





# Food environments

Actions to improve sustainable diets in the informal settlements of Mukuru, Nairobi



## FOOD ENVIRONMENTS:

## Actions to improve sustainable diets in the informal settlements of Mukuru, Nairobi

Discussion paper APRIL 2022

Written by:

Michael Hauser Immaculate Edel Jane Kahwai

Correct citation:

Hauser Michael, Edel Immaculate, and Kahwai, Jane. (2022). Food environments: Actions to improve sustainable diets in the informal settlements of Mukuru, Nairobi . Discussion paper. Berlin: TMG Research.

ISBN: 978-3-910560-56-7

Photo credits (cover):

Muungano wa Wanavijji



### Acknowledgement

This discussion paper results from many contributions.

We particularly thank our community partners who supported data collection. We are grateful to Samuel Wairimu, Omondi Okoyo, Evans Otibine, Maureen Musya, David Mwangi, Edith Murage, Victor Ocharo, Stellar Nduku, Lijodi Musimbi, Victor Otengo, Miriam Mumbi, Purity Wairimu, Catherine Nduku, Grace Adhiambo, Mary Muindi and Malyun Ibrahim. They and many more helped to understand challenges and opportunities the food environments to consumers. Writing this report would not have been possible without their assistance and site-specific knowledge about Mukuru.

We thank the Muungano wa Wanavijiji team for strategy conversations helping address the correct issues in this research, mapping the area and supporting the coordination in the field.

This study report is part of the action research program Urban Food Futures managed by TMG Think Tank for Sustainability Berlin. We thank the TMG team for the partnership; and the Federal Ministry for Economic Cooperation and Development (BMZ) for funding the Urban Food Futures program.

The way we present content, arguments and conclusions we draw from the data and observations remain the authors' responsibility. They may not represent the perspectives of TMG, partners and the donor.



### **Executive summary**

Food environments provide the space through which people access and consume food. Food environments are where people dispose unused food and food residues. Some food environments favour good food. They offer people abundant options to access healthy, nutritious, and safe food that farmers produce sustainably. These food environments explicitly promote sustainable diets. During a crisis within the food system or the broader economy, these food environments absorb shocks well, remain relatively stable or adapt to the new circumstances without significantly changing their functions. Some middle- and upper-class food environments show these characteristics.

In other areas, food environments offer, encourage, or even force unhealthy diets. These food environments lack options, and healthy food typically remains unavailable or unaffordable to people with little income. Information about sustainable diets hardly exists. In extreme cases, food environments deprive consumers of the fundamental right to food. When confronted with a crisis, these systems adapt to changes, but often to the disadvantage of consumers. Informal settlements in urbanising towns and cities are such spaces. There, food environments deprive residents of access to healthy food choices. In other words, during relatively stable circumstances, these food environments do not contribute to health and nutrition. When contextual factors destabilise, essential functions of the food environment collapse. Such system behaviours explain why informal settlements have gone through food crises during COVID-19 lockdowns and are likely to behave the same in the face of future crises.

This report presents findings from a rapid food environment analysis of one informal food environment in Nairobi, the capital city of Kenya. Nairobi is one of the rapidly urbanising metropolitans in East Africa. In 2022, the city was home to 4.3 million inhabitants. Although estimates vary, about 60% of Nairobi's population lives in high-density areas, and informal settlements. As the city expands to the north and the east, so do informal settlements. Scattered in about 200 settlements, people in these areas only occupy roughly 6% of the urban land.

For the scoping study presented in this discussion paper, we qualitatively appraised the food environment in Mukuru, one of Nairobi's largest informal settlements in the east of the city. The settlement is along the Nairobi Mombasa highway and east of the industrial area. It is home to at least 300.000 people. Large parts of Mukuru are informal, with a mix of permanent and impermanent houses built on public lands without a secure land title. Although electricity and access to water and sanitation exist, services remain unreliable. Throughout 2021, the Kenyan media covered evictions of settlers favouring infrastructure projects on a large scale.

Over the past decade, undernutrition in Mukuru declined, but malnutrition and micronutrient deficiencies remain a concern for residents in the settlement. Children below five years are amongst the most vulnerable members to fall short of consumption across Mukuru. The levels of stunting in informal settlements remain persistently higher than the national average. This has far-reaching consequences for human capital, economic productivity, and national development overall.

Together with Muungano wa Wanavijiji and community partners, we investigated Mukuru's food environment from the perspective of access to sustainable diets. We asked if the food environment supports sustainable diets, and the many additional functions food environments have, including employment, communication, and environmental protection. If it does not, we identified reasons. Also, we investigated the drivers pushing the function of the food environment in Mukuru into a state of unsustainability and fragility. We employed a typical mixed methods approach using qualitative and quantitative data collection tools. Together with Muungano and community partners, we organised focus group discussions, in-depth conversations, workshops and a household survey. Although we do not

CRÌSAT

quantify the risks for certain food environment functions in the settlement, our information is sufficient to point out critical actions for research, community-led improvement of the food environment, and policy. Although limited to one specific area, the generic lessons we draw from our investigations in Mukuru are likely to apply to similar settlements in other parts of the city and Kenya.

The conceptual starting point for our assessment of food environments is the food systems framework developed by the High-Level Panel of Experts on Food Security and Nutrition (HLPE) of the Committee on World Food Security. We distinguish between external food environments and the personal food environment affecting the consumption choices of individuals and households. The external food environment and the retail are informal to a large extent. Although the density of supermarkets has dramatically increased across the city in recent years, they hardly found their way into the informal settlements. The personal food environment is dominated by affordability and the necessity for people to make economically rational consumption choices. To capture the risks and uncertainties of informal settlements, we included the vulnerability context, a third food environment dimension.

#### Food environments in Mukuru: Key findings

A central finding of our scoping study is that the current design of Mukuru's food environment supports access to foods to satisfy the daily energy requirements of most people. Compared to 20 years ago, the degree of undernutrition in the settlement is low. This is not to say that the settlement is nutrition secure. Malnutrition and micronutrient deficiencies remain high, and food-related human diseases such as obesity and diabetes increase. Like other informal settlements in Kenya, also Mukuru shows characteristics of a 'nutrition transition'. Overall, the signs of increased sugar intake, saturated fats, and energy-dense diets are visible across the settlement. To a large extent, we relate this emerging nutrition transition to how the food environment operates.

Most food consumed in Mukuru is unprocessed. Although intakes vary and

depend largely on the purchasing power of residents, fruits and vegetables are readily available across the settlement during their seasons. There is no shortage of carbohydrates and root and tuber crops on the markets. Meat consumption has steadily increased over the past decade. Dairy products such as milk are readily available within a reasonable distance. Although informal vendors and shops are brokering most fresh produce, biscuits and bread sales are in the hands of Kenyan brands and companies. Despite the food industry reaching out to informal settlements in other parts of the continent and middle-class neighbourhoods, signs of increased consumption of processed foods emerge only gradually.

#### Ways to build food environments supporting sustainable diets

In theory, it is helpful to distinguish between demand-based, supply-based interventions, and policy actions. Demand-based actions to improve awareness, social organisation and agency of people in informal settlements regarding consumption choices. The better food-related networks under social organisation, the bigger the power of consumers and their ability to demand for changes in the food environment from government and public administration. Although by far not the only entry point for change, demand-based measures can pressure those responsible for shaping food environments. Relatedly, supply-based measures to improve the food environment increase the availability of sustainable diets in informal settlements. But both measures are insufficient without a conducive regulatory environment. To get supply and demand-based measures to work, policies favouring food environments supporting sustainable diets are necessary.

Yet, the limited purchasing power of residents and path-dependencies do not offer much room for improving food environments in Mukuru; too enormous are the challenges, and too little the purchasing power with little option for radical change. There is also the historical neglect of these areas by the government. Yet, we identify opportunities for leveraging change in three specific action domains.

### 1. Measures to improve access to sustainable diets

- Experimentally improve immediate and long term-cash transfers and financial support for vulnerable households to procure healthy and nutritious foods whenever they fall below a consumption threshold.
- Work with communities to raise awareness about health and nutrition and the importance of diversifying food intake.
- Invest in urban gardening and small livestock production units, and test how they contribute to nutrition hubs supporting the personal food environment of residents.
- Link school feeding programmes with kitchen gardens and controlled food production environments to improve awareness amongst children and youth and contribute to a new generation of nutrition-aware consumers. Then test the awareness spill-overs to households and family members.
- Test agency enhancing approaches to support communities to increase the accountability of value chain actors to supply settlements with safe and nutritious foods.

### 2. Measures to increase food availability and operations of vendors

- Test product-specific subsidies to increase the accessibility of fruits and vegetables currently lacking in the food basket.
- Use food pricing policies to increase the prices for food and products that do not provide essential energy for physically active consumers.
- Pilot new linkages between informal food vendors and financial services in Nairobi to improve informal markets' cash flow and investment potential.
- Work with regulatory bodies to test options for voluntary food labelling of healthy foods, such as those developed through participatory guarantee systems.
- Pilot new ways of improving storage and cooling infrastructure and support

renewable energy-driven processing of foods within Mukuru.

- Reduce the depth of supply chains by directly linking farmers in the rural, urban and peri-urban areas to vendors and markets within Mukuru.
- Support a food vendor association to increase agency and coordination.
- Calculate the job creation opportunities through green supply chains and food waste recycling in the area.

### 3. Measures to reduce vulnerabilities in the context

- Encourage cash instead of food aid to support vulnerable households during crises.
- Work with public administration to upgrade road infrastructure, electricity, water and sanitation as an indirect contribution to improving healthy food environments.
- Coordinate social policies with food and economic strategies at the government level.

#### Why forward: How action research helps to strengthen food environments for sustainable diets

Data remains a scarce commodity in urban food environments. When experimenting with new ways to improve food environments through community action and policy change, research helps define critical thresholds predicting radical food environment changes. Research data helps monitor and develop community-led preparedness and early warning of changes in the food environment. Data derived in such a way then help policy actions to create a regulatory environment that supports access to healthy food and allows easy identification and food safety standards.



### Concepts and abbreviations

Action research	Action research is an interactive and often community-led data collection and analysis process supporting problem-solving in a community or territory.
Complex systems	As food systems, also food environments are complex systems. Complex systems typically behave in a non-linear manner. System dynamics are uncertain and volatile.
External food environment	The concept describes factors that are not within the sphere of influence of consumers but influence consumer choices. These include the availability of food, food prices, the retail environment, and the relevant infrastructure for purchasing and consuming food and disposing of food residues.
Food	Food refers to all substances required to satisfy physiological and psychological needs, including non-alcoholic beverages.
Food environment	The physical, economic, social, and political context in which people process, trade, consume and dispose food. Food environments influence people's consumption choices. Food environments are part of food systems.
Food security	It is a state where people avail, excess, and utilise the food they require to live a healthy life.
Food system	A food system commonly refers to all elements, activities and people required to produce, process, trade, consume and recycle food within a given territory.
Informal settlement	There are settlements with houses constructed on land with unsecured or no land titles in cities and on municipal land. Informal settlements a typically unplanned and unauthorised by public administration.
NCDs	Non-communicable diseases (NCDs) refer to chronic, non-infectious human diseases. NCDs often result from inappropriate diets, such as hypertension and diabetes.
Nutrition	Nutrition refers to the biochemical and physiological processes in humans required to provide the body with vital energy and nutrients. Nutrition typically covers the entire process from food intake to food transformation and excretion.
Personal food environment	refers to a part of the food environment that is within the influence of consumers. Variables include affordability, acceptability and preferences people have towards specific types of food. The personal food environment influences food choices and food intake.
Policy action	Policy actions are specific interventions civil society or government agencies support to improve legislation, rules, norms and human behaviour within a food environment.
Public health	Public health commonly describes the health of a society. It is also the individual and collective action to prevent human diseases through public measures. These include legislation, awareness campaigns, and the support of health-improving collective actions. Healthy diets reduce NCDs and improve public health.



Regime shift	Eery team shift is the change beyond which a food environment changes its functions.
Sustainable diets	Sustainable diets refer to the composition of foods that meet sustainability standards from production to consumption. Sustainable diets often include fairness and economic benefits sharing along the supply chain.
Tipping points	Tipping points are thresholds beyond which systems change their behaviour and function.
Vulnerability	The susceptibility of a household, a community, a food environment, or a food system to physically, economic or ecologically risks. The higher the vulnerability, the bigger the susceptibility and the risk of harm.
Vulnerability context	In the context of this study, we refer to the vulnerability context as the setting that causes vulnerabilities in households, the food environments itself and food flows.



