

# Socio-material 'griddedness' and its role in driving food system outcomes in African cities

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## Abstract

Conventional framings of the urban food and nutrition challenge, policy orientations, and developmental responses require significant review. Four intersecting themes are considered; the second urban transition, how this intersects with the nutrition transition, how urban residents are responding to these issues, and finally, the limitations of existing food and nutrition security measurement. The drivers of poor food and nutrition outcomes align directly with the urban system, specifically infrastructure deficiencies in rapidly growing African cities. Citizens respond strategically to these deficiencies in ways overlooked in discourses aligned to the nutrition transition. Measurement and policy processes fail to consider this agency. Required are approaches that engage across multiple infrastructure grids, the wider urban system and the food system so as to support new forms of urban food systems governance that align food system needs with these complex urban systems, and see urban food and nutrition security and urban infrastructure as directly linked.

Key words: Second urbanisation transition, nutrition transition, urban infrastructure, agency, urban governance

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## Introduction

The population of food and nutrition insecure urban residents is growing in absolute terms in many cities in South Asia and Sub-Saharan Africa (Hawkes & Fanzo, 2017; Ruel et al, 2017; Crush et al, 2012; Popkin et al, 2012). This figure is higher in informal and marginalized settlements (Crush & Frayne, 2010). Generally, food and nutrition insecurity has been framed as a food provision issue, with the belief that food shortages and unavailability are the key limited factor of food security. Yet, this framing lacks the means to effectively conceptualize food and nutrition security, which are also affected by access to, use of, and stability of food. The demographic shifts that have taken place, and are currently accelerating in sub-Saharan Africa, mean that our current understanding of both the drivers of food and nutrition insecurity, but also policy responses, need review and nuance.

The premise of this paper is that conventional framings of challenges to the food and nutrition systems, the existing policy and developmental responses, and determinations of both the sites and dimensions of the challenge require significant review and expansion.

A critical area that is overlooked in existing food system policy and programming is the role that infrastructure plays in determining food and nutrition outcomes. Here infrastructure is understood as being far more than just food environments (Glanz, 2009) but the entire urban system, both material and social. Tools used to measure food and nutrition security fail to proactively engage and assess the intersections between food and nutrition outcomes and infrastructure, specifically non-food infrastructures. These infrastructures include energy access, energy types, housing types, sanitation, market infrastructures, spatial layout, and internet connectivity. This is not to say that these infrastructures are not present, but rather, intersect with food access and utilization in ways that are not fully understood.

Food allows us to study the politics and governance of infrastructure arrangements at multiple levels – the relationship between people and physical structures working together in socio-material systems, grids, a form of “griddedness”. Food and nutrition security offer an important lens to understand not just the causes of poverty and vulnerability, but a range of questions relating to urban systems, spatial planning and infrastructure provisioning.

Four themes are considered in this paper. The first is urbanization, specifically the Southern urban transition, or second urban transition, and its spatial and material impact on the lives of urban residents. Second is the food and nutrition security nexus at the urban scale, with a deliberate focus on the framings and conceptualizations embedded in the concepts of the nutrition transition. Thirdly the paper seeks to build on emergent work questioning the current approaches to food and nutrition security measurement, posing questions about the absence of explicit engagements in the material non-food drivers of food and nutrition insecurity. The use of material and materiality is deliberate, attempting to elevate discussion from a single grid view, offering novel ways of considering matter, material relations and agency and specifically the interplay between agency with the material realities of everyday life and broader political and socio-economic structures (see Bennett et al, 2010). Where households have constrained access to key infrastructure ‘grids’, strategic choices need to be made. These choices play an important role in food choices and the food systems accessed by these households. Infrastructure therefore plays a far greater role in the nutrition status of households. Finally, the paper seeks to both make evident, but also valorize the agency, and strategic approaches to the everyday struggles in sites of informality and poverty, where household food ‘managers’ make highly strategic decisions that are often considered irrational through generalized framings of development and need.

Africa is poised for dramatic change, both demographically and socially. When these changes are considered in the context of the COVID-19 pandemic, food, nutrition and urban health issues are of critical importance. Africa’s demographic and emergent economic growth is primarily taking place in cities and this is attracting large scale infrastructure investment, be this state and donor driven or private (Cirolia, 2020). This infrastructure investment is being planned with little or no cognizance of urban food system challenges,

specifically food and nutrition insecurity. Infrastructure requires far greater attention, “the urban transition of the next few decades will be formative of future developmental opportunities on the continent.” (Pieterse et al, 2018: 151).

This article seeks to engage the nutrition transition specifically through an examination of food system findings in cities, posing questions relating to how blame and development responses have been framed, and how urbanization’s culpability in the nutrition transition has been articulated.

Drawing on evidence from recent empirical work in cities across Africa, this paper interrogates the intersecting food and nutrition security, food systems and urban systems challenges. The paper concludes with a call for three aligned but independent areas of action. The first is for far greater attention and focus on all the dimensions of food and nutrition security at the urban scale. Second is a call for a far more encompassing approach to food and nutrition security measurement, where different forms of knowledge are used, to determine food security issues and policy programming. Finally, the paper stresses the central role of citizen agency in engaging wider food system issues. Considering ways in which this can be done is essential in responding to the nutrition transition taking place across the South, and increasingly a challenge in Africa.

## The Southern Urban Transition

Africa is urbanizing at a rapid rate, faster than any other continent (UN-DESA, 2019). Two aligned processes are driving this demographic transition. First is a move from rural to urban areas. The general depopulation of rural areas discourse requires interrogation though, with endogenous urban growth being an equal, if not greater driver of urban growth in Africa (Menashe-Oren & Bocquier, 2021; Crankshaw & Borel-Saladin, 2019). In addition to this, Africa’s median age is 19,7 years — the youngest in the world (Saleh, 2021). The rapid growth in developing world cities is a component of what has been termed the second urbanization transition (Pieterse, 2008).

The global North was the site of the first general societal urbanization process and was facilitated by, and resulted in, a number of societal shifts. Agricultural innovation and resultant increases in production reduced the price of food. Lower food prices meant reduced rural employment opportunities. Abundant labor and lower food prices were vital drivers of the industrialization process, particularly in rapidly growing urban areas (Beall & Fox, 2009: 47). The combination of cheap food, industrialization and subsequent specialization and new forms of urban governance enabled urban development. Cities in the developed world became the centers of economic growth. These foundational processes are different to cities in the global South, and increasingly different in African cities. The second urban transition is taking place within a particular geopolitical and economic moment (Pieterse, 2008: 16). The lack of industrial growth in developing world cities, particularly in African cities, reflects the sharp contrast between Africa’s current urban transition and that of the first urban transition (Swilling and Annecke, 2012).

General descriptions of the developing world city, the slum city (Davis, 2006), or the auto-constructed city (Pieterse, 2013) while real, fail to effectively capture the processes, networks and dynamics of a developing world city. What the African city does reflect is an endless struggle. In this struggle, different forms of city-ness, networks and agency emerge. Inequality and its intersection with infrastructure feed directly into how the food system operates.

The contemporary view of urban governance still sees the city as an entity run through what has been called "nucleated and hierarchically nested process of political governance, economic development, social order, and cultural identity" (Soja, 2000: 13-14). This notion implies a top-down governance structure that disregards agency, phronesis (per Flyvbjerg, 2004) or other forms of deep democracy (from Appadurai, 2001), and is readily questioned and challenged in the literature (Bayat, 2000; Appadurai, 2002; Pieterse and Simone, 2013). While officials may aspire to the hierarchical model of governance, the lived reality is very different. This is evident in the food systems of developing cities. However, the 'mandate-ism' evident in governance, across scales, entrenched by the silo-ed approach in fiscal regimes, all means that engagement in the intersections between food and nutrition security, governance and infrastructure is all the more challenging and clearly evident in the food systems of developing cities.

