with low interdependencies.

Such factors emerge from within the food system. Although it is essential to understand their effects, they are not the primary cause of concern for food and supply chain analysts. Their low interdependency disrupts the local level with limited cascading effects into adjacent systems. Examples include

demographic changes and the mobility of people.

- Exogenous factors with high interdependency.

The sources of risks are mainly outside the food systems or supply chains but a highly independent of the food sector and related industries. Examples include financial collapse, banking system shocks; oil and energy prices increase, increasing the cost of fertilisers, regime changes, and conflict and supply chain disruptions.

Often these factors interact and create combined effects on food systems and supply chains. Hence, there is increasing literature about Compound risks, a related concept.

- Compound risks require new preparedness and early warning approaches.

Compound risks combine several environmental, political or social risk factors into one comprehensive risk scenario. Traditionally, these risk scenarios have been handled along with disciplines and isolated from each other. Yet, they said locust swarms, heatwaves in the Sahel, droughts, and floods are linked together as ecosystem dynamics. Humans manage these ecosystems, and hence they intersect with social, political and economic systems societies depend on.

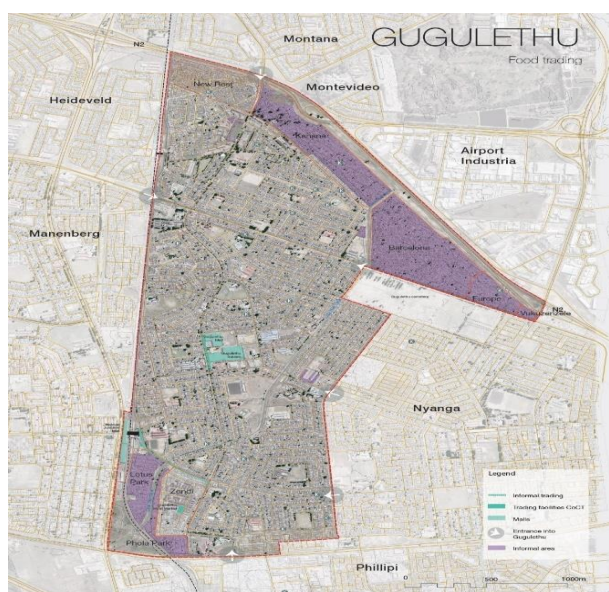


### 3. Case description: Mukuru and Gugulethu

#### a. Cape Town

Gugulethu (“Our pride” in isiXhosa), 15km from Cape Town CBD, is a township established in 1958 under the apartheid government for male migrant workers from the then so-called homelands. The typical south African township typology of single houses, row houses and hostels with a density of 15.600 people/km<sup>2</sup> forms a residential area with little to no income opportunity (Housing Development Agency, 2012). In 2011 the census counted a population of 98.500 on 6,3km<sup>2</sup>, including the informal settlements in the north and south of the area (Stat SA, 2019). The 28713 households are headed majority by men (62%) and 12% by children. Half of the households live in a shack (temporary structure) in informal settlements or backyards. The six informal areas are situated north on either previous dumps or stormwater detention ponds next to the N2 highway or in the south within the former hostel area and between the Lotus River canal and the railway. Around 37% percent of the Gugulethu population live in these informal areas. While the formal area households are headed by a majority of women (53%) are households in the informal areas governed mostly by men (66%).

**Figure 3. Map of Gugulethu**



#### b. Mukuru

Mukuru is a predominantly informal settlement east of the CBD Nairobi along the Mombasa highway. It is a vast area adjacent to the capital city's largest industrial area. Housing represents typical informal settlements and high-density areas in the capital city. There are hardly any permanent houses, mainly shacks connected to the electricity grid but with an uncertain water supply and inadequate sanitation. Mukuru is home to 400,000 people who live on around 650 acres (Corburn, Agoe, Asari, Ortiz, & Patterson, 2017). A central river passage through the settlement is highly polluted and used as a dumpsite. Although undernutrition declines, the prevalence of micronutrient deficiencies and obesity is high. Children below five years are most vulnerable to consumption shortfalls and human health in the settlement. Figure 3 and 4 below shows the map of Mukuru and Gugulethu with highlights of food traders and social services.

**Figure 4. Map of Mukuru**



Source: SUN development

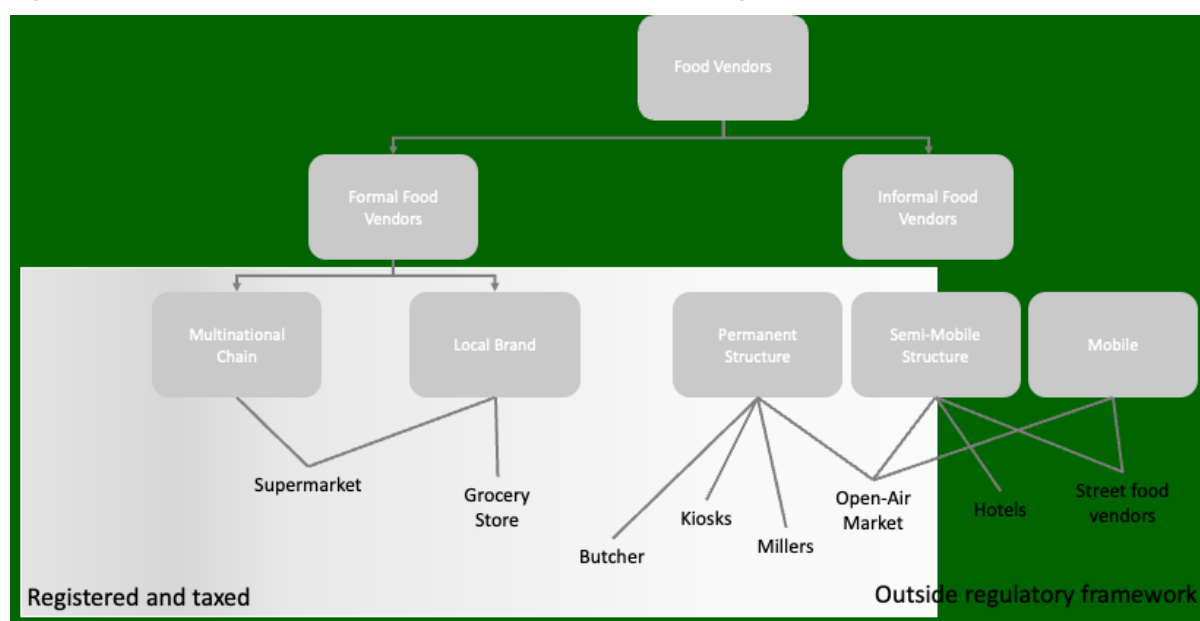
## 4. Informal markets and food flows

There are multiple ways to categorise food vendors in an informal settlement. Figure 4 shows our typology that guides the analysis of food flows through informal food vendors. We treat each vendor category as a single case for a deeper analysis of food flows linked to these vendors. As we will see later in this

document, some food flows intersect well. Others exclusively link one food vendor category to a privileged supplier.

Figure 4 presents the typology that we present in this section of the report in more details.

**Figure 5. Overview of formal and informal food vendors operating in Mukuru**



### 4.1. Kiosks

Kiosks are small shops embedded in houses and located on streets with some football car traffic. Kiosks are typically owned by a person or a family. *Duka* in Kenya and *Spaza* in South Africa. Most kiosks in Mukuru sell 7 to 10 different food items to consumers. Kiosks are typical for a city like Nairobi and do not exist in the same way in neighbouring countries or southern Africa. In Cape Town, for example, supermarkets have taken over the role of kiosks.

Although differences exist, most kiosks offer similar or the same product in Nairobi. For example, most vendors sell tomatoes, vegetables such as kales and kienyeji, potatoes and onions. The sources of horticulture produce tend to differ. In some

cases, vendors procure from *Muthurwa* and potatoes and onions from Marikiti. Those vegetables that pass through *Muthurwa* often originate from Kiambu, Muranga and Naivasha farms. Kales, on the other hand, market actors source from Narok.

Customers of kiosks vary. Some from the neighbourhood tend to frequent specific food vendors regularly. Others do not. The price margin differs per product. Table 2 provides an overview of prices for central produce sold at Kiosks.

**Table 1. Purchases and sale prices for horticultural produce in Mukuru**

Produce	Purchase Price	Selling Price	Margin
Tomatoes	3 pieces for KES 10	1 piece for KES 5	5 KES when selling three pieces
Kale	3 bunches for KES 10	1 bunch for KES 5	5 KES when selling three bunches
Potatoes	30 KES per 1 kg	50 KES per 1 kg	20 KES per 1kg
Onions	3 pieces for KES 10	1 piece for KES 5	5 KES when selling three pieces
Maize flour	115 KES per packet	125 KES per packet	10 KES per packet
Bread (Sandwich)	29 KES	KES 35	6 KES per piece

**Box 1. Gugulethu food retail**

The food retail infrastructure in Nairobi is fundamentally different in Cape Town. Gugulethu is serviced by three shopping malls internally and has another two in the neighbouring areas. Nyanga Junction is situated on the western boundary to Manenberg, with access through the metro rail station. Gugulethu Mall and Gugulethu Square are in the centre along Steve Biko Drive.