### Content

ACKNOWLEDGEMENT	I
EXECUTIVE SUMMARY	II
CONCEPTS AND APPRECIATIONS	v
LIST OF FIGURES	VIII
INTRODUCTION	1
Why this study Note on terminology Purpose of the study Our methodology for studying food environments Building a story for food environments in Mukuru	1 3 5 5 5
A PROFILE OF MUKURU AND ITS RESIDENTS	7
PERSONAL FOOD ENVIRONMENT: ACCESS, ECONOMICS, AND PREFERENCES	10
FOOD ACCESSIBILITY ECONOMIC FACTORS AND AFFORDABILITY OF FOOD CONVENIENCE HOUSEHOLD COPING STRATEGIES KEY FINDINGS.	10 11 12 14 14
EXTERNAL FOOD ENVIRONMENT: FOOD AVAILABILITIES AND VENDORS	16
FOOD TYPES, AVAILABILITY AND PRICE FOOD VENDORS REGULATORY CONTEXT KEY FINDINGS	16 16 19 20
VULNERABILITY CONTEXT	21
Environmental hazards Human health threats Community dynamics Infrastructure. Evictions Key findings.	21 21 21 21 21 21 21 21 22
FOOD ENVIRONMENT FUNCTIONS, DRIVERS AND RESPONSES SUPPORTING SUSTAINABLE DIETS	23
IMPLICATIONS FOR ACTION RESEARCH	27
CONCLUSION	32
REFERENCES	33



## List of figures

Figure 1.Three dimensions of a food environment in an informal settlement	
Figure 2. Functions of a food environment in an informal settlement	
Figure 3. Map of Mukuru, Nairobi	7
Figure 4.Demographics of survey respondents	
Figure 5. Food expenditure share is typical for households in Mukuru	11
Figure 6: A typical food plate in Mukuru, Nairobi (2022)	
Figure 7. Food choices consumers make in Mukuru	13
Figure 8. Sources of information about nutrition and health sources in Mukuru	13
Figure 9. Priority of coping strategies in response to cash flow and consumption shortfalls	14
Figure 10 Types of food offered on the informal markets in Mukuru (2022)	16
Figure 11. Purchase frequency of raw vs cooked in the last 7 days by Mukuru consumers	16
Figure 12. Effects of drivers on food environment functions	



### Introduction

#### Why this study

Urban areas in East Africa experience unprecedented population growth. While growth rates in rural areas have hardly changed in recent years and remain at around 1.7% towns and cities grow at the pace between 2 and 4% per annum<sup>1</sup>. East African cities with relatively low density expanded rapidly within two decades, comprising Dar es salaam, Addis Ababa and Nairobi, Kenya. By the year 2050, the number of Africans living in urban areas will exceed those in rural settings (United Nations, 2019).

The urbanisation of societies is not without consequences for city administration and state governments. More people require more infrastructure, road networks, water, sanitation and electricity. The younger the population, the higher the need for schools and a functioning labour market that offers post-education employment.

Unfortunately, adequate housing and decent living conditions do not keep pace with population growth rates in cities. Consequently, the share of people living in high-density areas and informal settlements has increased in recent years. Nairobi's informal settlements harbor approximately 60% of its total population (APHRC, 2014). Many people in these neighbourhoods are regularly confronted by natural hazards such as floods and landslides.

Finally, more people require more food. More people in cities require higher amounts of energy, vitamins and minerals that they do not grow or produce.

This rising demand for food has immediate consequences for imports, value chains and food production in peri-urban and rural areas. Food that cities demand not only has an environmental footprint but also sends explicit market signals to farmers. The fastest cities grow, the stronger these market signals become. Unlike their rural counterparts, residents in urban informal settlements purchase over 90% of their food (Vilar-Compte et al., 2021). In the absence of purchasing power and demand for products and services outside agriculture, the few options that people in informal settlements have is to trade food. As one of the few reliable markets, most people in informal settlements depend on food sales and the retail sector to access food for their daily needs. The higher the growth rate in urban areas, the higher the demand for food and food security measures.

Nutrition outcomes in towns and cities have changed dramatically in the past two decades, and so has malnutrition. While undernutrition remains a concern, especially for people in precarious living conditions, overnutrition, obesity, high blood pressure and Type 2 diabetes increase and stresses under-resourced public health systems. Many of these health concerns are related to inadequate food intake (FAO, 2021). At first sight, the health implications of poor nutrition are issues of concern in Southern and Northern Africa and the middle-income countries. But there are signs of increased consumption of highly processed foods that are energy dense and high in sugar and saturated fat, animal source foods s at the cost of nutritious foods such as fresh vegetables, fruits, legumes and nuts in East Africa and Kenya. Such nutrition transitions have also reached informal settlements in Nairobi. Also, dietary diversification options of consumers in these areas are constrained by poor availability and affordability of assorted alternatives. Consequently, chronic health conditions resulting from poor diets rise in Kenya and informal settlements (Kimani-Murage et al., 2015) and (Smit, 2016).

As we will show in this report, the context of food consumption influences food intake and nutrition outcomes. This relation between food contexts and nutrition outcomes is nowhere clearer than in informal settlements in towns and cities. Often it is in these urban neighbourhoods where undernutrition and overnutrition co-exist. Hence, we explored the

<sup>1</sup> See UN Habitat datasets: https://data.unhabitat.org/pages/datasets linkages between the food environment and the food intakes of residents in informal settlements.

At the same time, inhabitants of informal settlements are vulnerable to consumption shortfalls. This is a direct consequence of precarious employment and a lack of incomeearning opportunities in and around informal settlements. Global food system fragilities directly translate to fragilities in food environments. Hence, we are interested in understanding how to manoeuvre some of these fragilities and build resilience in food environments.

This report takes a deep dive into Mukuru, one of the major informal settlements in Nairobi, the capital city of Kenya and specifically in three settlements within Mukuru namely Mukuru Kwa Njenga, Mukuru Kwa Reuben and Viwandani which, collectively, are home to over 300,000 inhabitants (Corburn 2017). Aside from ongoing food system research in this area, we chose this site because it is at the centre of a precedent- setting planning initiative for participatory upgrading of informal settlements, having been designated a Special Planning Area (SPA) by the government in 2017 owing to its unique complex challenges brought about by multiple deprivations and tensions (Muungano wa Wanavijiji 2018). The aim of the SPA process is to develop comprehensive and coherent policies and plans aimed at improving the living standards of Mukuru residents and transform the settlement to a healthy and functioning neighbourhood within Nairobi.

Together with our community partners and Muungano wa Wanavijiji, we explored the context in which residents in Mukuru access their food. We have a particular interest in changes that have taken place in these settlements. And we wanted to understand how these changes affect the future trajectories of the settlements and people's nutrition.

### Informal markets are the backbone of food security in informal settlements.

Food environments in informal settlements, and often large parts of the food flows, are dominated by informal market institutions. Informal food retail outlets are primarily located in informal settlements. Most settlement residents depend on this sector for daily food purchases. This is usually bought on a cash basis although some vendors offer foods on credit to regular clientele. A systematic review from nine countries, majorly from sub-Saharan Africa, found that street foods significantly contribute to energy intake (up to 50% for adults and up to 40% for children) and protein intake (Steyn et al., 2014).

More than 70% of the working population in developing countries, predominantly women, depend on the informal sector, and majority of them live in urban areas (ILO 2018; Bonnet, Vanek & Chen 2019) Kenya, the informal sector workers account for 83.6% of the total employment (KNBS, 2019) with majority of them living in the informal settlements of Nairobi. Not all but a large proportion engages in the food system and draws on employment in the food environments.

The Kenya National Alliance of Street Vendors and Informal Traders (KENASVIT) estimates about 30,000 food vendors operating within Nairobi . With each serving about 60 customers in a day, the vendors serve roughly 1.8 million residents daily. Supposing these establishments have at least 2 workers, they create employment for almost 60,000 residents. The annual revenue received from the informal economy in Mukuru is estimated to be Ksh. 7 billion (Corburn, 2017).

By definition, informal food vendors are micro-enterprises. Together with the SMEs in the country, they contribute approximately 40% of the GDP. Again, these are to a large extent informal. Out of 7.41 million micro, small and medium-sized businesses (MSMEs) in Kenya, 5.85 million are unlicensed and would qualify as operating in the informal sector (KNBS, 2016).

# Food environments mediate access to foods. In informal settlements, the goal is to provide access to sustainable diets.

In recent years, investigating nutrition challenges in informal settlements through the lens of food environments has become an important research field. Researchers and development experts have conceptualised inappropriate diets and consumption shortfalls as a household-level challenge in the past. Amongst the main factors that have resulted in explanations for malnutrition were household



income and spending priorities. As logical as they may appear at first sight, these perspectives masked the systemic nature of malnutrition in urban areas. In response to these shortcomings, Battersby (2012) suggests considering the spatial determinants of food insecurity in urban areas. In other words, household food insecurity is always a function of household-level determinants, community dynamics and the broader economy. Framing these different levels of influencing factors cumulated in a vibrant academic food environment debate. As we present in more detail in this scoping study, food environments have affected access, purchasing habits, food intake and nutritional status of populations. Food environments are the context in which people make decisions.

#### Food inequalities are likely to increase unless policy and program actions build food system resilience in informal urban settlements

Even though the food trade in such neighbourhoods depends on complex supply chains, food environments are relatively predictable. This is not the case in informal settlements and high-density areas. There, the food environment is typically informal, complex, uncertain and volatile. Hence, if the goal is to understand and support food intake and nutrition outcomes in informal settlements, a thorough understanding of the complexity of food environments is a prerequisite for any future action.

Undoubtedly, food relevant resources and the food itself are unequally distributed within Nairobi. These inequalities include income and purchasing power. But there is also rising inequality regarding access to food. Investments in food environments, for instance, show such unequal allocation of resources and investments (FAO 2017; Lovhaug et al. 2022). Also, within informal settlements, people have different opportunities, social positions and capabilities to withstand economic shocks or trends such as food inflation. In Mukuru, most residents depend on jobs in industrial areas for their livelihood. These, in turn, rely on the overall economic performance of the sector and the country. If employment declines, people in settlements hardly have alternative employment opportunities within reach. This is one reason

why during COVID-19 lockdowns when people lost their jobs, the number of informal food vendors visibly increased across all informal settlements in Nairobi. Food vending was the only microenterprise people could develop without investment and sustain for a certain period of time.

#### Note on terminology

**Defining food environment.** The concept of the food environment has gained traction in recent years (HLPE 2017; Global Panel on Agriculture and Food Systems for Nutrition, 2017). Scientists use it to analyse the conditions under which people access and consume food. Consumer groups and civil society use food environment concepts to argue for better nutrition conditions. And policymakers view legislative and political measures through the lens of food environments. Food environments have become a critical heuristic to understand the physical, economic, political, and social conditions under which humans consume food. Some food environments lead to healthy nutrition outcomes, and others do the opposite. If the aim is to understand the nutrition outcomes of people, there's no way around analysing food environments.

The HLPE (2017) defines the food environment as the "physical, economic, political and socio-cultural context in which consumers engage with the food system to make their decisions about acquiring, preparing and consuming food." This definition underlines the fact that the reasons why people consume a specific type of food under certain circumstances depend on factors way beyond individual choices. Or in the words of the HLPE: "The key elements of the food environment that influence consumer food choices, food acceptability and diets are: physical and economic access to food (proximity and affordability); food promotion, advertising and information; and food quality and safety. (HLPE, 2017)". This definition implies that individual choice remains essential, but the structural conditions matter equally.

Those concerned with food and nutrition gradually realised that food environments do not exist in isolation. On the contrary, food environments are part of comprehensive, often complex food environments. Therefore, the European Commission, Group of Chief



Scientific Advisors in 2020 defines the food environment as "the interface that mediates people's food acquisition and consumption within the wider food system. It encompasses external dimensions such as the availability, prices, vendor and product properties, and promotional information; and personal dimensions such as the accessibility, affordability, convenience and desirability of food sources and products". As such, the European Commission underlines the role of food environments as an interface between consumers and the processing, trading and production of food (European Commission, 2020).

Although closely related, food environments differ from supply chains and the actual food

preparation and consumption. Value or supply chains refer to the stages through which food flows and transforms between production and consumption. On the other hand, food preparation defines the individual act of preparing and consuming food in households or public spaces. The lines between a food environment and food preparation are often blurred. Therefore, scholars have distinguished between the external and the personal food environment in recent years. For this report on food environments in Mukuru, we apply this distinction between personal and external food environments but expand it with what we call the 'vulnerability context' in which food matters are embedded.



#### Figure 1. Three dimensions of a food environment in an informal settlement

Figure 1 presents an image of three food environment layers helpful for this study. These three layers are tightly connected, and information, energy and resources flow between these dimensions of food environments. Some of these interactions provide stabilising feedback and maintain path dependencies food environments face. Others have the power to change the shape and function of food environments.

**Personal food environment.** At the heart of food consumption is a choice. People opt for one and opt out of another type of food. Understanding these choices have long been the subject of research by food psychology, sociology and behavioural economics. In the



food environment debate, many of these disciplinary insights and now captured under the label personal food environment. This label refers to the immediate context in which a consumer takes food-related decisions.

The personal food environment encompasses the ability of consumers to physically access healthy and nutritious foods without harm or side effects. It also addresses food prices and convenient access to food and food outlets within an acceptable time frame.

As much as food choices result from material factors within the immediate context offered to a person or household, culture, norms, and values are equally important. These include deeply held assumptions about the importance of food. The availability of information to a consumer, for example, does not necessarily capture these paradigmatic dimensions of food choices. In most cases, information on food and healthy eating remains inaccessible to human beings. This often is the case when messaging and underpinning paradigms held by a person contradict each other.

Food cultures and deeply held beliefs about food and eating are often reflected in the way people speak about food. We refer to these food stories as food narratives (O'Kane and Pamphilon, 2016; Swan et al., 2018). A food narrative is often unconscious expression preferences. This story tells what a person believes, feels and thinks about food and eating. Although hardly reflected in debates about the personal food environment, we believe food narratives are implicit, invisible pillars of the food environment and thus food choices (Kahwai and Hauser, 2022, in press). The better we understand these stories, the better our understanding of the psychological drivers of food choices of individuals and communities.