Until fairly recently Africanists largely ignored all aspects of a wider urban agenda, focusing instead on issues such as the peasantry, agriculture, natural resource use or national sovereignty (Pieterse et al, 2018). The anti-urban bias is receding (Myers, 2014), shepherded in by evidence of the rate and scale of urbanization (Pieterse et al, 2018). Research in African studies is undergoing an internal city-centric reworking that mirrors the urban transformations of the continent and the world (McPhearson et al, 2016). However, food related issues remain perceived as a deeply rural issue, not an urban issue (Crush & Riley, 2018). As a result, rural logics and approaches to food are often inappropriately transferred to the urban scale (Haysom, 2021). Governance structures, ministerial formations, even national statistical recording of the food system, all entrench this rural view. As a result, the role of urban infrastructure as an aligned urban food system driver is occluded and frequently disregarded.

Engaging the multi-scalar governance challenges of food and nutrition is all the more complex in Africa cities. Linking food system issues to urban infrastructure makes this even more complex. The combination of the legacy of a colonial-era footprint, and a post-colonial reality of long-term underinvestment in extending and maintaining infrastructure, has meant Africa's cities are currently trapped in the last century. This may change rapidly in the short to medium term. Development and investment are by no means uniform or equitable. Urban areas still reflect areas of entrenched inequality and limited access to basic services. However, "the sustainable development vision provides a useful stimulus for Africa's urban poly-crisis, demanding fresh interdisciplinary and normatively explicit thinking, grounded in a practical and realistic understanding of Africa's infrastructure and governance challenges." (Pieterse et al, 2018: 149). Given the dynamics of the second urban transition and the limitations in how the urban food and nutrition system is governed, what does this mean for how these realities are understood. As Kami Pothukuchi has stressed "... inaction in the

planning environment does not have neutral consequences, but often generates negative outcomes” (Pothukuchi, 2000). What does this mean for health and nutrition?

## The Nutrition Transition

Food systems and nutrition outcomes in cities are inter-linked. Hunger seasons, often associated with planting and harvest, or drought cycles, are drivers of rural food system related challenges. Urban food system related challenges differ. Drought and seasonal fluctuations certainly influence the flows of food into the urban system, but other factors play a far greater role in structuring the nature and challenges of urban food systems. One such challenge is the increasing spectre of urban food and nutrition insecurity. Another is the observed changes in diets in cities. Most frequently the change from predominantly rural-type diets to a more urban diet is referred to as the nutrition transition. A key cause of the nutrition transition is urbanization. An early literature review by Popkin and Bisgrove (1988) highlighted that urban diets were characterized by “the consumption of superior and polished grains, more fats and animal products, more sugar, more processed foods, and more foods consumed away from home” (in Drewnowski & Popkin, 1997: 34). The authors link diets and cities, citing increasing incomes due to urbanization as a primary driver of dietary changes

Wealth and poverty have profound effects on diets, nutrition, and health. Economic factors have a far broader influence on global eating habits than might be expected from the analysis of dietary trends in developed nations. As incomes rise and populations become *more urban*, societies enter different stages of what has been called the *nutrition transition* ... A major dilemma ... is how best to promote economic growth and prevent or delay the undesirable health effects of the nutrition transition.

(Drewnowski & Popkin, 1997: 31 - emphasis added)

Much of the literature on the nutrition transition suggests that dietary changes are a result of urbanization and globalization trends (Popkin, 1999; Kennedy et al, 2004; Hawkes, 2006). Globalization is changing food systems through food trade and global sourcing, foreign direct investment, global food advertising and promotions, the emergence of global agribusiness and transnational food companies (including the expanding supermarket sector in urban areas), and the development of global rules and institutions that govern the production, trade, distribution and marketing of food (Hawkes, 2006: 2).

There is no denying the fact that diets are changing in cities. In African cities the change has led to the triple burden of malnutrition (Pinstrup-Andersen, 2007; Meenakshi, 2016), where pervasive hunger, severe micronutrient deficits, sit alongside the rapid rise of diet related non-communicable diseases and obesity (Christian & Dake, 2021). One of the first changes is a transition from a diet of coarse grains to an increased consumption of sweeteners and fats, or a shift toward more “Western diets’ dominated by more refined foods and a higher fat diet and also a more sedentary lifestyle and more obesity” (Popkin, 1999: 1914). More recently the elements of the nutrition transition were found to be “negatively linked with

[nutrition related non-communicable diseases] NR-NCDs are obesity, adverse dietary changes ... and reduced physical activity in work and leisure.”(Popkin et al, 2012: 206).

In the nutrition-focused literature and policy framings, notions of the nutrition transition dominate. However, an important distinction is made between *dietary convergence* and *dietary adaptation*. Kennedy et al (2004: 9) clarifies the difference as follows:

Dietary convergence is occurring as a result of increased reliance on a narrow base of staple grains, increased consumption of meat and meat products, dairy products, edible oil, salt and sugar, and a lower intake of dietary fibre. Dietary adaptation is characterized by an increased consumption of brand name processed and store-bought foods, an increased number of meals eaten outside the home and consumer behaviors driven by the appeal of new foods available.

(Kennedy et al, 2004: 9)

In many African countries, the increased penetration of “Big Food” (Igumbor et al, 2012) and the ubiquity of ultra-processed foods, largely facilitated by the above cited globalization, are driving significant changes in the food system where “traditional long-established food systems and dietary patterns are being replaced ... by ultra-processed products” (Monteiro & Cannon, 2012: 1). One such example of this is South Africa, a country that is 67% urbanized (World Bank, 2020), where “the largest ten packaged food companies account for 51.8% of total packaged food sales” (Igumbor et al. 2012: 2). In South Africa and many other countries of the global South, inequality (Bigsten, 2018) further complicates these transitions. Food system transitions at the global scale impact other scales in different ways. The challenge presented by Hawkes (2006) requires further consideration, that “the convergence-divergence duality raises the policy concern that globalization could be encouraging the uneven development of new dietary habits between rich and poor. As high-income groups in developing countries accrue the benefits of a more dynamic marketplace, lower- income groups may experience convergence towards poor quality obesogenic diets.” (Hawkes, 2006: 14). This warning appears to be playing out in deeply problematic ways across cities in the global South (Popkin, 2002). The trend lines in dietary related negative food system outcomes across Africa are either stagnant or accelerating in an upward direction. Africa is often typified as being a continent where hunger is pervasive yet increases in overweight and diet related NCDs are worsening (See Table 1). While the base might be lower in Africa, the trend line is evident. This poses a critical question: are these changes driven by globalization, urbanization, development and increased wealth, or is something more contextual, more nuanced accelerating these changes?

Adult female obesity	Adult male obesity	Adult female diabetes	Adult male diabetes
53 No progress or worsening	53 No progress or worsening	53 No progress or worsening	53 No progress or worsening

Table 1: Health and diet related indicators for Africa (Source: compiled by author from Global Nutrition Report, 2020)

We propose that something more complex might also be at play, further driving changes, feeding off certain processes compounding this acceleration. This suggestion is informed by two unrelated aspects. One is that the assumptions about the intersections between urbanization and wealth creation in the global South, and specifically in Africa, require a more nuanced understanding. Secondly, current modes and approaches to food and nutrition security measurement require review.

The dichotomy of individual versus environmental drivers of obesity have not been effectively interrogated and the current modes of measurement fail to effectively capture the environmental determinants of the nutrition transition, per the trends depicted in Table 1. Roberto et al (2015: 2400) suggest that “today’s food environments exploit people’s biological, psychological, social, and economic vulnerabilities, making it easier for them to eat unhealthy foods.”

