LOGIC
Africa Project

Weekly Food Plate Research Report

LIVING OFF-GRID
FOOD & INFRASTRUCTURE COLLABORATION

2024

Living Off-Grid Food & Infrastructure Collaboration

Food Plate Research Report - Africa Project

About the Living Off-Grid Food & Infrastructure Collaboration

The Living Off-Grid Food & Infrastructure Collaboration (LOGIC) is a collaboration between the Institute of Development Studies; the African Centre for Cities, University of Cape Town; the Indian Institute of Human Settlements, Bangalore; Colombo Urban Lab and the University of Ghana, Accra and explores urban infrastructure in cities across Africa and Asia. The research focuses particularly on how the poorest residents of cities meet their basic needs and access infrastructure when they are living 'off-grid'.

Living Off-Grid Food & Infrastructure Collaboration: Food Plate Research Report - Africa Project

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We wish to acknowledge the households, all of whom were key research participants in this process. For various reasons, ethics being one, we have anonymized the research participants, both in our written account and in the images used. They remain participant authors in this process.

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Living Off-Grid Food & Infrastructure Collaboration

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About the Living Off-Grid Food & Infrastructure Collaboration: Funders

The Living Off-Grid Food & Infrastructure Collaboration (LOGIC) is a UKRI Global Challenges Research (GCRF)-funded project which is designed to bring together our thinking on how infrastructure can shape the food and nutritional security of urban marginalised populations.

The LOGIC Africa research team would like to express thanks to colleagues at the Institute of Development Studies (IDS) for their support and guidance with the drafting of this report, and many review suggestions.

The Living Off-Grid Food and Infrastructure Collaboration (LOGIC)

The Living Off-Grid Food and Infrastructure Collaboration (LOGIC) project focusses on how the most marginalised urban residents in five Southern cities (Tamale, Ghana; Mossel Bay, South Africa; Dzivarasekwa Extension, Zimbabwe, Bangalore, India and Colombo, Sri Lanka) are meeting their basic needs and accessing infrastructure, particularly when they are living 'off-grid'.[1]

The research is led by a consortium including experts in urban research from Africa and Asia, brought together by the Institute of Development Studies. Partner cities were selected because, while planning and infrastructure design and provision is improving for some in parts of these cities, such provision is not expanding fast enough to keep up with urban growth and provision is not evenly distributed for all. LOGIC focus on five main types of infrastructure – water, sanitation, energy, transport and communications.

In most poor neighbourhoods people meet their needs in a variety of ways – informal access to formal grids such as illegal energy hook ups; 'off-grid' forms such as latrines or boreholes; hybrid forms such as reliance on water trucks when urban supplies run dry; or local vehicles providing 'last-mile' connections to public transport.

A particular concern in these cities is whether such critical infrastructure is sufficiently robust and stable to weather the multitude of human/political and environmental shocks and stresses facing cities, ranging from droughts and floods to political and financial crises which can literally 'turn off the lights'. In order to gain a better understanding of these systemic urban issues and how they are affecting the poorest and most marginalised, we focus our research on one key means of measuring whether basic needs are being met – whether people have stable access and availability of sufficient, diverse and nutritious diets – their 'Food and Nutrition Security'.

This provides us with a way of researching how these various infrastructures combine at multiple levels, in order to achieve a more 'systemic' understanding of infrastructure provision and the implications for people's lives. This has been little researched to date, but it is critically important to understand for urban planners and infrastructure providers.

LOGIC project: African city profiles

Mossel Bay, South Africa

- Mossel Bay is a small coastal town, located in the Western Cape Province of South Africa. It is one of seven municipalities which form part of the Garden Route District. Mossel Bay has an interesting history as one of the oldest towns in South Africa, dating back to 1488. The town was declared a municipality in 1856. It has experienced several waves of demographic, socio-cultural and political transformations, closely tied to changes in the structure of its economy. Mossel Bay's economy which was previously based on agriculture and fishing has become more reliant on commercial services, with the informal economy becoming increasingly significant as a provider of employment to the growing population.