**External food environment.** Neither food choices nor the personal food environment exists in isolation from what scholars refer to as the external food environment. The external food environment comprises all the factors and processes in the material world that mediate availability and access to foods. These factors include physical infrastructure, food price dynamics, roads and food marketing.

While the personal food environment is to some extent within the sphere of influence of

consumers, the external food environment is not. The availability of certain types of foods and the outreach of vendors in and neighbourhood depends mainly on the food economy. Consumers influence this food economy by engaging in supply and demand dynamics in markets. But these influences are rather indirect and hardly change marketing and regulations. Consumers require a significant collective agency to influence external food environment variables. In most cases, these variables are in the domain of governments and the private sector.

External food environments address the provision of nutritious, healthy and affordable food within an acceptable distance of consumers. Food availability results from food infrastructure, roads, street lighting and security. Finally, food preferences depend on socialisation, culture and social context.

Vulnerability context. Residents in informal settlements live and often work in these settings that are inherently volatile, risky and complex. Many political, social and infrastructural challenges, directly and indirectly, affect the external and the personal food environment. Water and sanitation infrastructure, for example, have direct implications for the utilisation of food. Safety concerns and land tenure security affect people's choices. Some factors in the vulnerability context are almost permanent, such as infrastructure failure. Others are seasonal. Examples include seasonal migration of the settlement, heat waves and flash floods. Finally, trends such as demographic changes and population density increase with direct consequences on housing, food infrastructure and eating.

#### More than just food broker: Food environments have multiple functions in informal settlements

In this study, we define food environments through a functional lens (see Figure 2). We do so by asking what essential functions a food environment in an informal settlement has. The role of the food environment is to enable people to choose food. But there is more to that.





#### Figure 2. Functions of a food environment in an informal settlement

For this study, we distinguish between the core function of a food environment and three additional functions. The core function of any food environment is to make food available through transport and food retail and broker food between the retail and consumers. The aim is to increase nutrition and human health through access to affordable food. These core functions are central to sustainable food environments and food systems. A leading role food environments play is to maintain and further develop the channels through which food flows from producers to consumers<sup>2</sup>. Providing food and nutrition to people is a core function of food environments. In

<sup>2</sup> Conceptually, food flows supply chains that link producers and consumers through trade, processing and value addition. See separate TMG study report on food flows in informal settlements.

combination with other services, the food environment influences the type of foods and the quality people access. Hence, it directly impacts nutrition and food-related diseases and health.

Next to this function, three additional functions are often underrated and overlooked in food environment assessments. They play a central role in informal settlements. Food environments offer employment to residents in settlements as food vendors, shopkeepers, transporters, and garbage collectors. The food environment in an informal settlement is a large employer of people. Food environments are part of the formal and informal safety Nets



in settlements. Some of the safety nets are held by street food vendors who offer credit to consumers. Others are more formal through food aid delivered through public and humanitarian actors.

But food environments also provide the space for social interactions. People are able to meet and interact with each other's at markets and at street food vendors. Hence, food environments get people together and build social capital. Food environments provide the platform for social interaction and political action. Creativity and innovation, for example, require people to get together and often, markets play this role.

Finally, food environments provide this basis for the recycling or disposal of food. The better these processes are the more significant the contribution to environmental health in a settlement. It is helpful to distinguish between environmental functions that concern informal settlements directly. Organic waste disposed of in landfills, for example, has direct implications for the quality of the food environment and air quality and greenhouse gas emissions. But then there are environmental functions of the food environment that link urban areas with farmers in the countryside. People's choices and the kind of food consumers demand generate food flows and production incentives. Some of these growing choices degrade environmental health while others increase the quality of soils, land and water. These rural-urban linkages create an impact along the entire supply chain.

When assessing food environments regarding their contribution to society, it matters to consider and weigh each function thoroughly. Some food environments may contribute to public health but discount environmental safety. Others may contribute to nutrition and allow people to access healthy and safe foods. But at the same time, actors in these food environments may uphold versions of underemployment and indirectly contribute to precarious livelihood conditions.

A central question in food environment research is how informal settlements can uphold food environment functions in the light of compound risks and multiple crises. Which functions of the food environment can withstand shocks, and which ones are likely to collapse? In the wake of the COVID-19 pandemic and current geopolitical transformations in Europe, these questions are more relevant than ever. Answers, in turn, help community actors, private sector partners, and the government strengthen food environments' resilience across all its functions. Data and insights in response to these questions help craft a whole range of actions to build the resilience of food environments

#### Power relations within and between the three food environment dimensions.

The three food environment dimensions presented in this study link together through relations of power. Power refers to the ability of an individual or a circle organisation to influence the behaviour and interest of others. (Turner, 2005), for example, food retailers with the ability to set prices and offers have power. Consumers who make consumption choices in large numbers have some degree of control. And government agencies that set rules and regulations impose authority through their regulations. Food systems research must be concerned about power relations among food system actors. When these relations are reciprocal and coherent concerning a vision, they may support common goals, such as sustainable diets and affordability of healthy food.

But not all power relations favour values such as reciprocity, equality and sustainability in the food system. Food system actors often have vested interests. Such actors engage in certain food environment activities for personal gains. This is not to say that vested interests are necessarily inappropriate or harmful. But they increase imbalances when including some and excluding others regarding access to food. Food environments, through their systemic structure, exert power over people. And for that reason, one must understand the consequences of these systemic structures on people's behaviour through the lens of power relations.

Gender relations are typically organised along with power relations. Within food environments, men and female have divergent access to assets, decision-making authority and governance. Norms and rules encoded in institutions maintain relations between men and women. Examples include allocating responsibilities between men and women in the value chain, authority over financial resources and spending, and eating habits. Some food environments favour men, while others pose a risk to women. Hence, food environments are by no means neutral.

#### Purpose of the study

This report offers a deep dive into informal settlements and their food environments in rapidly urbanising African cities. This report aims to share policy-relevant aspects of food environment changes. It assesses these changes regarding access of people to healthy food and diets among people with little income. The specific aims are

- 1 To provide an overview of the food environment in Mukuru, one of Nairobi's largest informal settlements.
- 2 To assess drivers and future trends of selected food environment function in the settlement.
- 3 To identify and prioritise action research to support improvements in the food environment of Mukuru, ensure access to sustainable diets and build urban resilience.

The report serves as a basis for identifying and planning future action research strategies and possible interventions in Mukuru.

### Our methodology for studying food environments

The study works with a typical mixed methods approach. We draw on the rapidly expanding literature on food systems, food environments and eating in informal settlements. Some of these studies focused on Nairobi. We then worked with community members in Mukuru who shared their perspectives on the food environment they live in and draw from. These community members then helped conduct qualitative appraisals of the food environment. Following a two-step food environment workshop, we organised in-depth conversations with consumers and vendors to understand and document specific features of the Mukuru food environment. We did not offer any economic incentive to respondents, and it was clearly explained to them that the information provided would not lead to social benefits or food aid.

We then proceeded with a consumer household survey. For this survey, we interviewed 278 respondents in three settlements. In the absence of household lists, random sampling was not applicable. We, therefore, sampled across each of these three settlements using a quota of men and women in different livelihood categories. The livelihood categories were: Single male-headed, single female-headed, male headed, and female headed households.

Community voices and perspectives on our analysis matter to the final recommendations conveyed through this report. We, therefore, conducted one meeting with community members in Mukuru to test the validity of the conclusions expressed in this report.

#### Limitations

This scoping study is diagnostic in nature. Although insights from a consumer survey inform sections of this report, the lessons we draw are site specific and not representative for all people and Mukuru as whole. As a discussion paper, our recommendations are preliminary and invite stakeholders for further deliberations on what could work best from the perspectives of communities TMG engages in action research.

### Building a story for food environments in Mukuru

Understanding food environments in Mukuru – as it would be for any other informal settlement in Nairobi -- is critical for crafting effective food policies and strategies to improve nutrition in urban areas. Policymakers must see the relations between specific food environments and nutrition outcomes. The better the food environment, the argument the healthier nutrition outcomes of its population. The following summary provides an overview of the relevance of food environments in urban food systems.

### Food environments are complex systems

Food environments are part of more extensive food systems. We configure and conceptualise both as complex systems. The nature of these systems is unpredictable and volatile. This makes food environments in informal settlements so complex. Rather than ignoring this complexity, the only way for communities, practitioners and stakeholders is to work with the flow of complex changes. Agile



management, therefore, is central when designing strategies and pathways to build human agency and reform structures that influence food environments, their functions and performance.

A food environment creates a structure within which humans make decisions. A structure is a typical pattern of human behaviour within given economic, political, social and cultural conditions. These structures are created and maintained through human behaviour. Humans make food choices within the structures they create.

Nutrition outcomes and consequences of eating habits outpaced understood through the structures that create them.

If the goal is to achieve better nutrition outcomes in urban areas, it will be necessary to change structural arrangements that influence human behaviours.

Agency is the ability of humans to exert power and follow through with decisions. Agency is the key mechanism to change structures created through food environment variables in an urban setting. The higher the agency of people, the more capacity they have for leading changes in the food environment.

Communities and residents in the settlements will tell the story about future food environments and related systems in Mukuru. And although their footprint in this study report is minor, the report shall provide the basis for future discussions and storytelling. Stories are important because they help craft pathways into a future food environment with sufficient resilience to shocks while delivering healthy, nutritious food to people. How this story sounds and looks in detail is subject to the people. All we can offer here is a generic structure and flashlights on empirical evidence, anecdotes and perspectives.



### A profile of Mukuru and its residents

Mukuru is a largely informal settlement located to the Southeast of Nairobi on Mombasa Road between Nairobi's central business district and the Jomo Kenyatta International Airport. The area is home to about 100,561 households clustered across 30 villages, with approximately 400,000 people covering around 650 acres; it is estimated that the population in Mukuru will grow to over 650,000 people (Corburn, 2017). The settlement is adjacent to more than 300 industrial facilities in the industrial area which employs a large share of Mukuru's residents.

#### Figure 3. Map of Mukuru, Nairobi



Source: Kathrin Krause/SUN and Muungano wa Wanavijiji

Informal settlements comprise houses and shacks built on public or private lands without authorisation. Most housing structures have iron sheet walls with roofing made of iron sheets, but there are emerging dynamics with few permanent high-rise buildings being erected in some areas. Only the main roads are paved. Although conceptually different, both share a high level of poverty and populations with signs of malnutrition.

#### The economic status of residents in Mukuru is volatile, and wages are among the lowest in Nairobi

Unlike in rural areas, people in Mukuru rely almost entirely on access to cash to satisfy their nutrition needs. The higher the degree of poverty, the greater the share of the total available daily budget on food. Poor men and women in informal settlements spend between 50 and 70% of their available cash on food (Dixon et al., 2007). Consequently, underemployed or unemployed people who lack income through self-employment are most vulnerable to price fluctuations and sudden food price spikes. The food price crisis in 2007 and 2008 and the COVID-19 lockdown drove large shares of residents in the informal settlements into food poverty.

#### Food security in Mukuru has improved in recent years. Yet, residents face nutrition challenges

Food insecurity and undernutrition have rapidly declined in the past decade. But this is not to say there is no hunger in the settlement. Malnutrition and micronutrient deficiencies dominate. Especially children under five years are vulnerable to micronutrient deficiencies. During lockdowns and when parents lack the cash to cover school fees, they drop out of school feeding programmes.

There are increasing signs of overnutrition and obesity. And drawing from interviews and workshops with community members, participants flagged diabetes and blood pressure as food-related issues of concern.

Child malnutrition and micronutrient deficiencies are a particular public health concern (Wahome and Mbatia, 2021). At the same time, overweight and obesity increase in the settlements (Kimani-Murage et al., 2015).



### Housing conditions range from multi-story buildings to shacks

Mukuru has three settlements (Mukuru Kwa Njenga, Mukuru Kwa Reuben and Viwandani). The three settlements are multi-ethnic. Most of the houses in Mukuru are made of corrugated iron sheets, and most of the residents are tenants. There are several industries along the Viwandani area and, consequently, many cooked food vendors to serve the industry workers. During data collection, there were internally displaced persons from recent evictions in 2021.

### Poorly maintained urban infrastructure is a dominant characteristic of Mukuru

Informal settlements typically lack access to quality healthcare, safe water and sanitation facilities. Electricity supply often is erratic and insecure. The lack of reliable water and sanitation success has direct consequences on nutrition and the ability of people to utilise available foods efficiently. Poor water and sanitation often result in infectious diseases, including regular cholera outbreaks and malaria. Waste disposal and garbage collection often do not exist. Garbage then piles up in trenches along streets or in water streams.

### Public and private schools offer a back door into improving food environments.

- Kwa Njenga: three primary schools, one secondary school (day and boarding) for girls.
- Kwa Reuben: one and two public schools Viwandani

The number of non-government schools exceeds those managed by governments in the three settlements.

### Public healthcare exists, but residents prefer private service providers

The three settlements have either one or two public health centres. In Kwa Reuben, most residents prefer the Ruben Centre health clinic, managed by an NGO, Christian Brothers, compared to the government clinic due to the quality of service offered. Some residents from Mukuru Kwa Njenga also come to the Reuben Centre health clinic.