What is less frequently considered is the impact of spatial, physical, infrastructural factors, often those not associated with the food system, on nutrition outcomes.

These factors are seldom interrogated in food and nutrition measurement processes, particularly at the urban scale. Often measurement focuses on the household or individual while food balance sheets and market data general focus on the national or regional scale. The urban is the missing middle in measurement processes, a critical gap, the syllogistic fallacy or undistributed middle, where evidence from the household scale or from wider national or global scales are assumed to be equally true at the urban scale.

Food and Nutrition Security Measurement - “Measurement drives diagnosis and response”<sup>1</sup>

Without effective measurement, interventions, from development actions to policy prescripts, run the risk of missing key determinants of the specific issue. Food and nutrition measurement present a critical challenge, and not because we lack a conceptualization or way to measure them. Rather, the opposite is true. Evolving changes in food security conceptualizations have given rise to changes in the ways in which governments and aid organizations have approached food security challenges (Maxwell & Frankenberger, 1992; Cafiero et al. 2014: 230). Over time different scales of measurement have been applied. Following the 1975 United Nations World Food Conference, food security was seen as “availability at all times of adequate world food supplies of basic foodstuffs to sustain a steady expansion of food consumption and to offset fluctuations in production and prices” (UN, 1975: 14). This drove a production and supply orientation to food security. A process that generally saw the national scale, the state, being the area of focus, with national food balance sheets and food availability being the areas of concern and measurement. Following Sen’s 1981 entitlements perspective (Sen, 1981), measurement was de-scaled to the household and individual scale (Haysom & Tawodzera, 2017). Policies and response strategies informed by data generated at an inappropriate scale or inappropriate

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<sup>1</sup> This framing is drawn from Barrett (2010, p. 827)

measurement tools generally result in inappropriate responses (Haysom & Tawodzera, 2017).

The multi-dimensional and scalar nature of food security means that a single index that captures all aspects encapsulated in the food security concept will remain elusive. Measuring food and nutrition security requires the use of different measures to capture the different dimensions of food security (Ballard et al., 2013). Trade-offs understandably need to be made, what Barrett (2010: 828) describes as the “breadth-versus- depth trade-offs”.

Food and nutrition security measurement at the household scale allows for an understanding of consumption (Haysom and Tawodzera, 2017). However, many of the drivers of food security are not identifiable through household scale analysis alone (Battersby et al, 2014). Labonté and Schrecker (2007) called for far greater engagement with the scale at which measurement and subsequent policy are enacted.

Given the extent and pace of the second urban transition and the upward trend in negative food and nutrition system outcomes, far greater attention is required when trying to understand these resultant food and nutrition outcomes at the urban scale. Despite the FAO’s recognition of the need to change measurement approaches (FAO, 2012), practice remains largely unchanged. Since 1996, four dimensions are used to conceptualize of food security: availability, accessibility, utilization and stability (FAO, 1996). Recently the UN Food and Agricultural Organisation High Level Panel of Experts (HLPE) have suggested that two additional dimensions be added to the food and nutrition security framing, those of sustainability and agency (HLPE, 2018). These are essential additions to understanding food and nutrition security.

Importantly the agency dimension effectively brings questions of choice, decision making and even politics and activism, and the ability to determine food system functioning into the wider framing of food and nutrition security. Seeing the food insecure as active agents with the ability to determine their own food system is a radical departure from more traditional multi-lateral derived definitions. Working out how sustainability and agency will be measured only adds to the complexity of measurement and diagnosis (per Barrett, 2010). Given the addition of agency, and the earlier discussions on how food choices are being made in urban areas, specifically when the urban system and the food system intersect, it is worth considering agency more deeply.

## Agency

Questions of agency and the theoretical value of agency have been the subject of much debate within academic literature where “variants of action theory, normative theory, and political-institutional analysis have defended, attached, buried, and resuscitated the concept in often contradictory and overlapping ways” (Emirbayer & Mische, 1998: 962). However, in general terms, current perspectives of agency do not provide insight into how agency “interpenetrates with and impacts upon the temporal relational context of action” (Emirbayer & Mische, 1998: 1012). This view of agency is particularly important when



considering the intersectional conundrum when food and urban systems meet at the household scale, but equally how urban system functions serve to dictate agency at the urban and household scales. Agency, as an action, is inherently social and relational (Emirbayer, 1997) and consists of three key elements; iteration, projectivity and practical evaluation (Emirbayer & Mische, 1998: 1012).

The FAO HLPE define food system related agency as “the capacity of individuals or groups to make their own decisions about what foods they eat, what foods they produce, how that food is produced, processed and distributed within food systems, and their ability to engage in processes that shape food system policies and governance” (HLPE, 2020: xv). This framing of Agency draws on Sen’s (1985) framing of agency being “what a person is free to do and achieve in pursuit of whatever goals or values [they regard] as important.” The HLPE goes further stressing that agency goes beyond access to material resources, and stressing that this includes “the ability of people to take actions that help improve their own wellbeing, as well as their ability to engage in society in ways that influence the broader context, including their exercise of voice in shaping policies” (Alsop & Heinsohn, 2005 in HLPE, 2020)

The significant state of under development across most urban areas of the global South means that context also informs how agency is enacted in respect of material resources. Strategic choices are made every day as a result of specific local contexts, and these choices are driven by a strategic assessment of the trialectic<sup>2</sup> of health, infrastructure and cost. This form of material-derived agency intersects directly with the changing urban food systems, and specifically the intrusion of big food and the rise of ultra-processed food products. Here the framing of agency by Emirbayer and Mische as “the temporally constructed engagement by actors of different structural environments – the temporal-relational context of action – which, through the interplay of habit, imagination, and judgment, both reproduces and transforms those structures in interactive response to the problems posed by changing historical situations.” (1998: 970) is particularly important. This framing draws concepts of habit, imagination and active judgement into the ways in which responses to a specific material and political context are enacted. Understanding these responses, but also the habits, histories and contextual drivers adds significant complexity to how agency in the context of food and nutrition security is understood.

This is essential because food and nutrition security measurement currently provides only a partially formed hypothesis of reality. Building on the work of Elinor Ostrom, finding ways to understanding the actual reality is essential if responses to the seemingly intractable food and nutrition security challenges in cities of the global South are to be found. How are those faced with daily food and nutrition challenges making decisions and what material, economic and social processes are driving these decisions?

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<sup>2</sup> This framing builds on the approach suggested by Battersby and Moragues Faus (2021) where the trialectic is used to conceptualize a specific scale where “viewed simultaneously as a spatial container, a conceptual terrain and a governance structure” these same spatial, conceptual and governance considerations intersect with the three subjects of health, infrastructure and cost.

## Engaging the Material – Infrastructure grids and the food system

This next section draws on a larger body of emerging work across Africa and the global South. This nascent work uses food as a lens to better understand the processes, challenges and emergent trends associated with the second urban transition. The initial emphasis of this work was to understand the state of food security in African cities (Frayne et al, 2010). This work aligned with work in other regions of the South (see for example Rocha & Lessa, 2009; ICBF 2006; Ashe & Sonnino, 2013; SDIS, 2012). The Africa-specific work evolved over time. Different entry points have been used to understand the food systems of cities. These included poverty (Battersby & Watson, 2018) and inclusive growth (Pieterse et al, 2020). More recently this work has expanded from the specific project focus to wider engagements across different, at times contested themes and interpretations of both the problem and the solution (Crush et al, 2020).