**Gugulethu Mall and Square**

- **Supermarkets:** Shoprite and Superspar
- **Wholesale stores:** Kit Kat Cash & Carry, Choppies
- **Fast Food:** King Pie
- **Restaurant:** Debonair, Hungry Lion, KFC, Mc Donald's, Spur

- **Liquore Stores:** Shoprite Liquor, Tops
- **Butchery:** Skhoma Butchery, Shillo Butchery

**Nyanga Junction Shopping Centre**

- **Supermarkets:** Shoprite
- **Fast Food:** King Pie, Sweet City, Espress, Fridays
- **Restaurant:** Debonair, Zebros, Krispy King
- **Liquore Stores:** Shoprite Liquor
- **Butchery:** Junction Meat butcher

A network of spaza shops (informal convenience stores) serves the area on limited food items. The location and ownership of these stores change regularly.

**4.2. Street food vendors**

Street food vendors refer to individuals who prepare and sell fresh food to consumers. Street food vendors are highly specialised and hardly switch the food portfolio or strategy once it runs. Some offer products such as fresh milk and *mala* (fermented milk). Others prepare and sell maize, githeri or soup. But also, within the category of soup, does specialisation apply. There are street food vendors specialising in soups made of cow heads/legs and others on goat heads.

"I have specialised in selling soup from cow head and legs. I also sell other by-products of the cow, such as the tongue. Currently, I do not face much competition as other similar sellers specialise in goat soup."

Samuel, Street food vendor (soup), Mukuru

**Coping strategies when food prices rise, and customers drop.**

As consumers, also street food vendors are affected by food price fluctuations. Although general inflation drops, food inflation has increased since 2022. Food vendors employ several strategies to cope with such food price hikes.

- Visiting markets in the evening instead of early morning when perishable food prices drop.
- Replacing expensive foods with cheaper ones

- Maintaining the price for a plate and dish but reducing the size offered to customers.

The higher the food inflation and the lower the purchasing power of customers, the more urgent it becomes to get food on credit. While this is a critical social institution to support the food intake of people short on cash, it reduces the cash flow of food vendors. Also, food vendors purchase ingredients for what they sell daily.

The turnover of food increases when schools are closed. During these days in the year, the food consumption of children then relocates to the streets and households. But while this is to the benefit of food vendors, it further strains the already slim budget of households. And at the end of the day, all households seemed to be affected from school closures and higher food expenditures. A large share of those households with children is also engaged in food vending. Hence, school closures benefit and stress these households at the same time.

#### 4.3. Table vendors: sweets and snacks

Although sweets, biscuits and snacks are not part of our definition of food, it is worth mentioning table vendors selling sweets. They are indications that the number of sweet selling businesses has increased in recent years.

Sweet sellers mainly target children, and often the tables are overseen by children after school. Sweet sellers primarily purchase sweets and biscuits in bags and then sell them on a piece per piece level to clients. Dealers and wholesalers are the main sources for sweets of Mukuru sweet sellers.

Mid-month and end of the month when salaries are a bit more are among the busiest periods. When prices are high and purchasing power low, sweet vendors tend to replace their produce with cheaper ones.

#### 4.4. Hotels

Unlike the common definition of hotels that offer accommodation, in Kenya and Nairobi, hotels refer to small restaurants where you can get breakfast, lunch and dinner. Hotels range from simple open-air structures with plastic roof covers to buildings made of concrete with doors and windows. Across

Mukuru, hotels are one pillar of the food system.

In Mukuru, hotels offer typical foods to customers, such as *Chapatis*, *Mandazis*, rice and *Githeri* (beans and maize dish). Often, they serve customers who cannot afford or don't have the time to cook lunch or dinner at home. Many come from nearby factories during breaks to eat. As food vendors and kiosks, also hotels offer food on credit to those with poor cash flow.

Food prices in hotels across Mukuru have increased over the past months. This is a direct result of rising food prices and the cost of energy. Food price increases range from 25 to 50%. For example, *githeri* recently increased from 20 to 40 Kenyan shillings per plate. Only a few clients cope with these drastic price increases. Those who are unable to cover the additional expenses request for smaller portions or move to cheaper food altogether. There are cases of hotels that closed down recently. One main reason was the significant reduction in clients and the inability to source more inexpensive food ingredients to cover food preparation bills.

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"I only cook and sell ugali and meat in my hotel. Men are my main customers, and they come to eat here daily. For my most frequent customers sometimes serve them food on credit, and they pay me once they have received their salary. My best days are during the weekend as I manage to (go) home with a profit of about KES 500."

Margaret, Hotel owner, Mukuru

#### 4.5. Open-air markets

Open air markets hardly come with market infrastructure. These markets provide space for tables or benches to display products. Some are covered with a roof to protect market actors from rain and sunshine. In Mukuru, we counted eleven open-air markets. Although one can find the majority of produce consumed in Mukuru on this market, they are specialised in certain products. For example, some markets are known for freshwater fish, while others are known for horticultural produce and vegetables.



Open air markets serve a different kind of clients. Kiosks and street food vendors, for instance, procure ingredients and products from these markets. Open air markets also attract consumers in Mukuru. Although not by default, 67% percent of the respondents in our survey sourced their food from open air markets in the last 7 days preceding the survey. Hotels open as early as 4:00 am and close late in the evening.

Open air markets in Mukuru open as early as 4:00 am. Most of the traffic and business takes place during these morning hours. Those who frequent the market walk or use public transport to access the markets before sunrise. Although security has improved in recent years, these early market hours are of particular concern for females. It is also mainly women who visit markets during the morning in preparation for their businesses. Markets have a comparative advantage for bulk buyers. Product prices are slightly lower than in kiosks, a profit margin that is important for those running kiosk businesses.

Most street food vendors and kiosk owners visit open-air markets several times a week. Such regular visits come at a cost. One is transport, and the other is opportunity cost. Both are reflected in the price margin they arrived on this last mile between open their markets and consumers. There are various reasons for frequent market visits. One is a lack of cash flow and savings to purchase products in bulk. Another is the procurement of fresh produce that arrives at open-air markets early morning. In the absence of cooling facilities in these markets and at kiosks or places where produce for street food vendors is being kept, one is forced to procure fresh food in synchronicity with business requirements.

Clients of open-air markets and vendors in these markets maintain friendly relations. In most cases, clients visit the same vendor several times throughout the week. Switching clients or changing vendors people hardly practise. These relations have advantages and disadvantages. One disadvantage is that clients tend to stick to vendors amid Quality challenges or product price increases. Such practices make it challenging to optimise purchases. Instead, both prices increase, and quality issues are passed onto the consumers.

An advantage of tight linkages between clients and open-air market vendors is reliability and the ability to obtain food on credit.

#### 4.6. Millers

Miller's is a typically family-owned business that grinds cereals for clients. Proper equipment can serve large numbers of clients in a neighbourhood. Hence, the number of Millers operating in Mukuru ranges between 7 and 10 businesses.

There are two ways of doing business as a Miller. One is to purchase grains and grind them to maize flour. There's a constant market for such ground maize flour in Mukuru, especially among residents from western Kenya. The second income stream emerges from grinding grains against a fee that consumers bring to millers. This mode is still the case where residents maintain tight Ties with rural areas and farms. Most farm residents source grains independently or belongs to someone in the extended family. Grinding grains to flour against a fee is the smaller income stream for millers.

In recent years, Millers in Mukuru has received competition from companies grinding and packaging wheat and maize flour. Many of those who prefer packaged flour do so for its taste, cleanliness and constant grinding quality. Food quality control matters to an increasing number of residents in the settlements.

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"I have two main sources of my maize. The first one is either from local wholesalers who source it directly from farmers or from Muthurwa market from a lady who imports from Tanzania. My main challenge is high competition, especially with larger millers who source their maize directly from the farms and can sell at lower prices."

Felister, Miller

#### 4.7. Butchers

Butchers are highly specialised meat vendors. Compared to St based lenders, their capital investment is relatively high. Most butcherries reside in houses and fixed structures. Most of the butcherries in Mukuru lack cooling and storage facilities. But the structures allow

lowering temperatures and display of beef, goat and sheep meat. It is unlikely to find butchers with mixed meat portfolios. Butchers specialise in a specific kind of meat.

Butchers source their meat from arborators and slaughterhouses within Nairobi.

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“I mainly source my meat (beef) from Dagoretti market. My main clients are women who purchase meat three times a week. There are many butcheries around, and hence competition to sell is very high. Therefore, I have to stock with high-quality meat and sell meat to customers according to the amount of money they have.”