### Social safety nets exist but do not cover everyone in need

Although governments and humanitarian agencies put in place public safety nets in response to COVID- 19 lockdowns, there is no systematic coverage of such emergency response mechanisms in most African towns and cities. Urban dwellers, therefore, relied to a large extent on informal safety Nets and arrangements within the extended family, neighbours and the community.

### Demographics: About the people, we spoke to and interviewed

In Mukuru we almost exclusively spoke to residents. All respondents lived in one of the three settlements (Mukuru Kwa Njenga, Mukuru Kwa Reuben and Viwandani). Kamba, Kikuyu, Luhya, Kisii and Luo are the most common ethnic groups, with a small minority of Muslims. Figure 4 offers an overview of respondents.

		Mukuru Kwa	Mukuru Kwa	
	Total	Reuben	Njenga	Viwandani
No. of participants	n=287	n=93	n=94	n=100
Gender of respondents (%)				
%Female	45	54	52	60
%Male	56	46	48	40
Household characteristics				
Mean Age in years	36.4	35.6	34.9	38.4
Mean number of years of education	10.8	11.1	10.5	10.7
Mean number of years lived in				
Mukuru	13.2	12.2	14.9	12.3
Mean number of household				
members	3.5	3.6	3.5	3.6
Employment situation (%)				
Working full time	13.6	17	17	7

#### Figure 4.Demographics of survey respondents





Working part time	8	8.6	8.5	7
Own business	30.3	25.8	21.3	43
Casual laborer	24	25.8	21.3	25
Retired	0.7	1.1	1.1	0
Unemployed	20.6	20.4	27.7	14
Other	2.8	0	3.2	4
Marital status (%)				
Married	51.9	53.8	52.1	50
Single, never married	25.1	26.9	27.7	21
Separated	13.6	10.8	10.6	19
Divorced	4.9	5.4	5.3	4
Widowed	4.2	3.2	4.3	5
Other	0.3	0	0	1

Source: Household Survey Data, 2022. Mukuru



# Personal food environment: Access, economics, and preferences

Individuals and their households are central actors in food environments. Their capabilities, household dynamics influence the choices they make. We investigated accessibility, food preference, economic factors that influence food choices, and household coping mechanisms for this study.

#### Food accessibility

## Although concentrated in certain areas, consumers can access staple foods within walking distance.

The ability of consumers to access foods demands several factors. Road infrastructure, for example, influences the ability to reach shops or food vendors. Also, electricity and street lighting mediate access to food. Unlike in other neighbourhoods of Nairobi, essential foods are readily available across Mukuru. One reason is the high density of food vendors across the settlements. Although some neighbourhoods are known for specific foods, basic staples such as wheat and maize flour, cooking oil, and vegetables are accessible.

#### Food vendors and markets have long opening hours with peaks early morning and during the evenings.

Eleven open- air markets are within reach for most of the residents in Mukuru. They serve consumers as well as food vendors to stock supplies. Access to open-air markets is mainly early morning hours. Most markets start operating as early as 4:00 am. Food vendors and consumers then walk to these markets during darkness. The security of women remains a concern during those hours. Streetlights, therefore, directly contribute to better access to open-air markets for women.

Consumers visit food outlets and shops within their neighbourhood or workplace whenever they need food. Since food portions are limited and small, some visit more than one food outlet up to two and three times a day. Time influences food movement. In some markets, food vendors significantly lower the prices of their goods in the evening as they try to clear stock for the day, especially for perishable foods, considering the absence of adequate storage facilities such as refrigeration. Therefore, they incur food losses and wastage. Hence, access to food must be seen over the course of the day. The same applies to seasons. Some fruits and vegetables are out of stock or only available at high prices during the offseason.

### Safety and security concerns of women limit access to food vendors early morning.

Some males and especially female consumers avoid purchasing foods and walking long distances to look for food as darkness approaches. Although safety and security have improved in recent years, there is still that fear of being mugged on their way home. New access roads come with security lights. Therefore, this has improved food accessibility. These infrastructure investments will improve the accessibility of available food.

#### A considerable share of the population commutes, supplying themselves with food outside Mukuru.

There is also considerable outmigration every morning from the settlements to factories outside Mukuru. Rather than taking food with them, people tend to purchase lunch or dinner in the neighbourhood or area they reside in during the day. It is unclear how significant the share of commuting residents is. A better understanding of mobility patterns over the week and during the year would also help calculate food balances. It would then become clearer how big the current food deficit in Mukuru is.

### Although more affordable, access to food markets outside Mukuru is limited.

Despite residents travelling to work, the majority cannot afford public transport. (Salon and Gulyani, 2010) report that most low-



income populations cannot afford any of the motorized transport options in the city. Many residents in Mukuru limit their travel outside settlement or walk (Corburn 2017). They also show that women and children are disproportionately affected by reduced mobility. The situation in Nairobi then seems different to those in other cities, such as Kumasi in Ghana. There, consumers travel for longer distances than usual to access higher quality produce on markets outside their neighbourhood (Frimpong Boamah et al., 2020).

#### School feeding and food drives are additional food sources for vulnerable households.

Not everyone in the settlement accesses food through the informal food sector. School feeding programmes provide meals to children and have become an increasingly important nutrition pillar in this settlement. Food drives and food donations thrived during COVID-19 lockdowns. Some of those still exist and provide an important opportunity for residents to avail food at no cost. Access, however, depends on the availability of these donations and is not following a fixed schedule.

### Economic factors and affordability of food

#### The purchasing power of Mukuru residents is low and hardly varies between settlements.

Purchasing power is low and hardly varies between the three settlements we investigated. People we spoke to and interviewed spent between Ksh. 320 to 414 on food daily. As food prices increase, these expenditures increase within the limitations set by the household budget. The higher the food expenditure share, the bigger the vulnerability to consumption shortfalls in response to food inflation or price shocks.

Most residents in the settlements are jobless or are daily wage labourers. The exact figure is difficult to tell but has likely increased in the wake of COVID-19. The Covid-19 pandemic further worsened food access as 75% of the respondents claimed to using more money to purchase food compared to what they used before. To cope with the high food prices, 81% of the respondents purchased food on credit while 62% spent their savings to be able to access food.

## Residents spend a large share of their disposable money on cooked and fresh food.

Income and expenditure for food are direct. This means that most turnovers from a daily engagement in a factory or public works people invest in the daily food needs of the household. Saving then becomes problematic. Cash flow and financial reserves are barriers to investing in unique food environments and absorbing household-level shocks. Households with tiny budgets make careful and conscious spending decisions over a day. Some consume everything they have for a meal and then search for new cash afresh. This ties households into a constant circle of searching for income, generating income, consuming food, and searching for money. In such a cycle, there is little room for deliberation and innovation.

Residents in Mukuru spend about a third of their available cash on food (Figure 5). This share is not surprising given the income group we have been interviewing. Although there are slight differences between the three investigated neighbourhoods, they are statistically insignificant. Also, they are likely to change during a season or year. Against this background, we have some confidence to say that food expenditure is independent of the location.

# Figure 5. Food expenditure share is typical for households in Mukuru



Source; Household Survey Data, 2022. Mukuru informal settlement

The food expenditure share tells us something important about households and their food environments. The higher the food expenditure share, the bigger the dependency on food price fluctuation and the higher the vulnerability.



Households with a high food expenditure share are more sensitive to price fluctuations than those with a small expenditure share. But the food expenditure share also tells us something about the cost of living independent of food. From conversations during our workshops, we know that savings are difficult for Mukuru residents. Given these conditions, we can safely say that two-thirds of a household's turnover goes into housing, water bills and electricity, education and health services. As food prices inflate, so does the cost of living. This drives households into difficult expenditure choices with significant trade-offs between nutrition, health, housing and education.

These choices and the inability to save sufficient resources within a household directly impact resilience. The fewer resources, the smaller the likelihood for households to buffer, absorb and respond to shocks.

### Food prices determine food choices, amounts and frequency of purchases.

The stories people tell us about food in Mukuru resonate with the latest studies. (Downs et al., 2022), for example, report that across women of all age groups in Mukuru, food price was a major determining factor when making food choice decisions.

#### Convenience

### The high cost of energy pushes consumers into cooked street food.

A large share of residents in Mukuru depend on street food vendors. As a general tendency, the smaller the household budget, the higher the likelihood to satisfy nutritional needs outside the household. Also, the higher the fuel cost, the more likely the eating out habit of household members. Energy prices often are prohibitive to cooking at home. Those who prepare food in bulk can do so at a lower cost and pass on that cost advantage to consumers.

### The working class depends on fast street food to reduce opportunity costs.

Time is another reason for those employed or busy looking for food during the day. There are significant trade-offs between the time it takes to cook at home and other essential livelihood strategies to make it during the day. Preparing dishes with beans, for example, is a timeconsuming activity involving cooking and food preparation for people.

#### Food preferences and desirability

#### Residents have three meals that they reduce during scarcity

People we spoke to ideally have access to three meals a day, including breakfast.

#### Figure 6: A typical food plate in Mukuru, Nairobi (2022)



But the shorter the budget, the less frequent people eat in a day. Typical meals, people skip breakfasts and lunches (for details, see coping strategies in the same chapter).

### Many prefer to cook food at home to control quality if given an option.

The actual food consumption pattern is fundamentally different to food aspirations. The vast majority of Mukuru residents (93.4%) prefer to prepare their food in the house. When asked for the reasons, respondents say spending less money to buy enough food, especially for large household sizes (average size per household is 3 to 4people), autonomy in food preparation, cooking preference, hygiene observation, ability to cook in bulk for the next day and hence save on cost. However, the realisation of these aspirations is limited by cash flow and financial assets. Purchasing of food in Mukuru remains to be the responsibility of the women (44%).

### Ethnicities and neighbourhoods typically follow eating habits.

Cultural bonds influence food preferences. A typical example is maize. Especially residents from western Kenya have relied on maize as the single source of carbohydrates over generations. These patterns of maize consumption have created nutritional path dependencies. Changing these preferences is



then not a function of cost and income anymore. It is also cultural and closely linked to identity and belonging.

Food environments reinforce both and, as such, maintain systemic structures that make it difficult to change food preferences in isolation of communities and within a short period. It is

### Figure 7. Food choices consumers make in Mukuru



essential to see that power relations keep these systemic structures. For example, deviation from food patterns and eating practices within the family and the community could lead to tensions within the family and the community. People then carefully weigh the benefits and costs of changing food and eating strategies.

### Figure 8. Sources of information about nutrition and health sources in Mukuru



Source: Household Survey Data, 2022. Mukuru informal settlement.

### Maize, beans and vegetables are top ingredients for dishes.

To understand the food plate of consumers in Mukuru, we asked residents about their eating habits. Figure 7 sheds some light on these habits. As expected, meat is expensive, and residents we interviewed have access to meet between one and two times a week. Vegetables, on the other hand, interviewees consume between five and six times a week. The same is true for oil and fat. Maize remains the staple for most residents. Interestingly, deliberate sugar consumption takes place on two out of seven days. But it is important to see these sugar consumption figures in the light of hidden sugar that is an integral component in bread, mandazis, chapati and cooked meals.

The cash flow of the household and food prices are two main variables that influence food preferences. Gradually, food safety and health also become drivers of food choices and preferences. For example, during the workshops, participants refer to water-borne diseases and air pollution affecting food in markets. There are also increasing concerns about pesticide residues and agrochemicals on leafy vegetables and tomatoes.

### The nutrition transition is more pronounced among young generations.

There is an age generation difference between food preferences across community age structures. Younger generations are more open to processed food, fast food and food with high sugar content, including beverages.

There is some anecdotal evidence that there is increasing interest in ordering food digitally. Although we cannot verify these anecdotes we picked during workshops, they would fall in place with the channel trend towards food on wheels in Nairobi.

#### Health professionals and campaigns are primary sources of information on food and health.

Most consumers in Mukuru draw their information about food and healthy eating from campaigns and health services. Marketing of food and the visibility of large food brands has not infiltrated the settlement. This is not to say that food brands do not exist in Mukuru. But they are mainly restricted to brands held by domestic companies controlling the bread and flour market. Their marketing campaigns and outreach in the settlements are limited.



Knowledge and skills both influence the desire for certain kinds of food. Health services and nutrition campaigns at the primary sources of food in Mukuru (see Figure 8).

#### Household coping strategies

Consumers cut meals, improve cash flow and rely on networks during food emergencies.



#### Figure 9. Priority of coping strategies in response to cash flow and consumption shortfalls

Source: Household Survey Data, 2022. Mukuru informal settlement

**Consumption-based scoping.** Each coping strategy has advantages and consequences for household stability and livelihoods. Consumption-based scoping includes

- Reduce the number of meals per day and limiting food intake to the evenings.
- Maintain the number of meals per day but downsizing the portions and food intake.
- Prioritise children at the cost of men and women or favouring men in the household.
- Switch to cheaper foods and searching for locations offering more affordable foods
- Visit open-air markets and wet markets in the evening when residues and leftovers are passed on without payment.