The relationship between food consumption and infrastructure has always formed part of the wider framing of food security, specifically encapsulated in the utilization dimension. The FAO defines this as “the proper biological use of food, requiring a diet providing sufficient energy and essential nutrients, potable water, and adequate sanitation...” (FAO 2006:1). However, the definition continues, scaling to the household and individual, stressing that “... Effective food utilization depends in large measure on knowledge within the household of food storage and processing techniques, basic principles of nutrition and proper childcare” (FAO 2006:1). This implies a lack of knowledge and absent agency. Equally, this assumes a specific household typology, one not necessarily aligned to the lived reality of African cities. In this section, the evidence from a selection of studies are used to question the intersections between infrastructure and the nutrition transition, while asking if dietary convergence and adaptation are simultaneously being driven by the intersections between the materialities of the second urban transition, poverty and infrastructure access.

The next section draws on specific, admittedly purposefully selected vignettes to pose questions about the food system responses that emerge at the intersections between the above discussed themes of Southern urbanization, the nutrition transition and agency, and where the traditional food security measurement approaches as discussed by Haysom and Tawodzera (2017) and Blekking et al (forthcoming) still fail to effectively understand drivers of food system failure, and the associated bottom up responses. Whether these responses are signs of new and emergent responses to food system failure that require capacitation, or whether they are merely indicators of the multiple sites of struggle, requires far greater interrogation and falls outside the remit of this paper. What these vignettes do indicate is a distinctly failed food system. Despite this, food system consumers are responding in direct and interesting ways, seeking out ways to enact resilience in their daily struggles, developing adaptation strategies that reflect the deficiencies in the system but at all times seek to circumvent these limitations. These are by no means perfect, but they do reflect adaptation and risk mitigation strategies that are seldom captured in conventional food and nutrition security measurement protocols.

Using evaluations based on the food security measurement approaches developed by the United States Agency for International Development’s Food and Nutrition Technical

Assistance program (FANTA) (Coates et al, 2007) Table 2 provides an indication of the state of food security across a collection of both primary and secondary African cities, as well as the results from three other cities of the global South.

(HFIAP) Categories	Cape Town (n=1200)	Maputo (n=2105)	Windhoek* (n=875)	Nairobi (n=1414)	Kitwe* (n=871)	Kisumu (n=829)	Epworth (n=482)	Mexico City (n=1210)	Kingston (n=637)	Bangalore (n=1623)
Food secure	45%	29%	6%	29%	6%	20%	8%	49%	26%	83%
Mildly food secure	6%	11%	5%	13%	3%	9%	5%	12%	9%	2%
Moderately food insecure	13%	22%	5%	33%	12%	26%	20%	12%	28%	2%
Severely food insecure	36%	38%	84%	25%	79%	45%	67%	27%	37%	15%
Dietary diversity (HDDS /12)	6.8	4.1	3.2	6.1	3.25	4.1	4.2	5.8	4.5	6.0

Table 2: Food security and dietary diversity scores for selected Southern cities – periods 2015 - 2018 (Source: Pieterse, Haysom and Crush, 2020) \*All studies are at the city scale excepting Kitwe and Windhoek.

What Table 2 reflects is both the contextual variation across the so-called global South, but also the variation across different African cities. When engaging the question of the nutrition transition specifically, the household dietary diversity scores (HDDS) (Swindale & Bilinsky, 2006) presented in Table 2 reflect a significant dietary challenge. As a general rule HDDS scores of less than six are seen as a proxy indicator for potential risks of under nutrition. Across many cities, the scores are less than or equal to six. Amounts reflected in Table 2 are from pre-pandemic research and as such, scores are undoubtedly worse now.

The rates of consumption of the 12 HDDS food groups consumed from a study conducted in the City of Cape Town represents confirmation of both the nutrition transition (Figure 1), and of the significant urban nutrition challenge that Drenowsky and Popkin warned of in the late 1990s. There is a clear variation between the levels of food access across income terciles. This might serve to confirm the nutrition transition arguments about increased wealth driving food systems change and the points raised by Hawkes (2006) on the differentiated benefits of globalization. Importantly, Figure 1 reflects a profile that was similar across the different cities assessed. However, it does raise important questions about the generalizations about the urbanization/nutrition transition intersections. What Figure 1 also highlights in the dominance of grains, and the reduction of fruits, vegetables, proteins and pulses in the diets of the lowest income tercile.

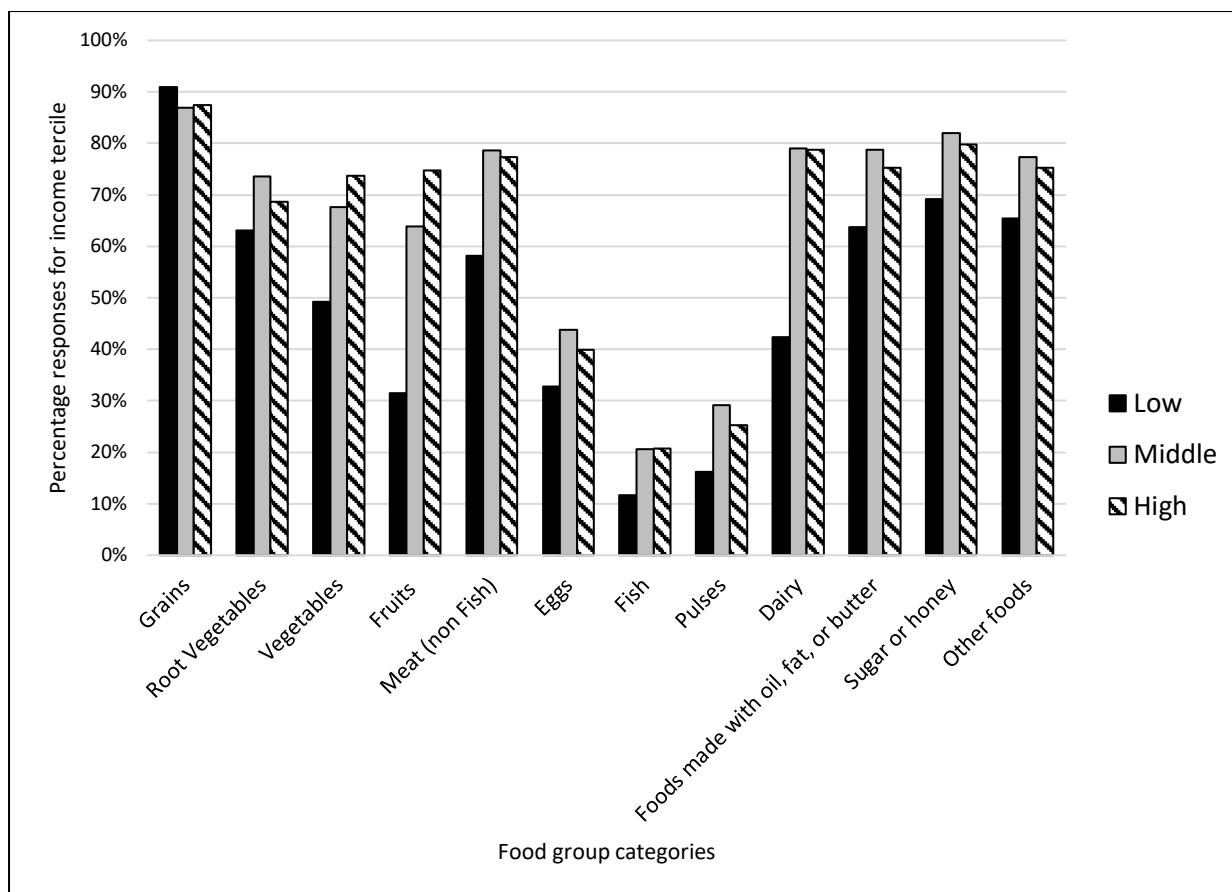


Figure 1: Household food sources and types in accordance with HDDS food groups (High: n=200; Middle: n=504; Low: n=1800) (Source: Haysom et al, 2017– from 2013 data)

Table 2 and Figure 1 offer insights into the nature of diets in the respective cities, both in terms of foods accessed and the constraints of that food access. These results are drawn from more conventional surveys, such as the FANTA aligned survey tools. It is suggested here that these food security and food access metrics are still largely informed by the food availability and food access dimensions of the four dimension interpretation of the earlier FAO (1996) definition of food security. This reading has value in terms of both urban and rural households. While it offers some sense of the nature of the food system serving the household assessed, it is unable to offer greater detail on the profile and functioning of that food system. Second, it fails to capture some of the more multi-dimensional poverty challenges faced by those households under review. Lastly, it also fails to capture how the specific food system is being used by different elements of society.