Joseph, Butcher

There are no butchers or food vendors specialising in chicken. Those few hotels that source chicken do so from the Bharmar Market. Kenchic is the primary type and source of chicken currently found in Mukuru markets. This is not the case for urban farms. The predominant brands are local.

#### Box 2. Meat markets instead of butchers in Cape Town

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“Meat consumption plays a central role in the diet of many, and people would rather spend money on meat than on vegetables, despite being perceived as less healthy. Meat stalls are usually the first stall established when a new settlement is established. Depending on the season, meat is also cheaper than vegetables.”

In Cape Town, the Gugulethu Meat market and meat traders play an essential role in the Gugulethu informal food trading. The Gugulethu meat market is situated in Zondi, the hostel area in Gugulethu. The hostels are predominantly male, populated by migrant workers. The meat market, a roofed structure with trading stalls, was built and is maintained by the City of Cape Town.

The meat sold at informal stores along NY3 is slaughtered elsewhere and, if required, cooked or prepared on-site. Traders at the meat market at Zondi (within the hostel area)

slaughter their animals on-site and sell raw or cooked meat to their customers. Customers have their preferred and trusted traders, which they frequent regularly.

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“Buying meat at the meat market brings you back to your roots from the village.”

Gugulethu resident

Three Kraals (livestock farmers) sell their animals (goats and cows) primarily for rituals to their customers. There is no slaughterhouse within the Gugulethu boundary.

#### 4.8. Urban farms

At the very latest, since the COVID-19 pandemic, urban farming in Mukuru has increased in prominence. What was first seen by residents as a way to substitute consumption shortfalls with their small livestock production is now increasingly considered a business. Often behind the shacks or along walls, residents keep chicken, rabbits and ducks for eggs and meat. There is a noticeable excitement amongst those engaging in urban gardening and livestock production. Many see these as future business opportunities.

However, looking at urban farming in Mukuru reveals a mixed picture and potential for strengthening both the production and marketing of food produced between houses and along riverines in the settlement. One challenge is the unwillingness of food vendors to purchase from urban farms in the unresolved challenge around hygiene and irrigation. Much of the water used for irrigating horticultural produce is not necessarily harvested through rainwater catchment. Some of the water comes from the drainage system or rivers. Water from these sources often is toxic and neither fit for consumption nor irrigation.

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“I do not source any vegetables from the local producers as my customers would not

buy them. They claim local vegetables are produced using sewerage.”

Kiosk owner, Mukuru

Another challenge is to ensure constant supply to food vendors in Mukuru. Urban farms and gardens produce leafy vegetables, vegetables and cabbages on small pieces of land. While this can support households, they're too small to create a reliable supply chain for food vendors. This is not to say that the potential to increase production and develop robust supply chains does not exist. But under current production conditions, the demand for food that vendors have can only be satisfied through open-air markets and wholesalers.

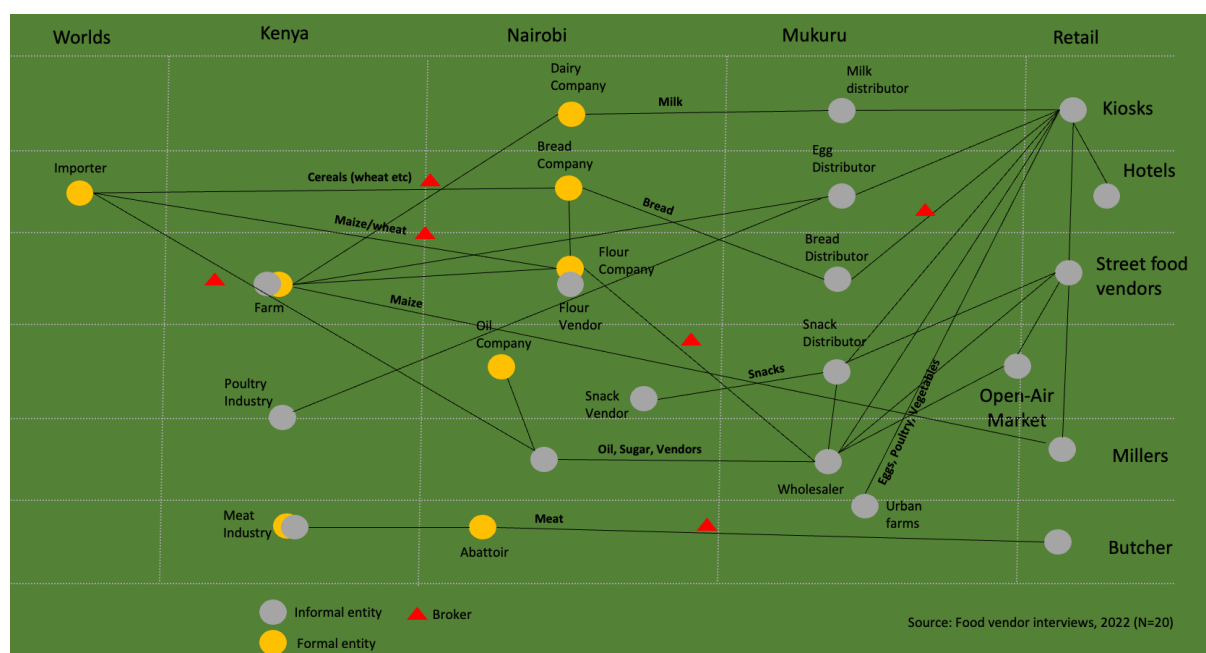
Small livestock keeping office households additional broadly in or income for meat and eggs. The energy demand for maintaining such small livestock enterprises is little and can be satisfied through residue collection. It gets more complicated with large ruminants like cattle. Also, goats and pigs in Mukuru have

a relatively high livestock footprint. Unless open-air markets produce sufficient food waste at a low cost for these livestock units, feeds will have to be imported from the peri-urban or rural areas around Nairobi. Transport costs could be prohibitive for reasons discussed earlier in this document. Against this need for shadow acres elsewhere to feed large ruminants, there's a specific limit to growing these businesses in Mukuru. Technical innovation such as hydroponic based for the production or the use of algae as energy producer could change that assessment in favour of livestock production.

### Summary insights

Each food vendor category draws on a more or less complex value chain (Figure 5). The complexity of the value chain depends on the commodity. Even though conditions for managing value chains, governance and outcomes vary, from the perspective of food vendors, we can aggregate several vital lessons.<sup>1</sup>

**Figure 6. Typical food flows linking producers with consumers in Mukuru**



The frequency of sourcing depends on the perishability of products.

Kiosk owners or employees purchase stock regularly but at a different frequency. The frequency of sourcing depends mainly on the

<sup>1</sup> Given the number of commodities, value chains and food vendors, figure 5 is an anticipation of likely value chain structures and far from comprehensiveness.

perishability of produce. Tomatoes and leafy vegetables, for example, kiosks purchase daily. The main reason for this is to avoid food waste in the absence of cooling and storage facilities. Potatoes and onions, on the other hand, most kiosk owners purchase in bulk. Like in the case of microenterprises, this means one sack of potatoes (70 kilogrammes) and 1-2 nets of onions. Depending on business developments, a potato sack lasts between one and a half and two weeks.

Although exceptions exist, Kiosks tend to purchase perishable produce from a specific win, either on open-air markets or wholesalers.

### Determinants of food prices within Mukuru

As indicated and outlined in earlier sections of this report, the food price within Mukuru depends mainly on food inflation and energy cost. But within these economic frameworks, food vendors carefully managed their business and price building to stay in business.

Although price agreements among those offering food in Mukuru may happen, they are the exception rather than the norm. Nonetheless, food vendors do look out for price developments amongst competitors. To maintain their clients, vendors must offer food for a competitive price. Hence, informal price intelligence is taking place within the network of lenders to adjust food prices, especially during food price spike seasons. The goal of vendors then is to offer the product for the same or lower price as their competitors. Quality differentiation rather than differentiation through prices hardly plays a role in Mukuru. No food vendor association oversees price building in the settlements.

Price competition is exceptionally high in food segments where the offer is high. Examples include maize, beans, rice and cabbages. Also, the tomato market is relatively competitive. The more exclusive the product selection, the lower the competition with others. Chicken-based foods, for example, hardly exist and could be in high demand.

- a) Food prices fluctuate in response to the season.

During the dry season, from January to March, prices are typically high. Food prices then drop during the rainy season and after harvests. High food prices kiosks usually pass on to consumers. The seasonality of food prices is a concern for many kiosk owners. There is a limit to which they can pass on food prices to consumers. Beyond a threshold unaffordable to consumers, clients are likely to stay away, move on to other businesses, or engage in one of the coping strategies outlined in the report acts.