Borrow food without repayment or

Individuals and households employ a wide

cash flows, purchasing power and access to food. Figure 9 provides an overview of the

coping strategies surveyed.

range of strategies to cope with disruptions in

- begging for food in the street.
- Share houses with relatives to save rent and increase cash availability

Selling off physical and productive assets, for instance, degrades the resource base of a household. Recovering from these losses takes long and puts the household at risk in the long run. The same applies to households that use savings to fill consumption gaps. These liquid assets are no longer available for investments that could progress a microenterprise.

#### Key findings

This chapter shows that household dynamics, economic status, and food preferences all influence the access of consumers to healthy



foods. Especially the purchasing power of consumers which influences consumption choices. Compared to other sites and countries, the household expenditure share for food is above the average but within an acceptable range. The challenge for consumers instead is the generally low liquidity and lack of employment opportunities in and outside Mukuru. Our analysis identifies several areas where tipping points could result in consumption shortfalls and widespread food insecurities.

- Unless food supplies change in the wake of a future economic crisis, the accessibility of food in Mukuru is not at stake. Even though floods during extreme weather events and the quality of road infrastructure hinders easy access to food markets for some residents, the distribution of food vendors is an advantage for accessibility in Mukuru.
- If employment opportunities suddenly decline, incomes drop and purchasing power declines. This has an immediate effect on the affordability of foods to satisfy basic needs. The risk is that these effects kick the band on the overall economic performance of the city and the country.
- Factors and developments far away from the settlement directly affect employment and food affordability for residents. The service industry and hotels were hit the most during the covert lockdowns. While we see a gradual economic recovery, the Russian war and invitation of Ukraine will likely change trade balances between Kenya and Europe. Although unlikely, they could affect the Kenyan labour market in and around Mukuru.
- As energy prices increase, the likelihood of home cooking will further decline. But we also anticipate rising prices for prepared and cooked food in Mukuru soon. This will likely change food intake as energy-intensive foods, and cooking requirements such as those of beans will further decline. This could have direct implications for the intake of proteins.



# External food environment: Food availabilities and vendors

Like other low-income settlements in Nairobi, informal food vendors dominate and orchestrates the food system in Mukuru. Most of these vendors are the backbone through which consumers obtain their food. But informal food vendors also create employment. in Mukuru, we estimate that six out of 10 residents engage in the food system.

#### Food types, availability and price

#### Supermarkets are out of reach for the majority of residents.

Although the food retail sector has changed dramatically in Nairobi in recent years, the expansion of supermarkets and larger food stalls have not reached informal settlements. The number of supermarkets in the proximity of Mukuru is comparably small. Three familyowned supermarkets exist, but most large supermarket brands are inaccessible to most Mukuru residents.

# Supply in Mukuru largely encompasses fresh and cooked foods offered through informal vendors.

Based on responses we received during the workshops and the consumer survey, we categorise food available in Mukuru into four categories (Figure 10)

### Figure 10 Types of food offered on the informal markets in Mukuru (2022)



#### Figure 11. Purchase frequency of raw vs cooked in the last 7 days by Mukuru consumers



Source: Household Survey Data, 2022. Mukuru informal settlement

#### Food vendors

Food vendors are the backbone of the food supply in Mukuru. They provide fresh and preserved food and link consumers to dairy products through distributors located in Mukuru. We estimate that six out of 10 households, in one way or the other, engage in the food sector in Mukuru. Many households are food brokers and own a kiosk or a shop. Compared to the formal sector, the informal food vending far exceeds the turnover and economic power in the settlement. Although supermarkets exist, there are out of reach both physically and in terms of the financial capabilities of consumers in the settlement.

### Food vendors represent a diverse group of people and strategies.

The landscape of food vendors in Mukuru is diverse. To capture and comprehend this diversity and offer tailor-made support, a typology such as the one developed by Ambikapathi et al. (2021) helps. They distinguish between formal, semi-formal and informal vendors. The principle distinguishing criterion is mobility and the investment in the physical infrastructure of the business.

#### Retail environment in Mukuru:

- Street food vendors: Permanent/semipermanent/temporary structures selling food ingredients or cooked food (boiled/fried) in varying proportions mostly operating along the roadside and sometimes next to open sewers. Majority of their customers include single men, casual laborers, school children during the day when they are unable to get home cooked food. Meals cooked by street food vendors range from githeri (a combination of maize and beans sometimes mixed with vegetables or potatoes), rice, beans, vegetables, Ugali, Chapati. This terminology also includes mobile vendors who use a wheel cart, or baskets to sell mostly seasonal fruits and vegetables.
- Posho mills: Small business mostly managed by a single individual (mostly male) either as a personal business or hired by the owner. Households either bring their own maize grains (mostly from the rural areas in Western Kenya) and pay a small fee to mill or purchase maize from the posho mill and then mill at no cost. Milled maize offers an alternative for those who don't have the financial means to purchase sifted maize meal from the kiosk/supermarket. Maize obtained from the rural areas is preferred by residents as they see it is as healthier than purchased maize, cheaper to obtain and is obtained in bulk hence lasts for a longer time.
- **Kiosk:** a small local store, often operate an extension of a main house in residential areas where goods are sold through a small opening. The kiosk seller may be the owner of the main house, or it may be hired/rented out. Some of the goods sold include essential household items e.g soap, cooking oil, maize flour, bread, milk, kerosene.
- Wholesale retailers: large establishment which sells products in bulk to other retailers for onward sale or individuals who wish to purchase goods in bulk for household use.
- Food kiosk: Semi-permanent/temporary structure with seating spaces where food

is prepared and sold to customer at affordable rates. With 1 USD you can get a decent meal; commonly known as *Kibanda* in Nairobi.

- **Butcher:** establishment where meat is cut and sold

In Mukuru, the density of formal vendors such as supermarkets and wet markets with fixed locations and structures is limited. Semi-formal food vendors stay at the exact location but have no access to permanent structures. Informal vendors mobile without permanent structure. Examples include windows moving around on foot or motorbikes selling produce in various locations they can access within the informal settlement.

The integration into the formal food economy is another important distinguishing criterion for speaking about food vendors. Although most food vendors procure food from either a formal or informal source somewhere along the supply chain, the extent to which food vendors in Mukuru pay tax and comply with Kenya's food safety standards is a principle distinguishing factor between formality and informality. Based on this criterion, most food vendors available in Mukuru are informal. All operate along the continuum of permanent to impermanent structure with different degrees of mobility. Although estimates are difficult to make, we reason that the ratio between mobile and permanent informal vendors is somewhere around 5:1.

Mukuru spends around \$ 3.6 million on food monthly through informal vendors (Githiri and Njoroge 2018). Although small for the given population, it's a reasonably sized food economy within a short area. This amount also illustrates the significance of the informal sector in the settlement. The vast share of cash flowing through the settlement occurs in the food sector. It is difficult to say which of the food attracts the most considerable turnover. Most likely, this is in the area of maize and beans, given the significance of these crops in food.

### The informal food sector in Mukuru outcompetes the formal by far

In all three settlements, the main and most frequent sources of food were the informal markets and traders (shops/kiosks (88% of respondents), street food vendors (70%) and



open-air markets (67%)) within the immediate neighbourhood. According to respondents, these sources are most preferred due to the affordability of food from the sources (63%), availability of food varieties (61%) and proximity of the food sources to their houses (57%). The proximity in terms of distance was reported to be less than 500 metres to their nearest food source by 81% of the respondents. The proximity seems to be instrumental in enhancing security within Mukuru as 81% of respondents reported feeling safe when going to shop for food. Supermarkets are not a common source of food with only 33% of Mukuru residents purchasing their food at supermarkets. This suggests that the informal economy continues to be a critical source of household and individual food procurement in Mukuru.

If 60% of the households engage in foodrelated businesses, we estimate that food vending generates about 40,000 jobs or microenterprises across Mukuru. This is roughly 10% of the total population in the settlement. However, low, at first sight, this 10% serves families and most likely a total number of 240,000 men, women and children. As such, food vending is an enormously important economic activity for Mukuru residents. From an economy of scale perspective, there is little growth potential for each of those who want food. But the risk of large retailers and supermarkets competing for clients is also plausible if they can bring food prices down to something compatible with street food vending. This could become a reality as energy prices increase and supermarkets become more competitive than complex supply chains run by families or individuals.

Judged by the average turnover of supermarkets in the central business district of Nairobi, 100 to 150 averaged size supermarket outlets in Mukuru could outcompete vendors and shops in the settlements<sup>3</sup>. These numbers of supermarkets are needed to work with residents. But their employment potential is limited, most likely ranging between 1500 and 2000 workers. This represents a fraction of workers the informal sector currently engages in Mukuru.

### Most food vendors are women and operate on tables or simple structures.

Food vendors selling cooked food (primarily women) operate by the roadside and drainage systems through simple structures with corrugated iron sheets for walls and roofs and wooden furniture. Operating on the roadside is to attract customers travelling on foot, a common means of transport in Mukuru. Roadside food vendors pay no tax or rent to owners or public administration. Anyone who wants to engage in food winning can do so by placing a table in coordination with other vendors sombre in the streets. There is no public registry or coordination of food vending.

#### Informal food vendors have a comparative advantage over the formal sector.

Informal food vendors in informal settlements have several comparative advantages over supermarkets and formal retail. In Mukuru, it is easy to access for consumers within walking distance from home or work. Extended opening hours from early morning to late night provide reliable access to food by people. Furthermore, informal vendors sell food in small quantities. Purchases in small amounts reflect the cash flow of consumers in informal settlements. Food vendors offer consumers food on credit. Hardly is that possible anymore formalised food retail sector. But in informal settlements, such institutions are essential informal safety Nets for people.

Food vending is highly specialised in Mukuru. In most cases, street food vendors offer a single dish throughout the season. There are food vendors offering maize and beans and other chapatis or soup. Some food vendors are located in specific districts or along roads throughout the year. Restaurants that provide a variety of foods hardly exist. This highly specialised nature of street food winning is an advantage and a risk. The advantage of specialisation is cost reduction and consistent quality of foods and products, depending on the supply chain. Once consumers appreciate a particular cooking style and quality, customers

<sup>&</sup>lt;sup>3</sup> Compare with figures offered on: https://blackorwa.medium.com/kenyasupermarket-report-e55ed2096f86



like to return, which offers food vendors some bit of certainty regarding the group of clients. The risk, however, is a minimal buffering capacity. They highly depend on a single type of supply chain. Changing the supply chain or even changing the product is limited and associated with high transaction costs. Also, the specialisation of one single dish limits the growth potential of the food winning business.

To some extent, food vendors trade and exchange with each other. This implies that a relatively high share of the daily turnover depends on the purchasing power of different food vendors in the area.

Like in several other informal settlements, there are seven millers in Mukuru. These millers specialised in milling maize grains into flour. Once these Millers were essential pillars of maize flour in the informal settlements. Gradually, however, Kenyan commercial brands have taken over the maize flour business. These flour packs come in small quantities of quality that are appealing to consumers in Mukuru. Although still important, these Millers gradually lose ground, especially among central Kenyan consumers. They prefer well-grounded maize free of residues and pollutants, including stones.

Many kiosks are situated beside busy roads that run into the heart of Mukuru kwa Njenga. Most of them are simple structures with corrugated iron walls, a dusty floor and wooden furniture.

To cope with inflation, the increased cost of living and reduced purchasing power among consumers, shopkeepers repackage goods into smaller quantities. This offers consumers a wide range of purchasing options, depending on financial capacity. For example, consumers can now buy a quarter or half packet of maize flour instead of the traditional 2kg packet or a quarter/half loaf of bread instead of the standard 400g size. Such strategies benefit consumers and vendors to stay in business.

### Most food vendors have liquidity constraints and high opportunity cost

One of the most significant pain points of informal vendors is finance. As consumers, also vendors operate on a tight budget. What they earn on one day they invest in the early morning on the following day into the food they prepare for sale. Savings are challenging to make. And in the absence of sufficient cash, food stocks can only be bought in small quantities and not embark. This increases transportation costs significantly, and there's a consequence, opportunity cost that is unaccounted for. Food vendors, we spoke to consider the lack of cash as the model of the most critical barriers to rationalising and modernising their business. There are community-based savings schemes among food vendors in place. But these schemes mainly cater for domestic challenges group members face. These informal savings groups gained momentum during COVID-19 lockdowns. As much as they help individual households to overcome illiquidity constraints at home, they are unlikely to support medium-sized investments of lenders in the long run.

### Misalignment of supermarkets with the needs of low-income populations

Despite the rapid expansion of supermarkets in Nairobi, they hardly reach informal settlements and buyers with little income. Supermarkets mainly enable access to food in Nairobi for the middle and upper class. (Berger and van Helvoirt, 2018) conclude for Nairobi that the supermarkets in the capital city are not well aligned with the needs of food-insecure consumers.

Although regulatory institutions exist, they hardly oversee quality management of food and supply chains within and into Mukuru. Especially fresh produce food vendors purchase in open-air markets cannot be traced for their origin. This is different from the few processed products such as bread and milk. However, then again enters the space of informality. It is difficult to distinguish or disentangle this complex web of formality in informal arrangements and the other way round.

#### **Regulatory context**

### Informal gatekeepers provide rules and regulate food environment interactions.

By default, informal vendors, shops and kiosks do not pay tax. Text payments are a major distinguishing factor between the formal and the informal sector. This does not mean that food vendors are deliberately exempted from tax payments. But in the absence of registrations, monitoring and follow-through by public administration, food vendors operate upon arrangements of informal institutions outside public policies and administrative oversight.