Using data again drawn from Cape Town, Figure 2 offers a sense of the diversity of food sources used to access food, and highlights the variations across the same income tertiles detailed in Figure 1. What Figure 2 highlights is that while all income categories may use supermarkets, the so-called informal economy is a key source of food access for low income communities. Local Spaza shops (a South African term for a small largely informal corner-type store located in a neighborhood) and street vendors are a key source of food access for poor households.

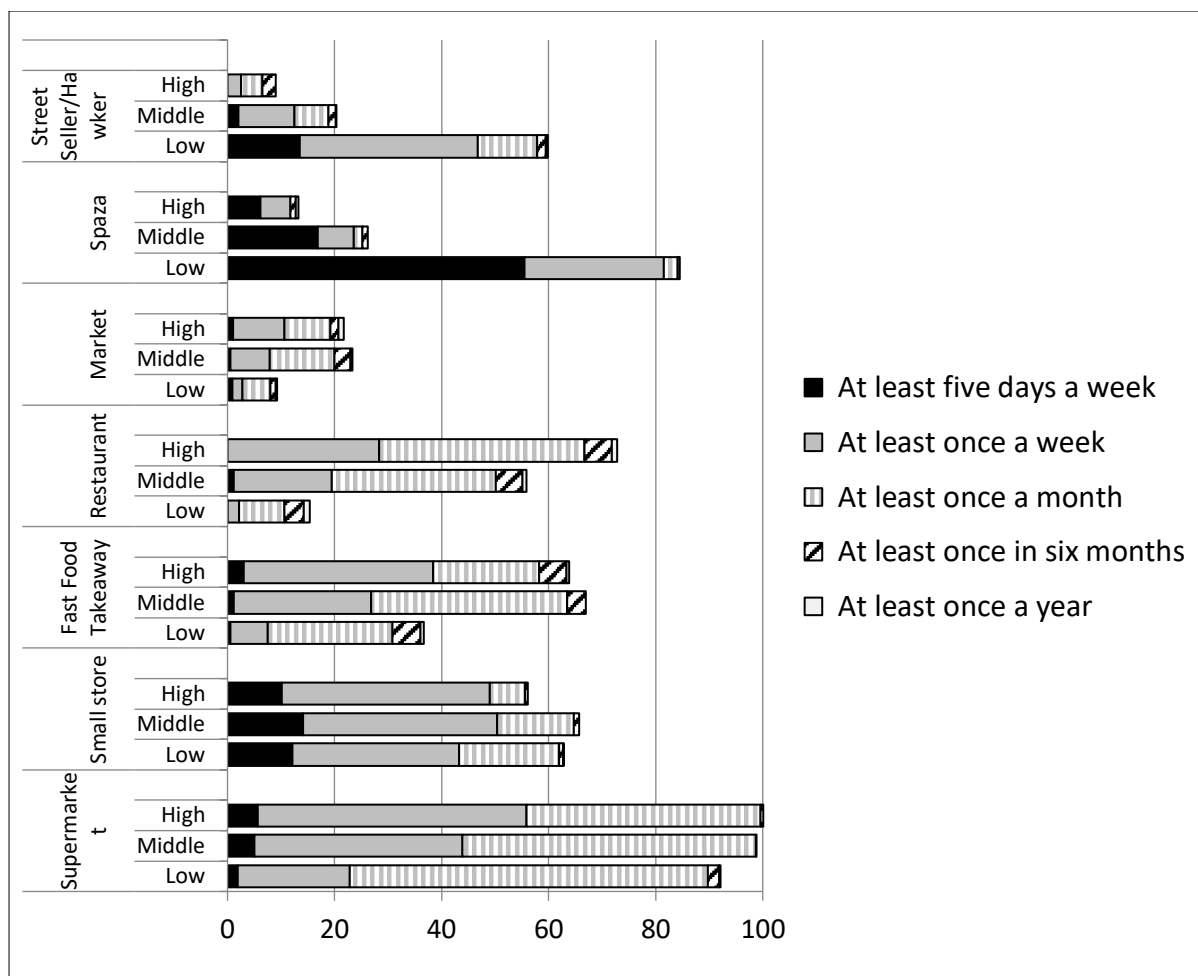


Figure 2: Food access profiles in Cape Town (n2503) (Source Haysom, Crush & Caesar, 2017)

Importantly, the frequency of use of these informal food access points requires far greater interrogation (See Figure 2). The fact that local corner stores are used as frequently as “at least five days a week” or “at least once a week” and is very different to the purchasing patterns of the upper income terciles, where weekly and monthly shopping dominate, indicates very different food use and purchasing profiles. The reasons for such variations in use frequency and typology (nature of the retail outlet) of access are seldom captured in food security surveys.

One way to attempt to understand such use and typology variation is to enquire into the everyday strategies applied by households in cities. This requires an engagement with the multi-dimensional nature of poverty. This is essential given that the urbanization associated with the second urbanization transition is not driving economic growth and not absorbing labor (Satterthwaite, 2007). While this does not directly capture food, it is a means through which the intersections between food choice, the food system and the urban system can be better understood. The example used below in Figure 3 draws on a form of multi-dimensional poverty assessment, the Lived Poverty Index (Mattes, 2008). This assessment reflects a categorical scale indicating the frequency over the past year in which households went without food, fuel to cook food, and clean water. Here multiple deprivations are evident.

As Kennedy et al (2004) have pointed out, infrastructure is a key consideration. While the general focus on the links between food access and nutritional intake and water and sanitation has been an area of focus (Young et al, 2021), links to the means to prepare food, household appliances and other factors that influence choice have been less considered. These questions are absent from traditional food and nutrition security assessments.