- b) Recycling food is not done by default and comes at a cost

For economic reasons, food vendors try everything possible to purchase the amounts of perishable produce they can consume or sell. Anything that perishes in the shop increases the cost and reduces the profit margin. Some kiosk owners pass on leafy vegetables that are starting to lose their freshness. Urban farmers and livestock keepers in the immediate neighbourhood are among the uptakers of these residues.

- c) Water supply affects product quality

Water and sanitation coverage in Mukuru remains a significant challenge for residents and public administration. Water supply is not always guaranteed. When water is absent, kiosks cannot anymore ensure the cleanliness of kiosks, kitchens and the product itself. Indeed, water and sanitation remain risk factors for food safety and public health in Mukuru.

- d) Supply chain disruption exists, especially during the rainy season

Some kiosks and products are independent of weather challenges and infrastructure. But the majority depends on fresh produce that transporters bring from rural areas onto the fresh market or other distribution centres. During the rainy season and especially extreme weather events disrupt supply. Flooded roads or landslides that block federal roads can easily result in delays of supply of several hours or days. The COVID-19 lockdowns practically demonstrated the volatility of supply chains and prices that would instantly respond to supply chain disruptions and delays in delivery.

Maize flour, cooking oil and sugar.

Maize flour, cooking oil and sugar offered by kiosks differ significantly from perishable produce significantly. Sourcing, for example, is mainly done through wholesalers. For maize, this is Pembe and Cosmo industries located in Industrial area.

### **Turnover of food vendors remains low.**

The turnover of food vendors depends on the number of clients and the financial capabilities the business owner has to pre-purchase food. In Nairobi, food vendors in settlements are, at best, micro-enterprises with a turnover between 200 and a few thousand shillings per day. The profit margin for single dishes is low. Many food vendors, however, depend on their businesses for their livelihood. Although pleurae activity is a common strategy in unstable working environments, many of the food vendors we spoke to concentrate on the one business throughout. The turnover then almost exclusively depends on one or two products. If something happens within the supply chain or consumers drop out for a specific product, the micro-enterprise is at risk.

### **Competition between Kiosks and other market players**

Competition between kiosks exists but mainly depends on price advantages they may or may not be able to pass on to consumers. As transport costs increase, the location of kiosks can be an advantage or disadvantage. But transport costs along the value chain kiosks cannot influence. Purchasing in bulk and in large amounts would be possible if there was storage and sufficient cash flow to finance purchases. At the same time, the risk for kiosks increases. One risk is that poor storage results in degrading food quality. Maize is at particular risk. But there are also risks related to price fluctuations. Without proper market intelligence, bulk purchases are made when relatively high food prices do not significantly become an advantage for kiosks when food prices drop. Kiosk owners seem to be illiquid

to assess and predict food price changes. This puts them in a vulnerable position and becomes a period of innovation and investment.

Microfinance to support purchases in bulk, however, hardly exists. Community-based saving exists but mainly addresses consumption shortfalls among members.

### **Fish, banana, tomato and avocado.**

Location matters for business and turnover.

Most of the main roads in Mukuru host and house kiosks selling fresh produce and packaged food. Although some of the kiosks are located inside the streets, most tend to concentrate near the roadside. The closer the kiosk to the main road, the smaller the share of clients from the immediate neighbourhood. Turnover of kiosks along the main street comes mainly from people passing by and irregular clients.

### **Measures to improve hygiene and food safety.**

Mukuru can be dusty, especially during the dry season. The settlements are close to some of Kenya's biggest industries. Air pollution and dust in public spaces are hardly reflected in the public media. But this does not imply that air pollutants are no issue or concern. Kiosk owners are aware of hygienic challenges that threaten food quality and business. Some, therefore, store food inside the house or structure, away from dusty roads and direct exposure to sunlight. To avoid direct contamination from along the roadside, vendors and kiosk owners wash dishes away from the roadside.

In response to water-borne diseases and infectious diseases like ordinary flu, some kiosks offer hand washing places to clients. Cool with 19 mitigation measures helped institutionalise hand washing in Nairobi and Mukuru settlements. This and only with the lift of mask-wearing in March 2022, this habit may gradually change again.

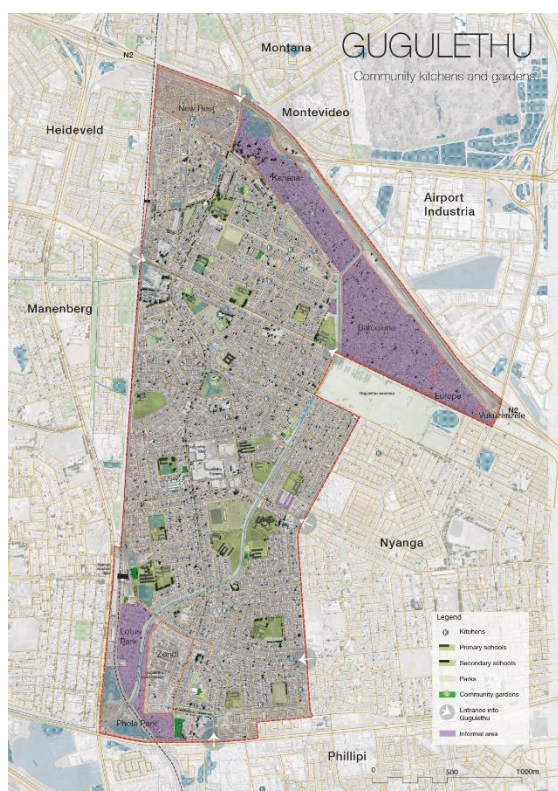


## 5. Deep dive: Urban gardens and kitchens in Cape Town

Cape Town offers an interesting case to understand the potential and limitations of urban gardening in and around informal settlements.

The seven food gardens surveyed (Figure 6) in Gugulethu are the market gardens of GUFFI (Gugulethu Urban Food Forest Initiative). Additionally, also six gardens in Mfuleni were surveyed. Mfuleni is a township further east of Gugulethu. Both areas are situated in the Cape Flats, a former dune landscape characterized by sandy soil, strong winds and a now primarily flat engineered topography.

**Figure 7. Map of community kitchens and gardens in Gugulethu and gardens**



Source: SUN development

Growing conditions for urban gardens are harsh in the dry and windy summers. Gardens need to be irrigated to produce throughout the year. Cape Town is a water-scarce city, which brings an extra cost and maintenance

issue to the gardens. The sandy soil needs to be improved regularly with compost and mulch to hold water, keep the soil down from the wind and supply the garden with the necessary nutrients. Apart from the climatic and geological obstacles to growing vegetables under natural conditions, vandalism, land access and funding difficulties create an almost hostile environment for urban farming. But the urban gardens are places of hope, conservation of open land and learning through generations. They are islands of green in very dense areas where land is contested.

The gardens differ in age as the oldest was established in 2006 and the youngest in 2021 only.

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Our soil is very sandy, shortly after watering our crop it dries again and that's due to the sandiness of the soil. I don't have enough seeds to plant. I think the other challenge is our ground is very sandy. You can see when you plant and water and then within maybe 10 or 15 minutes then it is dry again as if you didn't do anything, it is too sandy.

### *Farmer, Gugulethu*

Garden sizes differ significantly between 223m<sup>2</sup> and 1176 m<sup>2</sup>. Only three gardens use more than three-quarters of their available land for cultivation. Within the other ten gardens is the potential to extend their cultivated area to increase production. One garden grows its products exclusively in raised planters. While another garden has a combination of ground and raised beds. Raised beds are easier to manage and greater in production outcome but more costly to establish.

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The soil, the sand doesn't give me enough production. I have to have enough manure for it. I was planning to find funding so that I

can have a greenhouse because my crops get dried out when it gets very hot.

*Mfuleni farmer*

Growing tunnels or shade structures help alleviate the climatic conditions under shade netting. Eleven gardens have such structures, and some grow under these exclusively. Shade netting and the supporting structures are often vandalized or stolen. The fencing becomes important in defending the product against theft, vandalism or animal intrusion. Only eight gardens have a fence fulfilling its purpose.

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Besides vandalism, it's the animals, i.e., goats and cows, that are problematic, they usually eat everything, and another challenge is that there is no security for the garden, which makes it a challenge.

*Farmer, Mfuleni*

Irrigation is essential to growing vegetables during summer in Cape Town. 9 gardens have an installed borehole or wellpoint. However, the pumps are often subject to theft and vandalism and need ongoing maintenance. Only six managed to extract water for a water test during the survey, and only 5 of these are working. In gardens with access to municipal water (9), tap water is used for irrigation as a very costly substitute. The installed borehole systems are working with a storage system of rainwater tanks. Rainwater collection only for irrigation is in Cape Town not viable due to the amount of storage capacity needed. It is a good substitute during the winter month.

Only seven gardens grow their seedlings, which becomes a financial input they have to make regularly for the other six.