Tamale, Ghana

- Tamale is the capital city of Northern Region of Ghana, and the most urbanised urban centre in the entire northern Ghana. Established in 1907 as administrative and service centre of the then Northern Territories under colonial rule, Tamale has grown from an insignificant settlement in the socio-economically depressed Northern Territories to become the fourth largest urban centre in Ghana. The rapid growth of Tamale presents planning and governance challenges, and this partly explains the split of the greater Tamale Metropolitan Area (TMA) into two local government authorities: Tamale Metropolitan Assembly (TaMA) and Sagnarigu Municipal Assembly (SMA) according Ghana's local governance law. The city's local economy has also grown and diversified, escalating its importance beyond northern Ghana to internationally.

Dzivarasekwa Extension, Zimbabwe

- Dzivarasekwa Extension (DZ) is a low-income residential area on the western edge of Harare. It is located about 20 kilometres from central Harare. DZ Extension was established during the early 1990s as a halfway home and a temporary settlement. The settlement shares boundaries with the Mashonaland West Province. Dzivarasekwa Extension got its name with the suffix 'Extension' from the fact that the settlement is across the river from the old Dzivarasekwa Township, a low-income residential area that was established as part of the colonial segregation. DZ Extension is challenged by blurred jurisdiction in terms of the boundary between the City of Harare and Mashonaland West Province which has implications for infrastructure and other services provision. Officials from both central government and local government often deny responsibility for addressing the infrastructure gaps in Dzivarasekwa Extension.

LOGIC Project problem statement

Methodologically searching

Infrastructure assemblages include the material (physical and technological), as well as the political and systemic factors that 'govern' how infrastructure is developed and used. Urban food systems are made up of public and private actors, and market and governance processes that shape the cost and availability of food in different urban contexts. At the intersection of urban food systems and infrastructure assemblages lies the food and nutrition security of urban dwellers.

Contemporary debates and policy priorities with respect to both nutrition and infrastructure are heavily conditioned by presumptions – in favour of formality and griddedness – which fails to reflect the reality of marginalised communities in Southern cities. For these communities, their experience is one of hybridity, with formal and informal infrastructures and economies central to their lives and livelihoods.

These hybrid arrangements are imbued with power structures and socio-political dynamics that are context specific and further condition communities' experiences. Together, these are the factors that condition or shape the possibilities for individuals and households pursuing different food strategies. However, there is a failure to reflect this reality in the conceptualisation of infrastructure challenges, leading to unworkable solutions and policies that end up perpetuating problems.

Enquiries into these assemblages and the associated strategies adopted in their activation have not facilitated a robust and meaningful understanding of the inter-connections between the food and infrastructure systems of specific contexts.

In response to this challenge, the LOGIC project sought to ask deeper questions about infrastructure, griddedness and the strategies adopted by diverse households in the case study cities. This work is novel. Instead of focusing on infrastructure, it uses food as a lens to expose and make evident not only the infrastructure connections, but also the contingent social infrastructures necessary to construct meaningful daily lives within vulnerable settlements.

Weekly food plate as method

Methodologically searching

One of the underlying premises of the Living Off-Grid Food and Infrastructure Collaboration is that a greater understanding of food and nutrition in relation to infrastructures[1] is essential to engage in effective urban food, urban governance and nutrition planning in Southern cities. This understanding needs to interrogate the range of material, structural and socio-political inadequacies in the urban environment that shape both food and other infrastructures, particularly if it is to be alive to the situation of marginalised urban residents. Analysis of how infrastructure and the food system intersect have not been the primary focus of urban research in the global South. These questions have largely been ignored.[2]

Applying methods that enable greater focus on the range of material, structural and socio-political was deemed essential.

Earlier work carried out in Southern African cities had demonstrated great utility in exposing connections between the urban system and the food system, between the household food strategies and the wider infrastructure systems.[3]

Methods applied needed to make evident the intersections between the social and material infrastructural connections, choices and compromises made in respect of food and infrastructure choice. This component of the LOGIC research borrows from the work carried out by Faith D'Alusio and Peter Menzel in their photo book – Hungry Planet: What the world eats.[4] We have adapted their methodology, extending this slightly and making it more suited to our environments, specifically in the Southern African context.