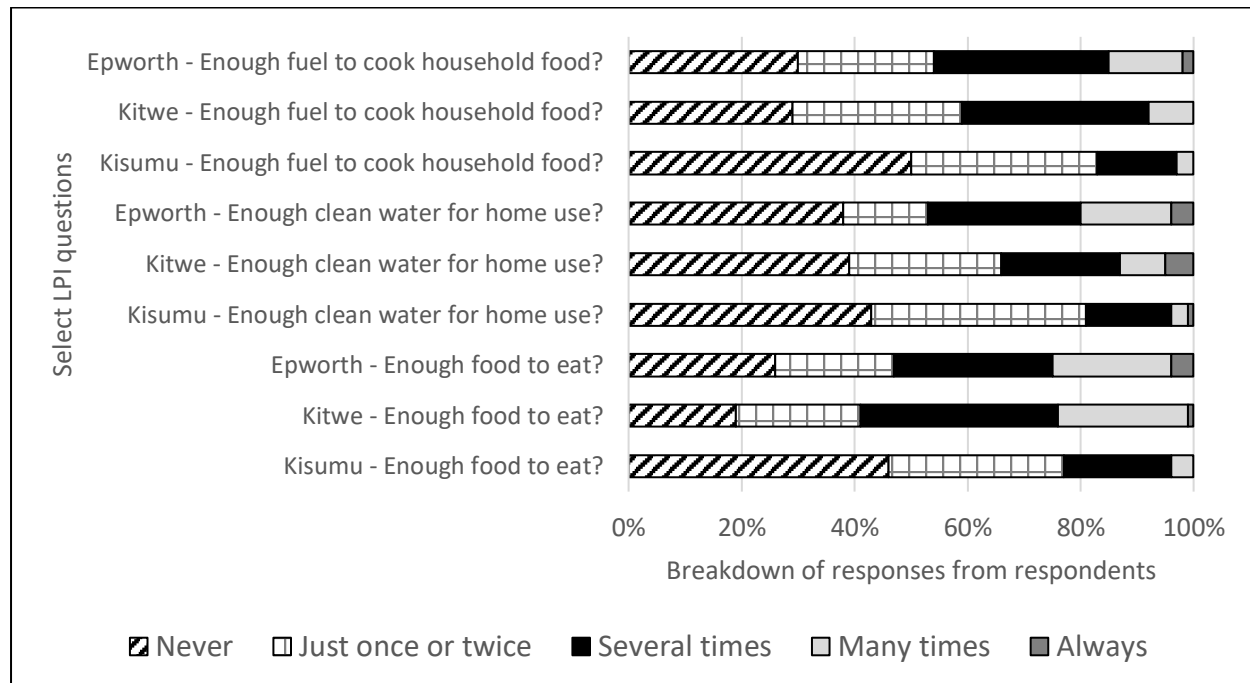


Figure 3: Combined Lived Poverty Index results for key indicators (Source: Haysom and Fuseini, 2019: 17)

Understanding how households manage food access and utilization is essential (Stamoulis, et al 2018). Traditional food and nutrition surveys generally fail to account for drivers of household food choice. Traditional policy prescripts and recommendations aimed at countering the negative impacts of the urban transition suggest a basket of options. These generally align with three core themes. First, by targeting the individual through nutrition education and facilitating increased physical activity (See Ruel, Garrett, Yosef & Olivier, 2017). Second, by increasing the supply of healthy food. Typically, this means by improving markets and market access, or increasing production, which in cities is often through recommendations for urban agriculture. For both of the first two, the reality is that many households know what foods are healthy but encounter significant challenges in accessing such foods as a result of affordability constraints (Peyton, et al , 2015) or due to spatial access limitations (Blekking et al. 2021). The third option focuses on improving economic activity through additional income from either increased job opportunities or through social protection programs. Unfortunately, the second urbanization transition is not facilitating employment. Often those seeking to generate income in the absence of formal jobs, turn to the informal sector, but are subjected to punitive regulations and policing (Skinner & Haysom, 2016). Furthermore, increased incomes do not solve food and nutrition security issues, because households still make highly strategic decisions about where limited household incomes need to be spent (Shifa & Leibbrandt, 2017), and other costs often associated with infrastructure, often at increased cost due infrastrucutre’s hybrid nature (Pieterse et al, 2018). Costs linked to infrastructure often take primacy over food spending. For example, having energy to enable homework or home-based enterprise might trump

spending money on nutritious foods, spending money on mobile data may ensure access to employment opportunities, spending money on burial and other forms of insurance may negate the need to make use of predatory loan sharks in times of need. These three themes, nutrition education, production and economic stimulus, while relevant, generally miss the everyday decision making process and daily struggles faced by poorer households in many African cities.

Household and community scale decisions, forms of agency, align with the process of iteration, projectivity and practical evaluation (Emirbayer and Mische, 1998). These decisions are usefully captured in work carried out in South Africa by the Pietermaritzburg Economic Justice and Dignity group (PMBEJD). PMBEJD tracks monthly household spending and measures this with the cost of an affordable food basket (Table 3). This work shows the limitation of policy suggestions such as those of Ruel et al (2017) highlighting the trade-offs and compromises made by poor households in Southern cities.

	Wage scenario 1		Wage scenario 2		Wage scenario 3	
	(A full time minimum wage worker)		(A part time minimum wage worker)		(A casual worker on basic wage)	
Days worked	<b>21</b>		<b>15</b>		<b>15</b>	
Hours worked	<b>8</b>		<b>8</b>		<b>5</b>	
<b>Monthly wage income</b>	<b>R3 643,92</b>		<b>R2 602,80</b>		<b>R1 626,75</b>	
<b>Household expenses</b>		<b>% of wage</b>		<b>% of wage</b>		<b>% of wage</b>
Transport to work (2 taxi, return)	R1 260,00	34,60%	R900,00	34,60%	R900,00	55,30%
Prepaid electricity (350kWh)	R731,50	20,10%	R731,50	28,10%	R731,50	45,00%
<b>Total for transport + electricity</b>	<b>R1 991,50</b>	<b>54,70%</b>	<b>R1 631,50</b>	<b>62,70%</b>	<b>R1 631,50</b>	<b>100,30%</b>
<b>Money remaining to secure all other expenses</b>	<b>R1 652,42</b>		<b>R971,30</b>		<b>-R4,75</b>	
Subtract: food (4 persons)	R2 889,20		R2 889,20		R2 889,20	
<b>Minimum surplus/shortfall on food costs</b>	<b>-R1 236,78</b>	<b>-42,80%</b>	<b>-R1 917,90</b>	<b>-66,40%</b>	<b>-R2 893,95</b>	<b>-100,20%</b>

Table 3: Household budget profile: General worker earning South African national minimum wage (ZAR21,69 an hour) according to different daily work and hour profiles per scenarios (Source: PMBEJD, 2021: 8) (1 US\$ = ZAR 14,50).

When just two essential infrastructure costs are considered, the cost to provide for a healthy daily diet (calculated per PMBEJD at ZAR 2 889.20 per month) is severely constrained across all employment scenarios, worse for those with more precarious employment. This is particularly pronounced when infrastructure costs are fixed. This raises critical questions about where savings can be made and where households compromise.

The household dynamics noted in Figure 3 have an additive effect and intersect with the food retail options chosen and the nature of that food retail in many African cities. Informal vendors are able to adapt to and respond to infrastructure deficiencies in ways that the formal sector cannot. In many instances, the informal sector takes on the role of the refrigerator, of the stove and of the storage cupboard for poor households living in precarious types of dwelling, across the continuum from self-built formal to largely informal dwellings. The adaptive approaches applied by informal food vendors enables a measure of food access, through bulk breaking and pre preparation of key foods.

*“These days, because wood is scarce and other cooking fuel is so expensive, we cook a lot of these beans and then we place these in small packets and freeze them ... otherwise no-one here would eat beans anymore; the tinned beans from the shops are also too expensive. Dry beans are not expensive, other costs [energy] are high and this takes beans from diets.”*

Informal food trader, Epworth, Harare, 2016

The quote from the vendor in Epworth, a town outside Harare in Zimbabwe, demonstrates the processes and practices that are emerging. Dry beans have traditionally been a key component of many diets across Africa, but these take time to prepare and as a result, require energy.

Infrastructural deficiencies are also faced by food vendors. The absence of reliable infrastructure plays a direct role in increasing the costs of operation for vendors across African cities. Figure 4 reflects the responses from vendors in the city of Kisumu, in Kenya, where the top three costs are directly related to infrastructure. The cost of transport is linked to both the temporary nature of these stores making them difficult to secure, but also the risks associated with unreliable (but costly) energy. Here vendors strategically choose to stock small amounts and re-stock daily. This drives up prices as bulk purchasing benefits fall away, and costs associated with transport impact food prices. This is again reflected in the high costs associated with spoilage. Refrigeration is not listed as one of the highest cost items, but this is due to the low frequency of respondents who chose to make use of refrigeration.