In Mukuru, however, there is a system of informal tax payments. For instance, there are casual tax collectors at an open-air market who elect stand fees. Also, some versions of protection fees are being paid to teen gangs and organised groups that oversee market arrangements. These practices seem to be especially prevalent in Kwa Njenga and Viwandani.

### Policies informing food environments in Mukuru are in place but hardly enforced.

Nairobi and Mukuru are governed and regulated by various city-level and federal policies, legislations and instruments. APHRC recently applied to Kenya Healthy Food Environment Policy Index (Food-EPI) to assess how food environments in Kenya support nutrition and health (Asiki et al., 2020). Relevant policies:

- Kenya Agri-Nutrition Strategy (2020 to 2024)
- Kenya Health Policy (2012-2030)
- National School Meals and Nutrition Strategy (2017-2022)
- National Food and Nutrition Security Policy
- The Kenya Food Composition Tables 2018
- Draft National Urban and Peri-Urban Agri & Livestock Policy, 2011
- Nairobi Urban Agriculture Production Regulation Act 2015
- Urban Areas and Cities Act No. 13 Of 2011
- The Physical Planning Act 2011
- Public Health Act

Kenya was also one of the supporters of the Harare Declaration on Urban and Peri-urban Agriculture, in which Kenya, Malawi, Swaziland, Tanzania and Zimbabwe committed to policies and instruments for integrating urban and peri-urban agriculture into urban economies (Mushamba et al., 2003).

In the capital city of Nairobi, the number of supermarkets increased rapidly in recent years. These supermarkets have changed the retail food environment, which is partly the result of government policies to promote the modernization of the food retail sector.

Structural policies to improve the enabling function of food environments

- Food price regulations
- Regulating food marketing
- Policies related to water, sanitation and health.
- Policies safeguarding food safety and regulating farming and gardening in cities.

#### Key findings

In this chapter, we have shown that food flows and the availability of food to satisfy basic needs in Mukuru are in the hands of food vendors. Most of these food vendors are informal and operate outside the regulatory environment of the state. The number of informal food vendors is comparably high. The high density of food vendors across the settlements ensures a specific availability of foods. Consumers have the flexibility to choose between many small shops and food vendors. Supermarkets are out of the physical and financial reach of most residents. Despite the high number of shops and food vendors that offer a certain degree of resilience to consumers, we identify areas of risk and tipping points that could easily result in food shortages in Mukuru.

Food availability depends to a large extent on the supply. Food supply is a function of food production and the cost of transportation. If energy prices increase, the food supply may decline.

- Food inflation has already set in across Kenya and also Mukuru. Price increase for basic staples, cooking oil and sugar range from 5 to 10 %.
- The vast network of informal food vendors in Mukuru depends largely on the purchasing power of consumers within Mukuru. In other words, residents rely on each other's purchasing power. If unemployment increases, the number of food vendors would likely decline. Already today, the competition among food vendors is significant.



### Vulnerability context

While the personal domain and the external food environment directly impact the ability to access, avail, and consume healthy food in Mukuru, the overall context in which life takes place indirectly affects food environments. We refer to this space as the vulnerability context. It comprises all factors and processes that increase the vulnerability of residents and limits the proper functioning of the food environment.

Mukuru, like most of the other settlements, have a long history of economic marginalisation and the absence of foodsensitive planning. This history has created persistent path dependencies of infrastructure, monetary exchange, and relations between people. As much as Mukuru residents depend on neighbouring industries, so do the industries. They benefit from cheap labour within the proximity of factories and offices. Underemployment and low wages further reduce the agency of labourers and residents in the settlements. All these contribute to a context that maintains vulnerabilities within households and neighbourhoods.

#### Environmental hazards

Neighbourhoods along the rivers and at lower altitudes are affected by floods. Especially during the rainy season, people residing in these areas must move houses between one to two months. Also common are flash floods.

Ngong River is the main water stream flowing through Mukuru. Throughout the year, the river shows toxic levels of water quality. Riverbanks are used as dump sites for trash in the absence of organised garbage collection systems.

#### Human health threats

Only a few Mukuru residents are connected to the sewer system. Public toilets are hardly reliable, and people often share toilets between families. At night, toilets outside the household expose women to safety and security risks. No toilets exist in the public markets in Mukuru. The Mombasa area of Kwa Reuben, vulnerable to floods, is also affected by cholera outbreaks despite Kwa Reuben generally having better connections to the sewer system and other sanitation facilities compared to the other two settlements. This area is also affected by malnutrition.

#### Community dynamics

Safety and security in Mukuru have dramatically improved over recent years. Nevertheless, there are unsafe areas in the settlements, especially for women and at night respectively early morning. Community members draw attention to the need for improved safety measures, fixing streetlights and ensuring law and order within the constitutional framework Kenya provides. A major implication of lack of safety and security is changing mobility patterns, hence access to food at stake. This concerns everyone and especially women food vendors.

#### Infrastructure

Access to safe and clean water is a prerequisite for food hygiene. Across the three settlements, clean drinking water from the Nairobi Water and Sanitation company is available five days a week. When water is not open through this source, private water sellers offer water at the cost of Ksh. 5 per 20 litre jerrican. Nairobi metropolitan services dug boreholes in several locations. Levels of salt, however, limit the utility of these boreholes.

#### Evictions

Evictions and demolishment of houses are among the most invasive interventions and human rights violations. They demolish the physical assets of people with limited resources; they also destroy livelihood opportunities and strategies. Such demolishment, as happened in Mukuru towards the end of 2021, has immediate effects on the food environments in the settlements. Food accessibility for residents changes, in most cases linked to loss of employment. The high number of people employed in the informal food sector in Mukuru suggests that a proportional number



lost food-related jobs and microenterprises in the wake of the most recent evictions.

#### Key findings

The food environment in Mukuru is part of a larger context that is inherently fragile. Some of these facilities lead to disturbances. Among the most recent significant disruptions were evictions of 40 thousand households overnight. These have changed the immediate food environment for those affected. Factors contributing to the vulnerability of food environments and households include environmental pollution, unprecedented weather changes flooding neighbourhoods, infrastructural development projects and precarious public health. Although these factors exist independent of the food system, they directly affect the performance, sustainability and resilience of food environments in informal settlements.

Linkages between measures to support the food environment and the larger vulnerability context are underdeveloped. Often, investments target aspects of the tool rather than strengthening relations. One example is water supply and sanitation in markets and central public places. Typically, investments into such infrastructure as seen from the perspective of secure housing and the right to shelter. But upgrading public spaces could have immediate, positive effects on the food environment. Bringing these linkages out and making it clear to investment and policy remains a challenge. Yet, unlocking synergies between the two could substantially increase positive outcomes for all relevant sectors.



# Food environment functions, drivers and responses supporting sustainable diets

So far, we have presented findings on the three dimensions of food environments in Mukuru. We show how they influence peoples' access to sustainable diets. We now turn to assess what drives the state of the food environment and their contributions to sustainable diets. Following that assessment, we turned to the risks of food environment failures in the light of shocks and economic developments detrimental to employment and income.



#### Figure 12. Effects of drivers on food environment functions

As it stands, the food system and food environment in Mukuru are in a stable state. This does not mean that the food system and its environment deliver on the essential functions. It only implies that interactions within the food environment reinforce each other. Through the feedback associated with reinforcement, the system is somewhat stable. Radical, drastic changes are possible if certain variables exceed a threshold. Then, relations within the food environment could change within a short period of time. Predicting outcomes is far from easy since some of these changes are non-linear. However, from a theoretical perspective, a system that tips over into a new stable state typically changes its functions. Then, certain old system functions

may not be as essential or realistic. One such change could be the rapid decline of the informal sector's employment effects. This could happen when large competitors enter the scene, such as supermarkets targeting lowincome groups. A similar effect could occur when governments enforce the formalisation of food vending without sufficient transition support, including time. We call such radical changes regime shifts. Some of these shifts result in positive outcomes and others in negative for food environment actors.

The effects of tipping points can also be indirect. For example, the widespread impact of floods or droughts in the region and their disruptive effects on food production and supply chains would immediately translate into changing food availability, quality, and pricing in informal settlements. Some of these tipping points may be local original. Others can be global, such as pandemics, wars or economic meltdowns.

Although we know too little about the cascading effects tipping points can unleash, there is a high likelihood that disruptions in the environmental systems will have implications for economic systems and food environments. As complex systems work through feedback, these can amplify the effects of food environment changes.

#### Anticipating changes and tipping points

For food environments in Mukuru to maintain their essential functions, stabilising conditions and processes must remain in place. But the opposite is true as well. Changes in these stabilising factors can put food environment functions at risk. Anticipating possible changes in the national column original and global context of food environments in informal settlements help to prepare for likely risks of food environment collapse.

Questions one would have to ask: Is public administration likely to proceed with large-scale evictions? How realistic is the quest of some in public administration to formalise food vendors? What is the potential for food hazards and safety concerns to create unmanageable public health burdens in Mukuru? How likely is the disruption of supply chains in the wake of production shortfalls of essential commodities upon which Mukuru residents depend? What are the potential climate and weather-related scenarios for Mukuru, and how do they affect the food environments in future? Answers to these questions provide starting points for developing risk management run by communities in cooperation with government agencies.

One way of anticipating such developments is to reason about trajectories of critical domains that affect food environments. These trajectories shed light on future developments and, if coupled with probabilities, help to prepare for undesired outcomes. Also, these directories inform the development of pathways to counter or mediate undesirable developments in food environments.

### Identifying positive changes in food environments and building them.

So far, in this report, we have addressed tipping points and regime shifts within food environments or those that affect food environments negatively. In other words, we anticipated developments in view of avoiding adverse outcomes. While essential to prevent harm in future, there are also promising trajectories that likely lead to positive outcomes. Identifying those and designing ways to support them in view of critical food environment functions is as important as preparedness and risk management.

Take the increasing awareness about fruits and their contribution to human health. Or increasing information among residents we spoke with about mycotoxins in cereals and milk. Mukuru residents are increasingly aware of the impact of environmental pollution on food production and human health. And there is increasing recognition that high levels of toxic chemicals in rivers is among the leading causes of human diseases. All these encouraging developments are essential ingredients of a forward-looking, solutionoriented theory of change to support food environments in an informal settlement.

To assess what drives each food environment function in a food system, it is helpful to determine the strength, direction and impact of these drivers. Some drivers help transition food environments towards configurations that support healthy and sustainable diets. Others become or already are barriers to such changes.

### Functions of the food environment and risks of failure

Making food available, brokering food linkages between demand and supply and ensuring health and nutrition are three central functions of any food environment. Conceptually, these functions of food environments intersect with food supply chains on the one hand. On the other hand, the food environment is the actual context in which consumption choices are made. Conceptually also, these choices are separate from the food environment. Hence, the food environment is the core domain between food supply and the actual utilisation of raw and processed foods.

All factors located along the value chain from production to the actual arrival of food in the informal settlement host drivers and entail potential risks. Here we focus on the core of the food environment.

The current setup of food environments in Mukuru, with exceptions, serve the availability and provision of food relatively well. It is unthinkable how not informal food vendors, but large corporate food retail provides food to Mukuru settlements. The advantage of the informal sector is its centrally organised, highly adaptive nature. Although not always to the benefit of individual households, adaptations within the network of food vendors help secure the last-mile delivery of food to residents.

It will be a significant risk to the food system and the supply of food to residents if the informality and the network-nature changes radically. The consequences would also be felt in the informal labour market. Many food vendors would lose the micro-enterprises and hence income.

#### Social functions of food environments

The social functions food environments offer to consumers, and market players, in general, are often neglected. Market places provide space for communication, information sharing, disputes, and the progression of ideas to strengthen food environments and urban food systems. In Mukuru, food environments serve as an informal safety net for people. A strong sense of reciprocity and trust keeps these networks together and operational.

What is an advantage to maintaining network structures can also become a risk. Especially before national elections, trust landscapes and interests change rapidly. But also, the increasing pressure on household economies and land evictions can also erode a carefully weaved social capital in Mukuru. Apart from these external drivers, internal dynamics also erode trust. One is the fierce competition among food vendors and kiosks over customers. This competition increases as the economic situation in the city gets direr. The increasing number of households adopting a version of food vending to make a living. Altogether these cracks can widen and put the overarching function at risk.

At this point, we see little preparedness to mitigate pressure and build resilience towards the collapse of the social function in food environments. Although households speak about the competition, there is no space for open conversations and mediation.

#### Economic functions of the food environment

The economic functions of the food environment are to generate income employment. We argue a food environment is healthy if it attracts green jobs with remunerations supporting a decent living. As presented earlier, however, the economic function also encompasses the provision of microfinance and credit support. As of now, these functions operate well, although at some level of fragility.

The increasing competition amongst food vendors and the dropping purchasing power of consumers can lead to a cash flow challenge within the entire sector. Also, food vendors trade with each other. In a way, they represent actors of a closed economy with a few larger scale; concentrated food flows in the settlements or neighbourhoods within Nairobi. The disadvantage of a closed economy is the lack of monetary circulation. One consequence is the lack of capital to invest in and upgrade businesses and food environments. Therefore, it is likely that food vendors remain at their economic level as long as there are no alternative market and income opportunities for people.