**Land ownership**

Land ownership varies in the City of Cape Town. However, only seven gardens have a written lease agreement and only three verbal lease agreements. Lease agreements for several years are a funding condition. Like the provincial Department of Agriculture demands an 11-year lease agreement, schools only give five years.

"My challenge is the lease, I met a City of Cape Town representative, and they sent me to the wrong department, I was then given an email, and I have not gotten a response yet."

*Farmer, Mfuleni*

Conflicts are highly likely without a secure land tenure based on land use planning to support urban gardening.

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"The challenge is that the land belongs to the school, so there is a conflict of interest should the SGB or the School decide not to renew my lease. I won't have a place to go, and it's not sustainable because I have put time into the garden."

*Farmer, Mfuleni*

The higher the land tenure security, the higher the potential for resource scar's households to invest into urban gardening. But the opposite is true as well. Insecure land tenure provides little incentive to households to invest in anything permanent, including trees.

**Funding**

More than 50% of the gardens received funding to start their garden, but only four are currently funded. The majority of the gardens find navigating the bureaucratic system to receive funding too tricky and that there is not enough information available about the different systems. Funding applications are time-consuming as follow-ups are needed.

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"Usually, companies don't respond or say we don't qualify, but it takes long to get a response."

*Farmer, Mfuleni*

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"We don't have funds to pay the helping staff. We need assistance (from the NGO assisting us), but we haven't gotten any positive feedback from them. We, the only thing we get from them is assistance with

the seeds, but I forgotten the name of the organisation.”

*Mfuleni farmer*

“All organizations that are willing to help /assist require a lease agreement, which I don’t have. Therefore, I am unable to get funding.”

*Farmer, Gugulethu*

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“We don’t know where to go to find funding, and secondly, we don’t know how to sell our things because we only sell to the community.”

*Gugulethu farmer*

### Market access

The selling of fresh seasonal vegetables to the local market or other resellers applies only to 9 gardens. Of these, only 3 receive a monthly income of more than R500 from the sale of vegetables. The other four gardens donate their produce to the school kitchen and ECD’s. The garden staff in 11 gardens receives vegetables for their consumption.

Ten gardens do not sell additional products like compost, seedlings, or mulch.

### Staff

Over 70% of the interviewed garden staff is female with an average age of 51. More than 50% learned to garden in a rural area. Most gardeners don’t have a salary but receive a government grant as an income.

### Food Kitchens

Food kitchens started in 2020 during the Covid 19 pandemic serving food to residents to mitigate hunger in the area. Twenty-one kitchens in Gugulethu serving together more than 15.800 meals a week were surveyed during this study.

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“Covid affected people, some lost their jobs, and some took a pay cut, so they need food support to supplement their income. Besides feeding people from the streets, there are people from Samora [an informal

settlement close by], some are working professionals and decent people who have homes, but they know a meal could help them, so they also come to the soup kitchen.”

*Kitchen staff, Gugulethu*

### Operation

The average kitchen operates from a private home in a formal area in Gugulethu. Meals get cooked on outside gas burners in a kitchen and are served at the door in customers containers. The kitchen sizes vary from 5-60m<sup>2</sup>. An average kitchen is 27m<sup>2</sup> small. Almost half of the kitchens operate out of garages, carports, sheds, and containers. Clients take their meals home for consumption. The main clients are children and men. Lunch is offered as the main meal, while some kitchens do breakfast and lunch. Drop-in clients don’t get turned down while a customer register is regularly kept. On average, a kitchen has five staff/volunteers, which fluctuate due to other job opportunities or commitments. In kitchens serving more than one meal the staff also works in shifts. The kitchens usually don’t have a menu as they rely on donations of ingredients. Mid-week, Tuesday to Friday, are the busiest times and when most kitchens operate.

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I would say there are a lot of people [who] are at home. We don’t normally eat lunch in our homes hence [why] so many people come in. Most people eat porridge in the morning and eat bread somewhere along the way [during the day] and then supper. So, we prefer to do lunch so that people get at least food for lunch for the day. We still hearing stories of people being retrenched or struggling with temporary jobs, and people are still not working. We also have children who are not going to school every day, so they also come to the kitchen and get their lunch.

*Gugulethu Kitchen staff*

There is a concentration of kitchens in the northern part of Gugulethu, where almost half the kitchens are situated. 2 of the kitchens are located in informal areas of



Kanana and Europe. A 500m circle was used in the map below to understand the catchments and highlight concentration.

### Ingredients

The ten most common ingredients used in the kitchens are Soya, Rice, Potatoes, Oil, Carrots, Pap (Maize semolina), Beans, Lentils, Pasta and Cabbage.

The five least common ingredients used are eggs, Butternut, Spices, and Maltabella (Sorghum porridge).

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"I would cook healthy food if I had the money, like vegetables and meat, which are both expensive. [ ] I hate cooking for people and serving them something I wouldn't eat. If I had money, I would really cook the best of the best. For example, last after last year I had some money from UIF, so I was buying ingredients from my own pocket. I used to do them buns, healthy blended soups, and other days it was meat like everything that I could afford so that I always make sure that whatever I cook, I would eat and go for it. "

*Gugulethu Kitchen staff*

### Funding

Over 70% of the kitchens find it harder to get donations than last year. 5 kitchens receive no funding. The funding support for the Gugulethu Can kitchens comes from the Seaboard CAN, Ladles of Love, Ikamva Labantu, and Bentleys and gets distributed from one central kitchen. Government support by the Department of Social Development was only given to 2 of the kitchens. Only 2 out of the 21 kitchens have a dedicated person to apply for funding.

"2020 was difficult as we had no starting point, and we were purchasing food with our own money. Last year (2021) was slightly better as we received vouchers from VPUU to buy food to cook for people, but its challenging because the numbers are increasing."

*Gugulethu Kitchen staff*

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"The demand is higher. The food is mainly for those in need. They need help with food because a lot of people are unemployed, and the grant money is not enough. Sometimes there are eight people from one home who comes to collect food. "

*Kitchen staff, Gugulethu*

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"It is harder because of covid. Things are not the same as they used to be]. It's only DSD that is helping me, so if I get donations like two bags of potatoes, it only lasts for two days, and afterwards, I'd have to buy out of my own pocket or ask my children to help me."

*Gugulethu Kitchen staff*

The greatest support is the donation of ingredients to the kitchens. The six main donated ingredients are Carrots, Mixed vegetables, Potatoes, Rice, Soya and Pap.

### Staff/Volunteers

Kitchen operations are in the hands of dedicated staff/volunteers, with 80% women in their prime working age.

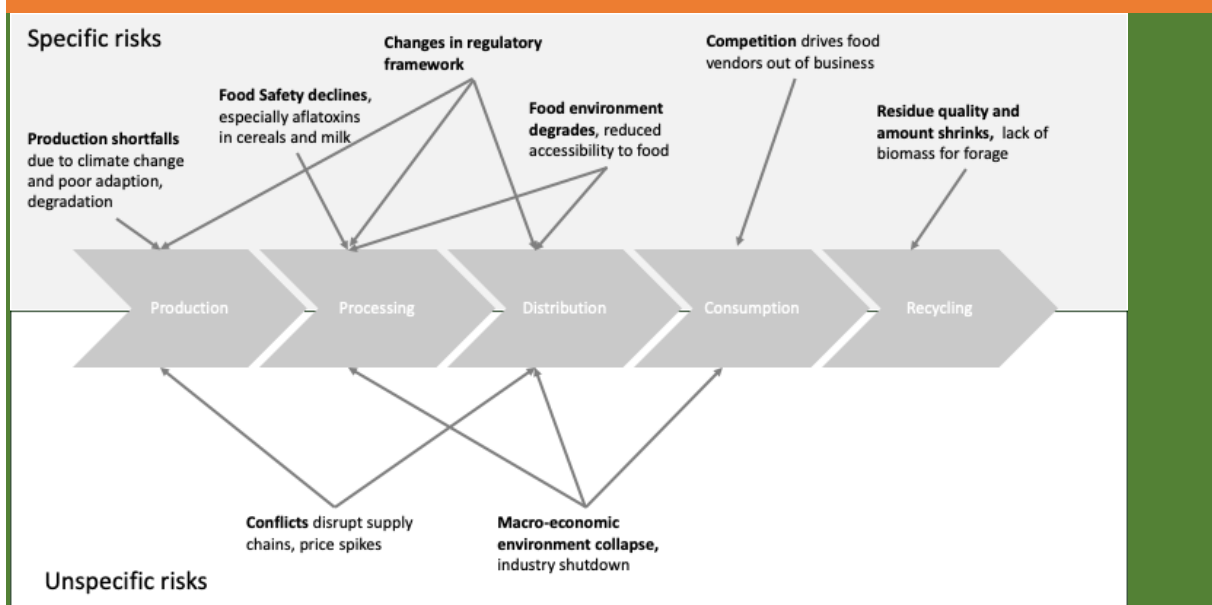
## 6. Compound risks and leverage points

Every food supply chain that links producers and consumers with all the stages has strong and weak points. They are confronted with specific and unspecific risks along the entire food flow ranging from production to the recycling of food (figure 7). Identifying and diagnosing how food flows operate and what causes risk at what stage is central to risk identification and management.