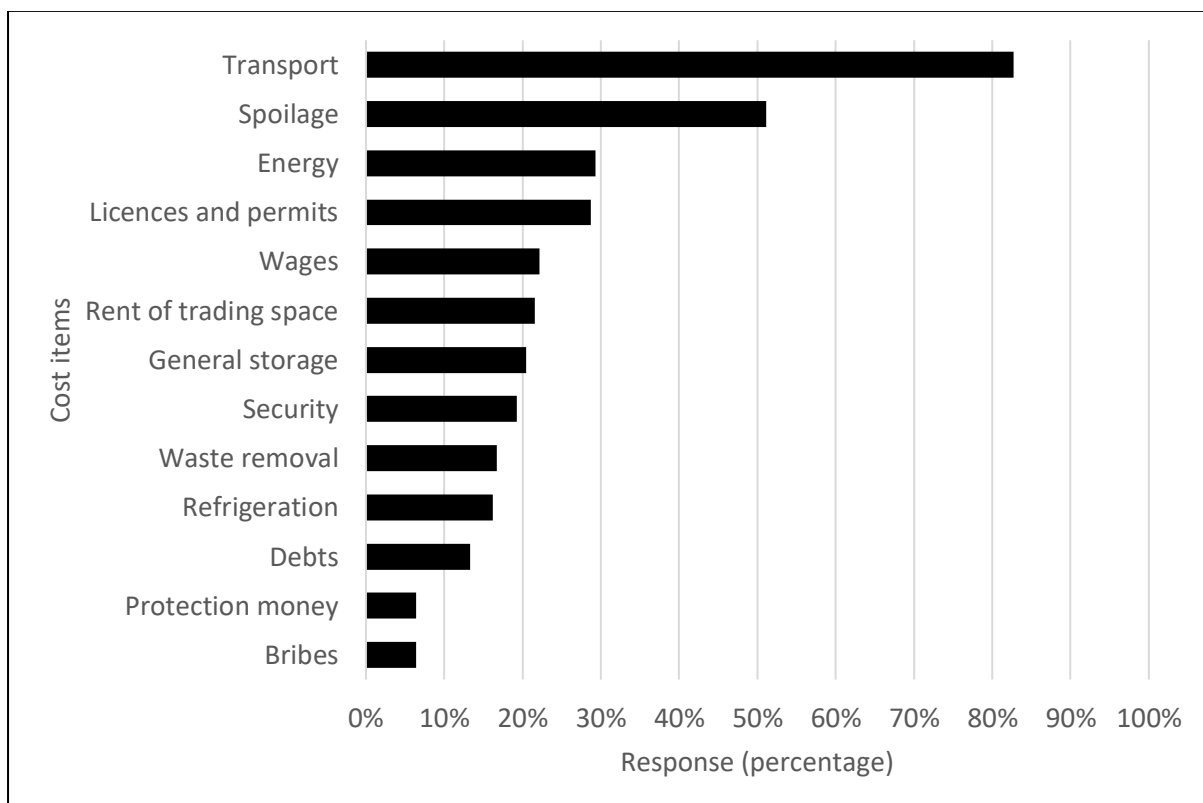


Figure 4: Kisumu food trader costs after stock purchase costs (multiple response option n=1839) (Source: Opiyo, Ogindo, Otiende, and Fuseini, 2018).



The absence of infrastructure also drives strategic choices on the part of vendors. Produce that carries a high risk of spoilage is avoided and products with longer shelf lives are preferred. Here the globalization of the food system intersects with the lack of infrastructure precipitating changes in the profiles of the urban diets, and thus a nutrition transition. These dynamics are reflected in Figure 5, drawn from the study of the food retail environment in Kitwe, Zambia. The primacy of sugared drinks, sugar and sweets and other ultra-processed foods, such as crisps and snack foods over more traditional foods such as dried fish and nutritionally important foods such as vegetables is telling. The absence of fruits in this list raises further concern.

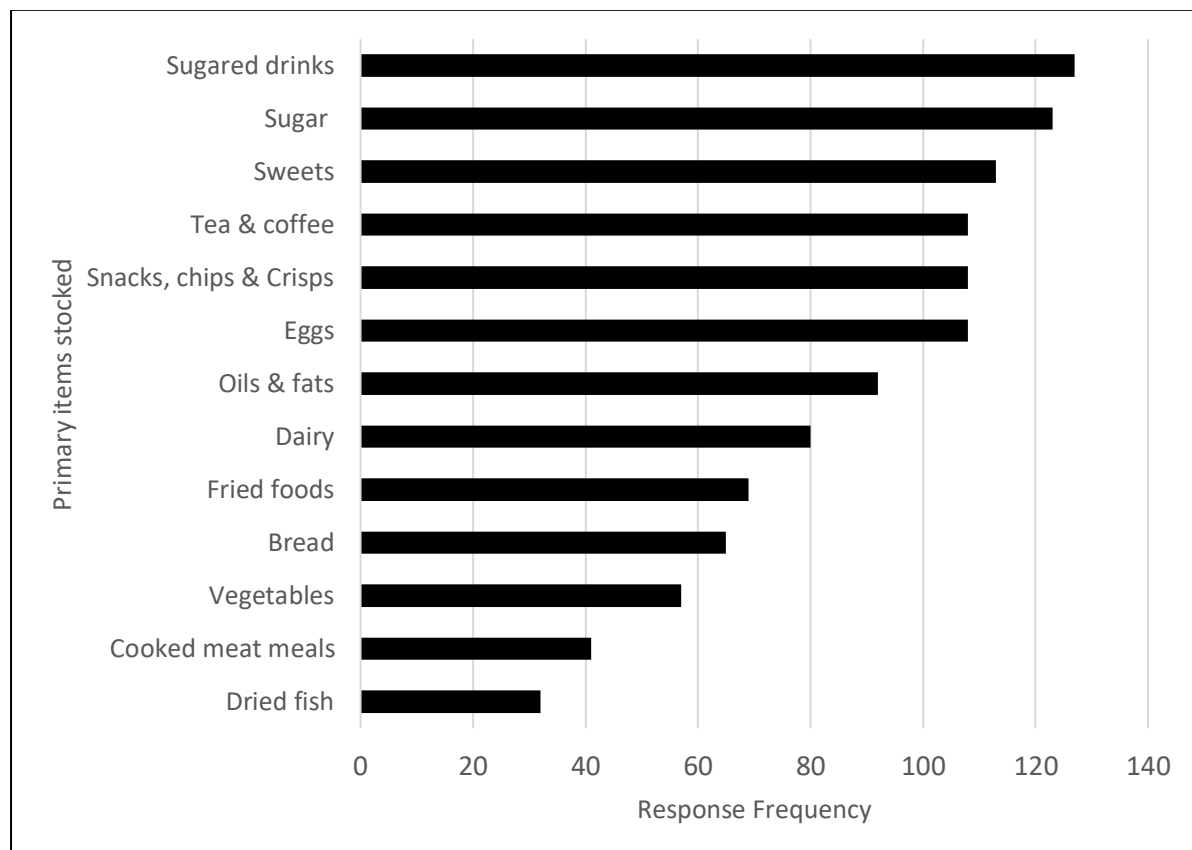


Figure 5: Most frequently stocked food items as reported by food traders in Kitwe, Zambia (n=375) (Source: Tawodzera and Chileshe, 2019)

The high levels of food insecurity, linked to high levels of multi-dimensional poverty, represent the reality in most African cities. Similar challenges exist in many cities of the global South. Households make use of a diverse food system to spread the limited resources that they have. Equally, as the multi-dimensional poverty results show, other costs eat into food budgets. Dietary diversity is low. Staple foods dominate diets and nutrition providing foods are largely absent. Informal food vendors respond to the challenges faced by households but they themselves are subject to similar resource constraints. The poor state of infrastructure means that vendors change the foods that they stock to both respond to the resource constraints of households, but also to ensure minimal losses as a result of such infrastructure deficits. These intersecting challenges are being responded to in dynamic and resourceful ways by both vendors and households.