#### Environmental and ecological functions of the food environment

Environmental protection and ecological health are vital functions of a food environment with two geographical dimensions. One is the immediate food environment within the settlement. The other is along the value chain and the farms from which food or raw products originate. Food environments shall contribute to sustainable diets and, therefore, to ecological health along with the entire food flow or supply chain.

In the absence of trash collection and heavy air pollution, food quality is at risk, and so is the ecological health of the food environment. Organic waste disposal, for example, directly contributes to degrading food environment quality. One practical example is the livestock keeping in Mukuru. Heat and dust waves, poor feed quality in landfills and poor water quality contribute to deteriorating livestock health.



Milk and meat are most at risk. Hence, Environmental quality and food safety intersect.

Although we notice signs of awareness and the willingness to change consumption in support of sustainable diets, the settlement is far from leading a sustainability transition that puts sustainable diets at the central stage. On the contrary, the nutrition transition that manifests increased consumption of unsaturated oil and fat, sugary products and ultra-processed food is only beginning in Nairobi. Strong forces at play make it difficult for actors to change production, storage and transportation modalities to meet sustainable diet criteria.

#### Summary

Food environments in informal settlements are micro functional. Most of these functions operate exceptionally well. They ensure access to food under relatively stable framework conditions. But this does not mean those food environments are not at risk. Personal domains of food environments will have more difficulties maintaining decent affordability to food. As soon as food vendors are at risk, the accessibility of food is likely to decline. Price fluctuations, and the fluctuating availability of food in its raw and processed form will increase in future. First signs are already visible, such as the vegetable oil price hike in April 2022. We expect similar price hikes for maize, wheat and energy, which will have direct implications for cooking and preparations of food.

The vulnerability context is unlikely to decrease within a short period of time. Despite upgrading programmes by humanitarian agencies, civil society and, to some extent, the government, the pace is simply too slow to ensure vulnerability declining effects of these upgrades. Although evictions are put on hold for the time being, there's no guarantee that further infrastructure investments or interests will prevent further forced evictions and resettlements of households. Such resettlements are the most radical changes in food environments one can think of.

Judged against resilience criteria, the food environment in Mukuru requires support. Support needs to improve the absorption capacity in view of future shocks and the ability to transform food environments to build resilience by design. Especially the latter will be a deciding factor between the progression of the food environment and partial collapse. The coming month will be crucial to study and strengthen food environments' resilience in informal settlements such as Mukuru.



### Implications for action research

Governments, city administration and communities face enormous challenges in informal settlements. There is a great deal of inequality in urban food environments and no guarantee of getting closer to sustainable diets soon. Poverty and lack of opportunities are considerable barriers to sustainable building responsive food environments. Also, populations in settlements become increasingly younger. And these young men and women, after having gone through education and training, look for jobs to make a living. Only economic progress and a diversifying economy must create these opportunities for young people. The extent to which urban food environments in informal settlements can create these jobs remains investigated.

### Ways to build food environments in support of sustainable diets

Despite challenges in informal settlements, informal markets and food environments are entrepreneurial and dynamic. The innovation capacity of people is high, and so is the potential to gradually built food environments that support sustainable diets. In support of food environments that fulfil their functions, we anticipate downstream and upstream approaches. Downstream measures increase the agency of actors in households and communities. Measures concern the personal food environment and aspects of the external food environment, including the vulnerability context. But not all measures are within the reach and capabilities of communities. Therefore, we also envision a set of upstream measures that call administration and governments to action. Upstream approaches change structures created through policies and market institutions.

It is helpful to distinguish between consumption-based and supply-based interventions and policy actions. First, consumption-based actions to improve awareness, social organisation and agency of people in informal settlements regarding consumption choices. The better food-related networks under social organisation, the bigger the power of consumers and their ability to dim and for changes in the food environment from government and public administration. Although by far not the only entry point for change, demand-based measures can pressure those Responsible for shaping food environments. Related supply-based measures to improve the food environment could increase the availability of healthy and affordable foods in informal settlements.

Against this background, we develop three bundles of measures to support food environments responsive to sustainable diets. Each of these bundles addresses one dimension of the food environment.

### 1. Measures to improve access to sustainable diets

Experimentally improve immediate and long term-cash transfers and financial support for vulnerable households to procure healthy and nutritious foods whenever they fall below a consumption threshold. Especially vulnerable households in informal settlements cannot afford the extra financial efforts to access fruits, safe vegetables and dairy products for a balanced diet. There is increasing evidence supporting the impact of social protection and safety nets on nutrition and health. We see opportunities to build on these successes in a settlement like Mukuru.

Work with communities to raise awareness about health and nutrition and the importance of diversifying food intake. Where access to information about nutrition and health is limited, awareness campaigns through schools, exposure of community representatives to kitchen gardens and food dialogues with health professionals and policymakers will increase awareness and access to information. Awareness campaigns are best designed with communities to ensure a high level of resonance between messages and their respective cultural, educational and economic context.

**Invest in urban gardening and small livestock production units**, and test how they contribute to nutrition hubs supporting the personal food environment of residents.



Although urban farming can only make decent contributions to household food security, strengthening gardens and livestock helps prepare for future shocks. Urban farming also creates green spaces, organises people around shared aspirations and provides space for reclaiming commons in city neighbourhoods. Urban farming in Mukuru could be further developed into sustainability promoting islands that support community action, visibility and political agency.

Link school feeding programmes with kitchen gardens and controlled food production environments to improve awareness amongst children and youth and contribute to a new generation of nutritionaware consumers. Then test the awareness spill-overs to households and family members. Where schools have sufficient area available for greenhouses and farming under controlled environments, they could support food supply to school kitchens directly. Next to the educational value for school children engaging in their food production, these closed linkages could also reduce food pills and offer school children access to healthy, nutritious and diverse diets. School children support food production and learn about the farm and nutritional diversity linkages. These educational values could significantly contribute to every attachment to farming and agriculture amongst young generations in cities. They could also contribute to the nutrition-sensitive demand of city dwellers in future.

Test agency enhancing approaches to support communities to increase the accountability of value chain actors to supply settlements with safe and nutritious foods. The better communities are organised along with their nutrition and health concerns, the higher their agency, voiced, and ability to influence systemic structures prohibiting access to safe and healthy foods. One option to support communities in organising their voices is to enable consumer protection committees. These comedies would work with public administration to ensure an adequate regulatory environment for informal markets.

### 2. Measures to increase food availability and operations of vendors

Test product-specific subsidies to increase the accessibility of fruits and vegetables currently lacking in the food basket. There is sufficient information about healthy food baskets and what could be changed to improve sustainable diets. But often, these are out of reach for consumers, especially in informal settlements. We believe that enhancing financial access to healthier foods is a promising approach to increase the chance for food behaviour change. Similar recommendations (Holdsworth et al., 2020) make for Ghana and Kenya.

Pilot new linkages between informal food vendors and financial services in Nairobi to improve informal markets' cash flow and investment potential. A main barrier to sustainable diets in Mukuru is finance. On the one hand, food vendors grant interest rate free food on credit to people in need within the neighbourhood. On the other hand, connections between food vendors and microfinance institutions to upgrade food vending is limited. One reason is the lack of formal recognition of food vendors in informal settlements. Supporting food vendors to organise a food vendor association help in accessing financial resources as a group and based on business plans, but also to coordinate businesses and outreach.

Work with regulatory bodies to test options for voluntary food labelling of healthy foods, such as those developed through participatory guarantee systems. Labelling builds trust amongst consumers in sustainable diets, including safe vegetables and fruits. Labelling could help build a community of practice amongst food vendors and create awareness about sustainable diets among consumers.

For example, use policy instruments to encourage consumers away from unhealthy foods and products that do not provide essential energy for physically active consumers. (Reardon et al., 2021) and colleagues suggest increased taxes on sugarsweetened beverages and nutrition labelling to steer consumers away from unhealthy foods.

Pilot new ways of improving storage and cooling infrastructure and support renewable energy-driven processing of foods within Mukuru. One reason for the inability to store is the lack of storage facilities. Hence, upgrading the cooling infrastructure and supporting renewable energy-driven processing of foods within Mukuru could be

ICRESSACH NTERNATIONAL CROPS RESACH UTUTE LEAD THE MALA BID YOCHCO

one workstream to increase the resilience of food environments.

Reduce the depth of supply chains by directly linking farmers in the rural, urban and peri-urban areas to vendors and markets within Mukuru. There is an increasing scope for direct linkages between consumers and producers through digital services. The advantage of such connections is less vulnerability because of fewer value chain nodes in the supply chain. But there es also room for organising value chains and the comparative advantage producer-consumer linkages have.

Support a food vendor association to increase agency and coordination. Informal food vendors in Mukuru know each other and network. These networks support their business, and they are based on reciprocity. Money lending, for example, or credit and saving schemes supporting food vendor group members are such examples of reciprocal relations. These relations, however, are not coordinated at a higher level. And hardly do they translate in agency and political capital in the interest of food vendors in Mukuru. During the workshops and background conversations, respondents we spoke to suggested forming more formal food vendor associations. These vendor associations, so the idea, could further develop linkages and build political capital.

Calculate the job creation opportunities through green supply chains and the recycling of food waste in the area. The extent to which the food system offers employment opportunities in future is uncertain. So far, most jobs in Mukuru either come from industries or the food environment. As food environments become more efficient, the employment effects of food-related sectors have declined.

### 3. Measures to reduce vulnerabilities in the context

Encourage cash instead of food aid to support vulnerable households during crises. During COVID-19 lockdowns, the initial response of citizens was food aid. One driving force for food aid was the direct benefit visible to donors. Within the first weeks of food aid, however, small vendors and food shops started losing business. This happens when food aid is brokered by donors outside the settlement. Such procurements by paralyses the local food economy and, if done systematically across a settlement, could halt food flows to a large extent.

Work with public administration to upgrade road infrastructure, electricity, water and sanitation as an indirect contribution to improving healthy food environments. Improving the larger context that causes risks and vulnerability to households in informal settlements often is beyond the mandate of food-related initiatives. Yet, the vulnerability context critically influences food environment dynamics to end the ability of people to utilise food. Therefore, collaboration with public administration to upgrade road infrastructure, electricity, water, and sanitation indirectly contributes to improving healthy food environments.

**Coordinate social policies with food and economic strategies at the government level. Policy coherence is not always given.** Food, trade, health, and social protection policies often operate in isolation. Coordinating these policies at the level of cities and the country would significantly improve synergies and impact the entire spectrum of food-related governance instruments.

#### **Opportunities for research to help sustainable diets**

Policy actions put in place a regulatory environment that supports access to healthy food allows easy identification and food safety standards.

Define critical thresholds predicting radical food environment changes. For an informal settlement such as Mukuru, metrics to understand the degree of resilience has never been more important than these days. Even though isolated physically, almost like an enclave, the settlements food environment is connected to the process in the city, country and the region. Global and geopolitical changes will have instant consequences for residents and their food environments.

Future research will have to help identify thresholds beyond which food environments in Mukuru shift into an undesirable state. Drivers towards these tipping points may arise from within the settlement. Examples include the most recent evictions, changing development



priorities of the government or health-related developments. Drivers may also emerge from outside the settlement. Global climate change or conflicts that disrupt supply chains or contribute to price spikes are examples. Understanding when the food environment starts flickering, in other words, becomes unstable, is essential for future research.

#### Monitor, prepare and support early warning of changes in the food

environment. Researchers have developed several ways to measure food environments and their performance in recent years. Examples include the Modified Retail Food Environment Index, and the Food Balance Score see (Havewala, 2021). These are simple density measures to assess the prevalence of desired retail structures in an area. Most of these indices and measures are developed for the global north. However, to our knowledge, there is no rating or grading of the food environment and its quality and support for healthy diets in Mukuru. Consequently, the accountability of public and private sector partners towards consumers is limited. In response, we suggest the development of healthy food environment indicators to monitor progress towards improving food environments (see also (Fanzo et al., 2021).

One crucial policy action to support the preparedness of food environments in informal settlements is monitoring and early warning. Governments must develop respective indicators in collaboration with communities and researchers. Measuring food system changes and identifying thresholds remain a critical empirical challenge. One option to identify thresholds becomes volatile, and the food environment shows signs of flickering. An example includes food price and energy price changes that increase nervosity among communities. These behavioural changes and stories people tell can be captured and measured. Community organisations and public administration can prepare for and take stabilising measures in response.

Test True-Cost Accounting for food in informal settlements. No data exist on the actual cost and potential benefits of food environments in informal settlements. We believe it is essential to apply a holistic approach to measure the value of healthy food and the cost of unhealthy food environments on public health, economic progress and social cohesion in informal settlements.

#### Towards pathways to build food environments supporting sustainable diets

Food environments that shall function in relation to its purpose require good designs. This is to say that food environments perform along with a particular design. Changes in the design modify functions and outcomes. In this regard, food environments are not broken or dysfunctional. They are designed in a way to produces undesirable outcomes.

Changing food environment designs, however, is demanding and challenging. One reason is the complex nature of these environments and their back and forward linkages to food systems. These food systems are highly dynamic, volatile and respond to changes in the larger context. Small changes in the regulatory environment order relation between actors can easily change the habitus and outcomes of food environments. As much as such interventions have good intentions, they can also result in unintended outcomes.