The concept of leverage points or areas becomes relevant here. Leverage areas are

those in a complex system that requires relatively little effort to trigger significant changes. Some of these changes resulted in what we call regime shifts. Such regime shift occurs when the habitus and the function of the system change. Regime shifts can be positive and negative. To improve the resilience of food flows and support sustainable diets in informal settlements, our interest is to identify leverage points we must avoid and doors that we could tip to improve anticipated outcomes.

Figure 8. Risks confronting food flows between production and consumers in Mukuru



Source: Result of discussion of authors, 2022

As introduced earlier, we see food flow risk through the lens of its compounded nature. Compound risks are systemic challenges that can potentially collapse an entire value chain, sector. A supply chain disruption would cause a wide-scale shortage of that product. Even though complete collapses of supply chains or food sectors have been rare in the past, disorders will have comprehensive consequences for residents in informal settlements.

Some of these disruptions and consequences are caused by food flow specific risks. For example, maybe the breakdown of a manufacturer or Harvest disruption through pests at large scale. There are, however, a

range of non-specific risks to food flows. Examples include armed conflict, energy price increases, or natural catastrophes.

There are several factors contributing to compound risks in food flows.

- Geographic concentration of production, processing and supply without the substantial potential for substitution.
- Over-reliance on single suppliers or supply channels.
- Over dependency on a single or a few commodities as staples, such as maize, wheat and rice.

This section diagnoses the compound risks we see along food flows linking consumers in

informal settlements with production. The aim is to flag areas for future action and policy measures to minimise probabilities of failure and support food flow transformations that ensure sustainable diets, green jobs and the resilience needed to withstand worst-case scenarios.

We see two entry points for a community-led food flow risk assessment. One is to assess risks from the perspective of food vendors, the other option is to take a commodity focus.

It makes sense to systematically assess compound risks from the perspective of food vendors as an entry point. Food vendors represent the last mile delivery mechanism in urban settlements. If they fail, much of the food delivery fails, leaving alone the employment effects at risk. But food vendors also represent gateways into complex food flows intersecting with each other. Understanding the risks and possible impact

of failure is a starting point for prioritisation and preparedness planning. Table 3 shows a risk assessment matrix we sketched for Mukuru food vendors. From this rapid diagnosis, it becomes clear that butcheries and millers fall into the lowest risk category. Even if these food flows collapse, the food security and employment impact these collapses may have in informal settlements are comparably small. This is not the case for all other food vending arrangements. For example, the impact of unemployment and income from a street food vendor collapse would be significant. Given the interconnectedness of street food vending along the value chains, we expect ripple effects deep into households with negative consequences for food and nutrition security.

**Table 2. Qualitative risk appraisal per vendor category, Mukuru**

Food Vendors	Functions	Vulnerability	Impact	Preparedness
Street food vendors	Large employment effects, food outreach	Illegal occupation, prone to harassment, food safety, food quality, hygiene, insecurity	Food-borne diseases, loss of life, large unemployment, food emergency	Food vendor associations in discussion, food hygiene and safety training, refrigeration facilities, loans
Hotels	Medium employment effects, food outreach	Irregular employment, food safety and quality, hygiene, inadequate access to potable water	Medium unemployment, Food-borne diseases	Food hygiene and food safety training, access to potable water
Open-Air Market	Medium employment effects, food distributor	Prone to fire incidences and demolitions, food wastage, poor sanitation,	Loss of property and livelihood, physical injury and loss of life	Toilet facilities, proper garbage disposal, insurance from fires and demolitions
Kiosks	Small-medium employment effects, food distributor	Irregular employment, insecurity, food safety, food quality, high cost of operation, theft	Loss of investment and property due to theft	Financial and infrastructural support
Millers	Small employment effects, food distributor	Competition with packaged flour	Low profits, shutting of business, effects on industry	Financial and infrastructural support
Butcher	Small employment effects, food distributor	food safety, food quality, hygiene,	Low profits, shutting down the business, impact on transporter	Food hygiene and food safety training

Source: Based on interviews with food vendors, 2022 (N=20)

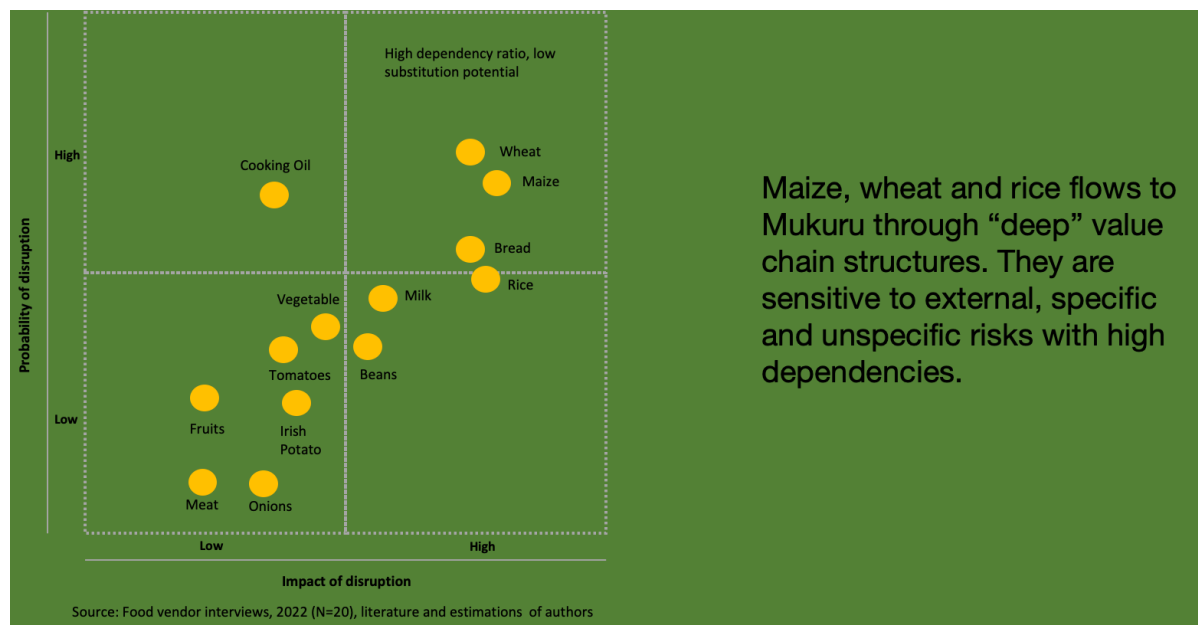
The second perspective on compound risks is the focus on commodities. While some commodities have a low probability of disruption, others are prone to economic and supply chain-related developments. Then there are commodities susceptible to

changes with a significant impact on food and nutrition security in case of disturbances. Examples include maize, wheat and, to some extent, rice. Given their interconnectedness with industry, any collapse of those value chains will trigger ripple effects deep into the

society and employment arrangements. Given their deep value chain structure and sourcing often outside Kenya, they are highly dependent on economic and political

development at the global level. Figure 8 shows the degree of risk associated with certain commodities and processed foods in Mukuru (Figure 8)<sup>2</sup>.

**Figure 9. Qualitative estimation of commodities at risk in Mukuru**



The higher the dependency of households on one commodity, the higher the risk of impact during supply chain disruptions. The same applies to food vendors who rely on one single product. Especially street food vendors who highly specialised in one raw or cooked dish are at high risk. Although informality allows food vendors to adapt flexibly, they often draw food and commodities through formal elements in the supply. The bread industry is a good example. Supply challenges the bread industry may face at some point will

not only risk the employment of workers. It will also immediately affect informal food vendors who live on the margin generated through selling bread in informal settlements. The substitution potential for bread and its ingredients along the value chain is limited. Although there is domestic supply of bread wheat, it is insufficient to meet the demands for bread in Kenya. This example clearly shows that risk mitigation within an informal settlement reduces the degree of supply chain complexity and the deep structures through which value chain actors trade food.

<sup>2</sup> This is a qualitative estimate and requires quantitative validation to become valid and representative for Mukuru.

## 7. Building resilience through actions research

Food flow disruptions and price spikes make essential commodities inaccessible or unaffordable for consumers in informal settlements. And although the probability of risk scenarios remains uncertain, action research should help develop resilience increasing measures to sustain food flows considering different risk scenarios. Some of these measures are short term, and others require a long-term time horizon. Given the different setups of Cape Town and Nairobi, we focus this chapter on Kenya and Mukuru only.

Several of the measures proposed in this study could be implemented with partners within Mukuru. A primary aim will be to search for endogenous factors with high interdependencies. These have the launches potential to become compound risks. Several significant measures and strategies would require the buy-in and support of public administration, companies and the farming community.