## Discussion and conclusion

While choices are clearly being made, are these choices “bad” lifestyle choices or are these choices being made out of necessity? The different questions present fundamentally different policy responses.

In his essential work David Smith raised a question that is as relevant today as it was in 1998, that

In many cities in developing countries, hunger and malnutrition are common amongst the poor, even when food is relatively abundant. Over the past two decades, a considerable literature has accumulated on the problems associated with rapid urbanization in developing countries – a literature that for the most part has neglected the important dimension of urban food systems and how these link production and consumption networks at local, regional and global levels. Similarly, whilst there is a newly burgeoning literature on global food systems, the contextual role of the urbanization process is rarely addressed.

(Smith, 1998: 207).

This quote on urban food system related literature demonstrates the flaw in past and current measurement, policy and development positions. When read with the scenarios pointed out in the preceding section, the urban food policy oversight is glaringly obvious. Smith’s (1998) quote was not the only warning. Drewnowski and Popkin offered a similar warning pertaining to the urban transition across the South, and in Africa, that “urban residency will be the norm by 2025 for all but the poorest African countries. Its consequences on diet and disease are likely to be profound” (Drewnowski and Popkin, 1997: 36). It is beyond this paper to offer reasons for these oversights, but some markers are evident. The first is that food policy and development approaches, across much of the South, have largely ignored urban food systems, as Smith cautions. If cities have been considered, the focus has been confined mostly to production and increased supply, mostly urban agriculture. Secondly, most national governments have the mandate for food security and as such, hold fiscal control over spending, directing national government engagement in the same production oriented approaches. Finally, there has been a misguided belief that the market, and the globalized food system, would enable employment (accessibility) and efficiencies (availability) resulting in improved access to food. These policy oversights have had a profound impact on the nutrition outcomes of most of urban Africa.

There is no doubt that a nutrition transition is underway. However, we question whether the drivers of this transition are effectively understood? Yes, households are making clear food choices. However, are the intersections between these choices and infrastructure deficits fully understood? Emerging evidence from the studies referenced would suggest not. Households are having to make critical strategic choices each and every day. These choices, we argue, are not driven by ignorance, disregard for health outcomes, or laziness, even fecklessness (see Tihelková, 2015). These choices are highly strategic but do involve having to make challenging trade-offs between immediate needs and the consequences of those choices. Households choices align directly with infrastructure deficits and the wider

dynamics associated with the Southern urban transition. Here households make use of multiple grids, physical, social, material and relational. This “griddedness” enables a measure of resilience but is not fully understood.

More importantly, the globalized food system is aligning directly with these infrastructure deficits. Here ultra-processed food products are ideally suited to these infrastructure constraints, accelerating and amplifying both nutrition transition convergence and divergence.

Foods that can be prepared with limited cooking, and in a limited time, such as ‘two minute’ noodles, instant maize meal, par-boiled rice, breads with extended shelf lives, to name but a few, are all ideally suited to these situations. These foods are generally highly processed with limited nutritional quality, but often carry far higher than normal percentages of sugars and starch (Igumbor et al. 2012). Equally, when access to clean water is constrained sugar sweetened beverages and other packaged beverage options become increasingly consumed.

There is no denying that choice, often influenced by the marketing efforts of multinational food corporations, plays a role in the food choice, however, to see this as the only driver is a deeply flawed position.

Some have stressed that infrastructure needs to be a key consideration in addressing nutrition related challenges in cities (Kennedy et al, 2004: 21). Attention has been blinkered though, the focus has generally been on infrastructure as a means to enhance economic access to foods and this misses the key factors influencing and shifting the nature and profile of the urban food system. While processes and interventions, such as the Nourishing Framework<sup>3</sup> of the World Cancer Research Fund offer a start, explicitly bringing the food environment into the strategic processes to address the diet related challenges faced in African cities, the focus remains oriented towards food specific actions (Hawkes et al, 2013). The non-food urban systems are not effectively considered, to the intersections between the food system challenges and the urban system.

A deliberate urban infrastructure, and specifically non-food infrastructure grids, focus also (re)scales the food and nutrition challenge to the city scale, a governance scale that has traditionally not engaged food and nutrition issues in Africa. Urban managers need to start to play a far more proactive role in food systems governance. City managers, food system actors and urban political actors have a far greater role to play in the rapidly transforming urban food systems of the South. This also requires a fundamental change in how national and urban policies align themselves with these processes. If measurement drives diagnosis (per Barret, 2010), then measurement needs to change in fundamental ways.

Simply recording the state of food and nutrition deficiencies, and assuming past metrics and development approaches will enable change is no longer a valid policy or developmental response. Understanding the everyday struggles, and ways in which households are attempting to build resilience and respond to food system deficits is essential.

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<sup>3</sup> See: <https://www.wcrf.org/policy/policy-databases/nourishing-framework/>

Understanding the knowledge of household food managers and the strategies being applied in response to a wide and intersecting set of urban challenges is key. Of equal importance is understanding the modes of operation, and drivers, of the food retail sector, across the food retail continuum.

Agency is clearly at play, but not in the ways in which agency is articulated on the recent HLPE (2020) framing. Households are making strategic decisions in response to food system deficits. Understanding these decision-making processes and seeing the food system as being about far more than just supply chains is essential.

The deeply prejudicial views of the poor as ignorant, and lazy are baseless, and needs to change. The poor are active agents responding to a confluence of development challenges, making strategic material decisions that respond to the specific outcomes of such intersectional challenges. Framing diet related non-communicable diseases as diseases of lifestyle is a flawed starting point. For the food insecure in Southern cities these are diseases of poverty and under development.

The original framings of the nutrition transition have shifted significantly and newer articulations of this are evident, including calls for far greater contextual focus, as well as critiques of how the concept has been applied, specifically from the source of such a term, Barry Popkin (See Popkin, 2021: 319). However, understanding the intersections with factors outside the food system are still absent from most positions on the nutrition transition. Nuance has been introduced around taxation and governance, but all retain the silos of current policy making.

Southern food system researchers have started to stress the need to consider infrastructural aspects as critical, particularly its impact on food preparation and choice (Moseley & Battersby, 2020) but this is yet to be effectively inculcated into measurement and policy. Equally, these views are yet to taken up within the nutrition sciences.

While the role of urbanization as a driver of the nutrition transition is accepted, missing is an understanding of how the different urban and food systems combine in people's lives and affect their capacity to respond to policy and development interventions, and the system of complementary actions needed across these different systems to enable populations in urban settings to eat nutritious diets.

However, for cities in Africa, food and nutrition measurement approaches mean that current policy interventions and development programming are not going to solve the significant food and nutrition security challenges. Required is greater engagement with the urban system, approaches that engage across multiple infrastructure grids and systems. These are highly complex systems and cannot be understood in silos. Existing governance structures and regimes are ill-equipped to engage in and surf the complexity of these intersecting systems. Required are new forms of governance, new forms of measurement, and the activation of local knowledge, all integrated with new forms and understandings of infrastructure development. Responding to these issues is urgent. The infrastructure investment in Africa's growing cities in the next 20 years will determine the wider development trajectory across Africa for the next century. If different approaches to

understanding and responding to the challenges at the intersection between the food system and the urban system are not found, the path dependency that will be locked in has the potential to curtail Africa's development potential for generations.

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