The key motivator in using this method was informed by a wider approach to research methods within the LOGIC project that enabled greater exposure to the connections between food, food systems, cities and urban infrastructures.

Each research site applied for due ethical and institutional approval prior to conducting this research. This research was carried out in five linked but discrete phases.

Method – Phases of food plate exercise research

Phase 1: Understanding g the average weeks food purchases - capturing the weekly food plate:

This was done through the use of a household food diary (with purchase slips or equivalent). Eight households were targeted with the hope that a minimum of 5 households would remain. After collection of weekly food diaries for an agreed period of time, generally for one month - an average week's food purchases were identified in consultation with the household food manager. Once the week's food purchases were discerned, the value of those purchases was agreed and the household was then either provided with cash to purchase the required food, or the research team purchased the weekly food allocation, in accordance with the averaged weekly purchases.

Phase 2: Capturing the weekly food plate:

The foods purchased were displayed in a site agreed by the household, generally inside the home. A photograph of the week's purchased food was then taken. A copy of the image was presented to the household. The household were then asked if the image could be used for further research. An attempt was also made to take the photograph in a manner that it included the primary source of fuel and/or cooking utensils and storage equipment.

Importantly, in order to ensure dignity and effectively capture the weekly food plate. We asked the households to use their mobile phones to capture the images used. As such, these images and credit for the photos used for each household vests with the household.

Phase 3: Recording the infrastructure connections:

Using the photos, in-depth conversations were held with the household in order to understand the connections between food choice and infrastructure. Conversations are engaged on changes to infrastructure – in relation to historical food options, new food types, specifically Ultra Processed Products (UPPs), and changes in household structure (new child, etc.). Attempts were also made to understand changes in household economic status and changes to infrastructure (good and bad).

Method – Phases of food plate exercise research

Phase 4: Recording the socio-spatial and infrastructural connections:

The image was then used to discuss "assemblages" and the socio-spatial relationships with food and how these relationships influence foods choses, if they do? We also sought to understand the socio-spatial links to infrastructure.

Phase 5: Consultation and revisiting of households:

This phase of the research involved a review of the images as a collection of images, generating a wider neighbourhood picture of the food/infrastructure/assemblage intersections at a wider scale. This feedback took the form of a small workshop where just the participating households were invited, along with key researchers.

Images: Samantha Reinders for Consuming Urban Poverty

Research site specific food plate insights

- Each site reflected a diverse collection of food and infrastructure intersections.
- Research participants reported diverse motivations for the foods purchased and the strategies applied when making food purchasing choices.
- When using the images, detailed narratives of food purchase strategies, household-related decisions, agency, and temporal considerations were provided.
- The images and subsequent conversations revealed detailed insights into the connections between foods consumed and infrastructure, space, social networks and agency.
- What follows is a collection of these diverse household food and infrastructure connections with reflections pertinent to each research site. This is followed by a reflection on the wider process and associated lessons that emerged from these processes.

Image: Samantha Reinders for Consuming Urban Poverty

Dzivarasekwa Extension Zimbabwe

Dzivarasekwa Extension, Zimbabwe

Household 1:

Household profile:

This a typical low-income household comprising a father, a mother, and four children who are all still dependents. Two of the children are in primary school whilst the two younger children are not yet in school. Similar households of this profile would have one of the two younger children in creche/pre-school, but this family is unable to afford such a facility. Since most pre-schools in Harare are privately managed, they are often more expensive that primary school. The household rents 3 rooms from a landlord, a retired person who does not live in the home, but lives in the rural areas.

Household food purchase details:

The household purchases comprised two by two-litre bottles of cooking oil, a crate of 30 eggs, a 10-kilogram bag of baking flour, a two-litre bottle of concentrated drink, diluted with water when drinking, six-kilograms of rice (three by 2kg packs), sugar, a 15-kilograms bag of Irish potatoes, a bag of maize mealie meal, salt, mayonnaise, soya chunks, biscuits and a small packet of fresh meat.