While taking measures to increase the resilience of food flows allows no delay, an equally important answer to questions around sustainability and sustainable diets must be addressed. Improving the resilience

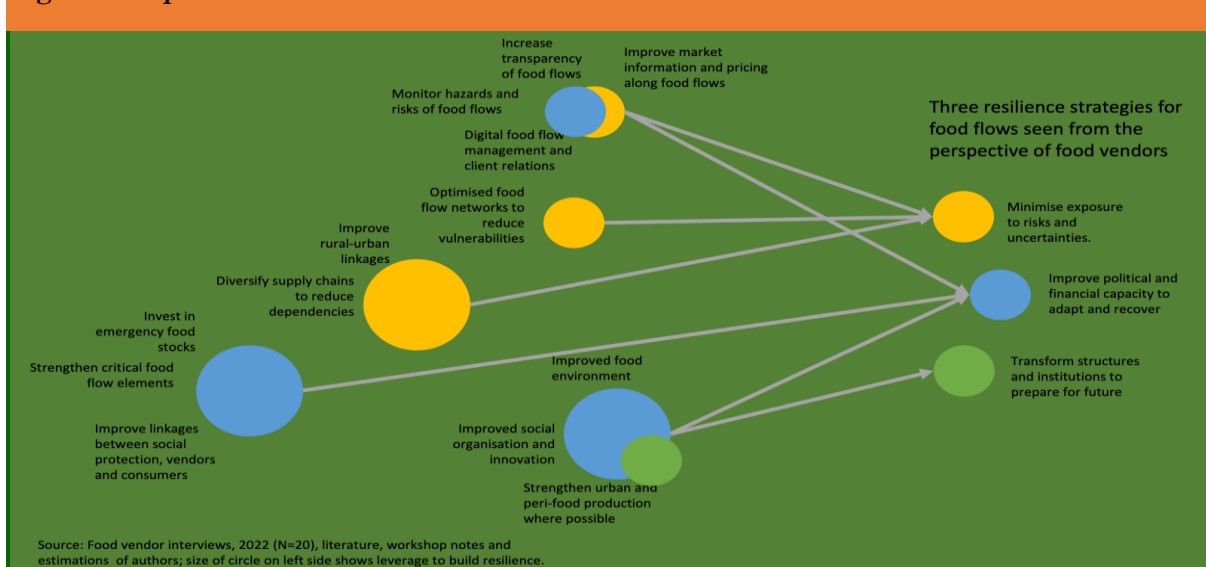
of the status quo would also imply that the status quo, with all its food safety concerns and benefit-sharing inequities, bounces back. If this happens, value chain actors would close shop and make improvements and innovations to support sustainable, healthy diets holistically. Against this background, measures supported through action research in future would benefit from balancing sustainability and resilience measures.

### 7.1. Priority actions

As seen in this working paper, cities like Nairobi source their food from local, regional and global sources. Understanding production conditions in these areas and risk exposure must be part of the risk assessment of food systems in counts and cities. The more concentrated the food supply from risk-prone and volatile areas, the higher the risk for urban food supply. Therefore, increasing urban food resilience must come with a distinct perspective of food production in rural areas.

Figure 9 shows three principal strategies to counter compound risks that threaten food flows and people in informal settlements

**Figure 10. Options to increase resilience of food flow**



## 7.2.Minimise exposure to risks and uncertainties.

- **Monitoring food flows for hazards and risks.**

Hazards in food include the persistence of toxins in leafy vegetables, Mycotoxins such as aflatoxin, which have been strongly associated with stunting in children and liver cancer (Leroy 2013), microbiological growth and other forms of unacceptable contamination in foods. Due to the lack of an organised structure, informal food flows hardly monitor these probabilities that certain conditions lead to hazards. It is beyond the reach of informal settlements to introduce the monitoring of critical control points as done in the industry. However, food committees and conversations amongst central actors could help develop standard operating procedures and principles to support quality management. The PGS could be linked to such an approach.

- **Improve the flow of information on markets and pricing.**

Neither those who serve the end consumers nor vendors on markets and wholesalers have sufficient access to market information. The absence of this market information makes strategic investments and rational economic choices difficult. Putting in place respective market information and making it accessible to the central actors of key food flows linking production and consumption in Mukuru could lower transaction costs in the value chain. Digital services have long been in place and could be easily adapted to Mukuru and its vendors.

Broker access to microfinance. Without sufficient cash flow or savings, strategic investments by vendors a difficult to make. Bulk purchases reduce food prices and increase the profit margin, which could be passed on to consumers. But microfinance is out of reach for many in the informal settlement. The barrier is exceptionally high for micro-enterprises and street food vendors. This is not to say that all vendors should access microfinance, irrespective of

their economic capabilities. But those who have business plans, and the capability of investing would benefit from credits.

- **Create a network of food supply chains to buffer supply risks.**

For essential commodities and products vulnerable to geopolitical changes and the macroeconomic environment meltdown kicks in, it is helpful to build alternative scenarios of procurement end product substitution. This is necessary to prepare for possible shortfalls in the supply of wheat, maize, cooking oil and other essential food commodities. Although the diversification of procurement networks and possible substitution strategies can be supported by communities, it also requires public administration and the private sector to support. A healthy mix of local, regional, and global procurement for strategic commodities helps spread risks.

## 7.3.Improve political and financial capacity to adapt and to recovery.

- **Test and scale digital supply chain management and client relations via social protection.**

Over the past decade, the number of successful digital solutions to manage supply chains over large distances has increased tremendously. Kenya is an excellent example of these improvements. Although several systems also work in the proximity of Mukuru, a gap among what is available, in our opinion, is the linkage between consumers, vendors and social protection. Social protection and emergency cash transfers have been administered independently of vendors. In the worst case, these transfers undermine the informal sector of food vending in the area. But when these linkages exist, then cash transfers can become a powerful mechanism to stabilise food vendors during a crisis. Households eligible for cash transfers would then purchase from food vendors enrolled in the social protection partnership.

Comprehensive risk assessments. This study report identified several risk factors and possible response measures to continue food flows between producers and consumers in Mukuru in the light of shocks and compound



risks. These insights are communicated in the report. However, our diagnostic and the result of a scoping exercise. More in-depth research with communities would be needed to provide the basis for risk-reducing and resilience enhancing measures along the value chain.

- **Improve personal relations between buyers and sellers.**

From direct marketing, we know about the value of trustful ties between producers and consumers of food. One way of organising such linkages is through participatory guarantee systems. Originally developed as an alternative tool expensive organic and fair-trade certification, participate recurrently system spring together consumers and producers to negotiate and agree on product qualities, prices and delivery modalities. The viability of such a system is higher in high-value crops and hardly done for cereals such as maize, wheat and millet. Yet, some of the PGS principles could be tested for leafy vegetables and tomatoes where pesticide residues and food safety concerns are exceptionally high.

- **Improve infrastructure to reduce transport costs.**

Transport food within a row be and between the city, and the rural area is likely to become more expensive. Although infrastructure projects in Kenya have significantly reduced transport and travel time, fuel prices are reasonable to increase.

#### 7.4. Transform structures and institutions to prepare for the future.

- **Improve rural urban-linkages to increase the resilience of growers and consumers.**

Cities, including those we addressed in this report, depending on a complex system of Food flows linking urban consumption and food production in peri-urban and rural areas. Improving the connectivity between urban and rural areas is one principal recommendation from our analysis. Improved rural-urban

linkages could reduce food miles, cut down on transport and energy cost, and increase food quality. Equally important is the effect improved rural urban linkages have on social relations between key actors in the value chain. There are various ways to enhance rural-urban food linkages.

- **Focus supply on regenerative agriculture to deliver healthy and affordable food.**

Industrial agriculture and high-external input farming depend on fertilisers purchased on international markets and easily collapse during disturbances. Also, their environmental footprint and ecologically balanced gradually reduce the ability of ecosystems to bounce back during natural disasters. Hence, investments in reaching narrative agriculture to improve soil quality, biodiversity, and water use efficiency in rural areas are also investments in food security in towns and cities. Cities are not only consumers of produce from regenerative agriculture. They could also become game changes in accelerating transitions towards regenerative farming in rural areas. Developing alliances between cities and specific production areas around regenerative agricultural principles common, therefore, could also increase mutual support during times of crisis.

- **Building climate alliances between cities and core food production areas.**

change and better abilities, including extreme weather events, are among the most significant risks threatening reliable food supply in cities. Therefore, investing in climate adaptation does not only support farmers to stay food secure and in business. Climate adaptation pays dividends to cities and urban consumers, especially those in informal settlements which rely on affordable food. Climate action requires partnerships, and cities have an essential role in supporting climate action in rural areas.