Support platforms for dialogues and conversations across all relevant food environment actors in Mukuru could help coordinate some of the actions across time and space. Such platforms could bring on board public administration and policymakers. Although these platforms serve as an accountability mechanism, they also provide space for learning and experimentation with some of these actions to improve Mukuru's food environment.

Although informal coordination does exist, there is no systematic communication between private, public and civil society partners when it comes to food. There is no structured coordination among development initiatives and research. We recommend putting in place a coordination platform to unlock synergies and increase the communication between public and private sector partners. These platforms aim to coordinate policy actions, monitor responses, and take coordinated measures to improve food environments in Mukuru.

Design pathways that build resilience while transforming food environments. One



message of this study is that food environments in Mukuru are relatively stable and adaptive. This means that food environment actors, over time, found ways to adjust operations in the light of disturbances. At the same time, the food environment is far from contributing to health outcomes. The degree of resilience Mukuru currently has is a disadvantage for transforming food environments, so they support human health, and nutrition and create new jobs for residents.

Any pathway to build the resilience of food environments in informal settlements, therefore, must strike a balance between maintaining the adaptive capacity of actors while supporting transformative change designed by residents and supporting sustainability, prosperity and health outcomes. Precautious principles and do no harm are the basics for creating such pathways. Governments and community partners must agree on such fundamental principles for transformative change. These principles then inform the designs of pathways.

For practitioners, researchers and communityled initiatives, anticipating likely future outcomes of pathways help prepare for adverse consequences of well-intended interventions. Foresight and scenario planning are two practical tools assisting the stakeholders in opening windows into the likely future. Initiating action without anticipating consequences, no matter how good the intention is, requires an ethical clearance and informed consent by all stakeholders directly or indirectly concerned with pathways.

Monitoring remains critical. But monitoring thresholds is also time-consuming and expensive. It, therefore, makes sense to cooperate with monitoring structures already in place. One example is the Nairobi Health and Demographic Surveillance System (NUHDSS), which routinely collects data on demography, health outcomes and socio-economic outcomes in Korogocho and Viwandani in Nairobi to understand changes in informal urban settlements.

As much as quantitative data help track changes in the food environment, stories and qualitative accounts matter equally. Food narratives, for example, tell stories about the shape and changes in food environments (Kahwai and Hauser, 2022, in press). Such appraisals could be easily integrated into traditional surveys or organised separately as part of regular monitoring events. Along the same lines, Photovoice is a method to capture central food environment components that matter to residents (Pradeilles et al., 2021). If done repeatedly over a certain., respective monitoring data helps track changes in food environments against interventions and changes in the policy and regulatory environment.

Work with all relevant public and private sector actors. Working in a co-design mode is essential for any engagement with food environments in informal settlements. Copdesign is an interactive process between all relevant actors and stakeholders concerned with the change process. Typical actors encompass communities and external partners such as government agencies, humanitarian aid, research and civil society representatives. The private sector plays an increasingly important role in food environments. Hence, their participation will be equally relevant to designing new food environment models. Discovery often is an essential stage early in the process.

For Mukuru, essential stakeholders include

- Kenya National Alliance of Street Vendors and Informal Traders (KENASVIT)
- Communities and consumer organisations
- Governments and their policies
- Ministries of Agriculture, Health,
- Treasury, Planning and Education.Government Regulatory agencies
- (NEMA, KEBS, PCB, KEPHIS, etc.)
- County Government Departments
- Committees dealing with food security, food safety and health at the county and national levels.
- Food Security Private sector organisations

Depending on the purpose of the co-design, research including universities, may play a role in generating information that is relevant to the process. Equally relevant is robust monitoring, evolution and learning system that supports data generation, sharing, deep reflections and strategy of all actors involved.



### Conclusion

This study investigated the relationship between food environments and access to healthy and nutritious food in Mukuru. This settlement in the eastern part of Kenya's capital city of Nairobi is representative of similar informal settlements across Kenya. We also explored possible tipping points that would shift large proportions of the population below the poverty line. Our interest was to spell out policy actions and programme measures to improve the resilience of food environments and strengthen their contribution to healthy eating. Food environments are a central pillar of resilient and sustainable food systems. And such principles unknown more relevant than in informal settlements.

The best we could do within the mandate we had for this study was shed light on some critical features of the Mukuru food environment. We also highlight possible points where we see leverage towards positive change. Given the enormous complexity of food environments, we want readers to consider recommendations and programme actions with care. None of these is sufficiently tested. As part of community-led action research, however, we hope this document provides a basis for discussion, prioritisation and informed decision-making with regard to what next.

Without a doubt, Mukuru, like most other informal settlements with similar characteristics in Nairobi and Kenya must prepare its food environment for future disruptions. The COVID-19 pandemic came to many as a surprise. Most likely, the time to prepare for one next significant disruption is limited. We, therefore, believe it is the right time to explore further ways to improve the resilience and sustainability of food environments in places like Mukuru. As much as we think this is urgent and important, we also believe that any measures require thoughtful co-design process authentic, solution-oriented citizen engagement. May this study provide some of the content in support of the same.

Insights gained through the scoping study shall help communities and partners progress in

#### food environments in

Mukuru. However, as much as we design our work to support a specific site or geography, we aim to draw lessons from similar settings elsewhere in the country or region. As such, our work contributes to global public goods, and we hope this report does the same.



### References

- Ambikapathi, R., Shively, G., Leyna, G., Mosha, D., Mangara, A., Patil, C. L., Boncyk, M., Froese, S. L., Verissimo, C. K., Kazonda, P., Mwanyika-Sando, M., Killewo, J., and Gunaratna, N. S. (2021). Informal food environment is associated with household vegetable purchase patterns and dietary intake in the DECIDE study: Empirical evidence from food vendor mapping in peri-urban Dar es Salaam, Tanzania. *Glob Food Sec* 28, 100474.
- APHRC (2014). "African Population and Health Research Center (APHRC). 2014. Population and Health Dynamics in Nairobi's Informal Settlements: Report of the Nairobi Crosssectional Slums Survey (NCSS) 2012. Nairobi: APHRC.."
- Asiki, G., Wanjohi, M. N., Barnes, A., Bash, K., Muthuri, S., Amugsi, D., Doughman, D., Kimani, E., Vandevijvere, S., and Holdsworth, M. (2020). Benchmarking food environment policies for the prevention of diet-related non-communicable diseases in Kenya: National expert panel's assessment and priority recommendations. *PLoS One* 15, e0236699.
- Battersby, J. (2012). Beyond the food desert: finding ways to speak about urban food security in south africa. *Geografiska Annaler: Series B, Human Geography* **94**, 141-159.
- Berger, M., and van Helvoirt, B. (2018). Ensuring food secure cities Retail modernization and policy implications in Nairobi, Kenya. *Food Policy* **79**, 12-22.
- Corburn, J. (2017). "Mukuru Situational Analysis 2017, Mukuru Special Planning Area Analysis: Population and Growth."
- Dixon, J., Omwega, A. M., Friel, S., Burns, C., Donati, K., and Carlisle, R. (2007). The health equity dimensions of urban food systems. *J Urban Health* **84**, i118-29.
- Downs, S. M., Fox, E. L., Zivkovic, A., Mavros, T., Sabbahi, M., Merchant, E. V., Mutuku, V., Okumu-Camerra, K., and Kimenju, S. (2022). Drivers of food choice among women living in informal settlements in Nairobi, Kenya. *Appetite* 168, 105748.
- Fanzo, J., Haddad, L., Schneider, K. R., Béné, C., Covic, N. M., Guarin, A., Herforth, A. W., Herrero, M., Sumaila, U. R., Aburto, N. J., Amuyunzu-Nyamongo, M., Barquera, S., Battersby, J., Beal, T., Bizzotto Molina, P., Brusset, E., Cafiero, C., Campeau, C., Caron, P., Cattaneo, A., Conforti, P., Davis, C., DeClerck, F. A. J., Elouafi, I., Fabi, C., Gephart, J. A., Golden, C. D., Hendriks, S. L., Huang, J., Laar, A., Lal, R., Lidder, P., Loken, B., Marshall, Q., Masuda, Y. J., McLaren, R., Neufeld, L. M., Nordhagen, S., Remans, R., Resnick, D., Silverberg, M., Torero Cullen, M., Tubiello, F. N., Vivero-Pol, J.-L., Wei, S., and Rosero Moncayo, J. (2021). Viewpoint: Rigorous monitoring is necessary to guide food system transformation in the countdown to the 2030 global goals. *Food Policy* 104.
- FAO, I., UNICEF, WFP and WHO (2021). "The State of Food Security and Nutrition in the World 2021."
- Frimpong Boamah, E., Amoako, C., and Asenso, B. K. (2020). Spaces of market politics: Retailscapes and modernist planning imaginaries in African cities. *Appl Geogr* 123, 102265.
- Havewala, F. (2021). The dynamics between the food environment and residential segregation: An analysis of metropolitan areas. *Food Policy* **103**.



- Holdsworth, M., Pradeilles, R., Tandoh, A., Green, M., Wanjohi, M., Zotor, F., Asiki, G.,
  Klomegah, S., Abdul-Haq, Z., Osei-Kwasi, H., Akparibo, R., Bricas, N., Auma, C.,
  Griffiths, P., and Laar, A. (2020). Unhealthy eating practices of city-dwelling Africans in
  deprived neighbourhoods: Evidence for policy action from Ghana and Kenya. *Glob Food Sec* 26, 100452.
- Kimani-Murage, E. W., Muthuri, S. K., Oti, S. O., Mutua, M. K., van de Vijver, S., and Kyobutungi, C. (2015). Evidence of a Double Burden of Malnutrition in Urban Poor Settings in Nairobi, Kenya. *PLoS One* **10**, e0129943.
- KNBS (2016). "Economic Survey 2016."
- KNBS (2019). Kenya Population and Housing Census.
- O'Kane, G., and Pamphilon, B. (2016). The importance of stories in understanding people's relationship to food: narrative inquiry methodology has much to offer the public health nutrition researcher and practitioner. *Public Health Nutr* **19**, 585-92.
- Pradeilles, R., Irache, A., Wanjohi, M. N., Holdsworth, M., Laar, A., Zotor, F., Tandoh, A., Klomegah, S., Graham, F., Muthuri, S. K., Kimani-Murage, E. W., Coleman, N., Green, M. A., Osei-Kwasi, H. A., Bohr, M., Rousham, E. K., Asiki, G., Akparibo, R., Mensah, K., Aryeetey, R., Bricas, N., and Griffiths, P. (2021). Urban physical food environments drive dietary behaviours in Ghana and Kenya: A photovoice study. *Health Place* **71**, 102647.
- Reardon, T., Tschirley, D., Liverpool-Tasie, L. S. O., Awokuse, T., Fanzo, J., Minten, B., Vos,
  R., Dolislager, M., Sauer, C., Dhar, R., Vargas, C., Lartey, A., Raza, A., and Popkin, B.
  M. (2021). The Processed food revolution in African food systems and the Double
  Burden of Malnutrition. *Glob Food Sec* 28.
- Salon, D., and Gulyani, S. (2010). Mobility, Poverty, and Gender: Travel 'Choices' of Slum Residents in Nairobi, Kenya. *Transport Reviews* **30**, 641-657.
- Smit, W. (2016). Urban governance and urban food systems in Africa: Examining the linkages. *Cities* **58**, 80-86.
- Steyn, N. P., McHiza, Z., Hill, J., Davids, Y. D., Venter, I., Hinrichsen, E., Opperman, M., Rumbelow, J., and Jacobs, P. (2014). Nutritional contribution of street foods to the diet of people in developing countries: a systematic review. *Public Health Nutr* 17, 1363-74.
- Swan, E., Bouwman, L., Aarts, N., Rosen, L., Hiddink, G. J., and Koelen, M. (2018). Food stories: Unraveling the mechanisms underlying healthful eating. *Appetite* **120**, 456-463.
- Turner, J. C. (2005). Explaining the nature of power: a three-process theory. *European Journal of Social Psychology* **35**, 1-22.
- United Nations, D. o. E. a. S. A., Population Division (2019). "World Urbanization Prospects 2018: Highlights (ST/ESA/SER.A/421).".
- Vilar-Compte, M., Burrola-Mendez, S., Lozano-Marrufo, A., Ferre-Eguiluz, I., Flores, D., Gaitan-Rossi, P., Teruel, G., and Perez-Escamilla, R. (2021). Urban poverty and nutrition challenges associated with accessibility to a healthy diet: a global systematic literature review. *Int J Equity Health* **20**, 40.
- Wahome, M., and Mbatia, P. (2021). Causes of undernutrition and in Mukuru and Vivandani urban informal settlement. *American Journal of Food Science and Nutrition* Vol.3, Issue 1, pp 34-45, 2021.

#### **TMG Research**

TMG- Think Tank for Sustainability TMG Research gGmbH EUREF-Campus 6-9 10829 Berlin, Germany Phone: +49 30 92 10 74 07 00 Email: info@tmg-thinktank.com Website: www.tmg-thinktank.com

This publication was made possible with the financial support by the German Federal Ministry for Economic Cooperation and Development (BMZ).



Federal Ministry for Economic Cooperation and Development