- **Support peri-urban and urban farming and strategic land use planning around cities.**

Sustainable food security in cities requires a sufficient supply of fresh produce from the hinterlands. The more strategically these hinterlands develop into sustainable farm production areas, the better the supply chain and support of the urban regions with food. These hinterlands are also recipients of energy and food waste emerging from markets in cities. But there is a constant competition between a city's desire to expand for housing, infrastructure and industry end farm production. Managing these trade-offs through citizen engagement and long-term land-use planning is critical to improving the resilience of urban food systems and the agriculture around cities.

Wherever space in settlements is available, urban agriculture particularly has the potential to contribute to more resilient and sustainable cities and food systems and strengthen local food production (Yan, Liu, Liu, & Zhang, 2022). In Mukuru, urban gardeners see gardening and livestock keeping as a business and not an emergency strategy. Previous support through sack gardening has lacked a sustainability strategy. One option is to improve efficiency in the local supply chain, directly linking farmers in the rural areas to vendors and markets within Mukuru and developing linkages between urban gardens and uptake in the immediate neighbourhood.

- **Upgrade food environments to prepare for future risks and uncertainties.**

Once food reaches the informal settlement, it is mainly the informal market responsible for the last-mile delivery. This informal market is dominated by microenterprises to ensure that raw and processed, and cooked food reaches consumers. These micro-enterprises are part of the food environment. In Hauser et al. (2022, in press), we suggest several strategic investments in the food environment. Without going into detail here, it is important to see that improvements in the food flow will be unlikely without upgrades to the food environment. The reason is that food environments provide the context in which the last-mile delivery of fresh and processed food takes place. The better this context and the more innovation it allows,

the more likely consumers and informal vendors will forge alliances to improve food flows.

- **Compound risks require long-term risks management strategies and agile management.**

Traditional approaches to managing compound risks in food systems and supply chains are insufficient to prepare and mitigate the impact. Instead, food flows between production and rural areas and informal settlements require institutions that are ready, proactive in terms of taking countermeasures in advance, agile and adaptive when confronted with compound risks. Hence, disaster management strategies run by communities and the state must prepare for compound risks. These strategies must have a long-term perspective and respond to short term, and ad hoc collapses summer along the supply chain. Their focus must be on an entire food system rather than on consumption within informal settlements. Many risks emerge along the entire supply chain between production and consumption.

## 7.5. Social Innovation

Integrating sustainable diets and resilience measures to improve food flows between producers and consumers in Mukuru requires creativity, innovation and collective action. From the deeper meaning of these three concepts, it becomes clear that what we refer to here is tight into social organisations and their capacity to go through food flow assessments and respective improvements. Neither is this exercise of technical nature nor is it limited to a few actors. Instead, we can figure innovation to improve resilience and sustainable diets as an open architecture process that involves all relevant public and private sector actors to instigate reforms and eventually food system transformations wherever these are needed.

None of the issues on the transformation agenda to improve food flows are simple. This absence of simplicity is that most supply chains and the actors involved operate in an environment that we described as volatile, uncertain, complex and arbitrary. Working in such environments requires the right action research approach and understanding of complex, dynamic systems. Equally important



is the inner attitude of all parties involved. This inner attitude supports experimentation and learning without harming in already fragile, often precarious livelihood contexts.

Given consumers and informal food vendors are the entry point for this scoping study, it becomes evident that these should also be the entry points for any future action research. We believe that measures to improve food flows, access to nutrition and the creation of new, ideally will require bottom-up rationality. As much as reforms start with communities, it is important to recognise the heterogeneity common capabilities and power balances within communities. No community or person is alike.

At the same time, the bottom-up rationality must be matched with institutional and policy reforms that typically start at the political level outside the informal settlement. Experiments and action research to improve food flows regarding the resilience and support for sustainable diets is intersectional. No sector such as health, nutrition, agriculture or trade on its own can handle the challenge sufficiently well.

Innovation to improve the resilience and sustainability of tight and related value chains can only work well when all relevant stakeholders sit at the table. This process is albino means without frictions. But frictions potentially develop new insights that can inform the way forward. What dates, however, to manage frictions constructively our capacities to mediate, reconcile and lead. Leadership also entails the ability to formulate visions and integrate these visions into the most potential pathways to instigate change.

Relations of power and financial means along supply chains to end urban areas remain unequal. Often if value chain actors determine prices and pass on those changes to value chain actors along hierarchies, financial and symbolic authority.

As much as tackling food flow challenges by action research shall yield tangible outcomes, learning how to work together and support the development of such outcomes can be as rewarding as the focus on content. This is where monitoring, evaluation and learning

must require a neutral platform for deliberations, the critical exchange of ideas and conflict resolutions. Learning how to manage such complex change in a multistakeholder environment that is inherently volatile and arbitrary an outcome in its own right. Generalising lessons from this process can potentially help communities reform food flows and increase resilience and sustainability elsewhere.

### 7.6. Towards pathways

Given the magnitude and scale of challenges in urban food systems, addressing all necessary leverage points within one project is highly unrealistic. Investments needed to support excess to healthy, nutritious foods for low-income populations in urban areas depend on the public, private sector and civil society actors. Finding arrangements to engage with all these actors at scale within a confined project period is hardly realistic. This is not to say that change is impossible within the limitations of available project resources.

### 7.7. Role of research

Neither urban food systems nor food flows are new research areas. Especially in recent years, the number of publications has increased dramatically. This research increased momentum, especially in the wake of COVID-19 lockdowns and their impact on food systems and supply chains.

Research produces evidence and data helping actors understand what works well under what kind of conditions, and study explains why specific measures to improve food flows fail. Some of the data come through regular monitoring that the project governs through the monitoring, evaluation and learning system. If done systematically across sites, respective data can be aggregated and become a valuable feedback mechanism for action on the ground.

Data that the community and researchers collected in partnership can become a vital support instrument to lobby for supply chain improvements. A practical example is a quest for true cost accounting. Unpacking food prices and making transparent benefit-sharing along the value chain can be an essential method to engage all relevant actors in conversations about changing the political economy of specific food flows. A classic

example is the maize value chain that outcompetes alternative grains, including millets. Although millets have a comparative advantage in health and nutrition, they are often more expensive and less available in settlements. For example, unpacking the pricing of maize could become the starting point for discussions around products some cities support healthy, nutritious foods. True cost accounting studies can help craft the correct political arguments for respective changes.

Research can help test the feasibility and economic rationality of technological solutions supporting food flows with service providers outside the settlement. Cooling and storage facilities, for example, exist but have not yet been tested under the conditions of

Mukuru. Research can help collect respective data and analyse them together with communities. These data sets and assessments then become the ground for informed decisions by communities and possible investors, including microfinance organisations operating in the area.

The research was done in a comparative mode spanning across Nairobi and Cape Town and can be a valuable learning ground for community actors, activists and social businesses. There is a great deal to learn from strategies to improve food flows in these two political and economic contexts.

## 8. Conclusion

This study investigated food flows linking consumers and producers in informal settlements in Nairobi and Cape Town. Although both cities have extended informal settlements, they differ in food environments, access to infrastructure and food flows. A significant factor that distinguishes both cities is that Cape Town has a comparably well-developed social protection system and higher cash flows of consumers in settlements. Consequently, food flows and the retail food environment enabled the expansion of supermarkets and fast-food chains. Informal food vendors exist but mainly along the roads before supermarkets.

In contrast to Cape Town, supermarkets and fast-food restaurants are out of the physical and economic reach of the majority of residents in Mukuru. Consequently, food value chains in these two cities differ. So do risks and strategies to increase the resilience of food flows.

Food vendors in Mukuru are certainly in a difficult position. On the one hand, they are the backbone of the food supply in the informal settlements. Without their outreach, food availability and access to affordable diets will be at risk for many settlement residents. At the same time, a large share of households in Mukuru engage in one form or the other in the food system. They keep shops and run food vendor businesses or support local transport. This means the food system in these settlements creates employment and provides income through microenterprises residents run. To maintain their businesses, they purchase food and energy on external markets. But then they

trade food amongst themselves. Against the turnover and limits to growth these microenterprises are confronted with, taking significant steps across the poverty line through engaging in the food business is limited and most likely restricted to a few.

Considering future shocks and value chain disruptions likely resulting from geopolitical developments and changes in the macroeconomic environment, supply chains in both cities would benefit from upgrades of resilience measures. In view of the specific risks to the supply chain specific, we recommended several short- and long-term measures worth addressing or experimenting with. Some of these measures can be handled directly by the urban food futures project. A few do not require broadscale partnerships and can be managed instantly. Others need buy-in and support from public administration, the regulatory agencies and microfinance organisations. In the food environment report, we suggested hosting innovation platforms. These platforms bring together the main actors relevant for implementing measures that require broad-scale participation.

Data and evidence research can generate during action research as a key ingredient for innovation and change. If documented well, the action research on food flows also provides new insights into the management and enabling of such transformations.

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