All the above foodstuffs do not require refrigeration excerpt the small packet of meat which was for consumption on the day of purchase.

Dzivarasekwa Extension, Zimbabwe

Household 1 continued:

The household purchases were largely influenced by the **poor infrastructure** and the **unreliability** of the same. The reason for the large expenditure a large bag of flour is so that the household could bake their own confectioneries. The household respondents clearly stated that their choices would have been different if they lived in a well-connected area with good **electricity supply** and affordable access to other **food products**.

The informality of Dzivarasekwa Extension, and **variability in supply of energy** is a key factor influencing food choice and the modes of food procurement.

All images: Percy Toriro (not for re-use)

Dzivarasekwa Extension, Zimbabwe

Household 2:

Household profile:

Household 2 comprised two working civil servants, two children, and a live-in house maid who looks after the children when the parents are at work. One of the children is in primary school whilst the other is in a local creche. They live in a government house under a long tenure system known as a ***rent-to-buy* scheme**. They would be lower middle-income, but due to depressed earnings, they are low-income.

Household food purchase details:

Household 2 purchased similar products to household 1 which comprised two, two-litre bottles of cooking oil, Two kilograms of baking flour, four kilograms of sugar, two cans of tinned beans, cookies (biscuits), five kilograms of rice, tomato source, *mazoe* drink which has a long shelf life (*Mazoe is* diluted with water and does not require refrigeration), peanut butter, soya chunks, maize meal, tea leaves, tomatoes, and vegetable mix. These foods require no refrigeration and limited preparation.

Key food and infrastructure insights:

All purchases were influenced by **available infrastructure, particularly energy**: the household avoided foods that required **refrigeration** and only bought foods with a **long shelf life**. Items were specifically purchased because they did not take long to cook.

Dzivarasekwa Extension, Zimbabwe

Household 3:

Household profile:

Household 3 was female headed with two children and a relative who looks after the children. The household head is an informal trader who operates a used-clothes market stall in Harare CBD.

Household food purchase details:

The household purchased less than households 1 and 2.

Items purchased included a bag of Irish potatoes, a two-kilogram packet of rice, baking flour, cooking oil, spaghetti, dried kapenta fish, soya chunks, two cabbages, tea bags, sugar, and one chicken. Except for the chicken items, most of the food stuffs have a long shelf life without the need for refrigeration. Even the choice of cabbage is influenced by its long shelf life compared to other vegetables.

Key food and infrastructure insights:

All the purchased food **requires no refrigeration**. The chicken is deep-fried on a **gas stove** so that some can be kept for a few more days without going bad.

Dzivarasekwa Extension, Zimbabwe

Household 4:

Household profile:

The household comprised two working parents, one teenager in university, a sibling in school, and a third child in creche. They also have a live-in maid. They bought their house as a 2-bedroom unit but have since added two extra bedrooms. They also have a **protected well for back-up water** and **a solar system** to cater for **long hours of power cuts.**

Household food purchase details:

The household bought similar basic staple goods as the other DZ households, but this household was **not restricted by energy concerns** (they have **back-up power and so they continue to use their refrigerator)**. They therefore bought additional fresh meat, sausages, and chicken. They also bought vegetables that ned refrigeration for longer shelf life.

Key food and infrastructure insights:

This household demonstrates the variation in households across DZ, and greater Harare, caused by **infrastructure constraints**. Given their higher economic status, they were able to counter these limitations. Their **food choices are what made up the more conventional food plate before electricity challenges in Zimbabwe**. The household also shopped in a **large supermarket** in Harare, made possible by the fact that they work outside the settlement and **own a car**.

Dzivarasekwa Extension, Zimbabwe

Household 5:

Household profile:

This household comprised two working parents, two children in school and an elderly grandparent. The household is categorised as low-income, due to their low paying [but] formal jobs. Despite the **poor settlement infrastructure**, their formal government house does mean that they have better access to, but not necessarily availability of, key infrastructures.

Household food purchase details:

The household purchases were similar to other households, with one innovation, they bought meat which they process on purchase, cooking the meat and then drying it for future use. In addition to purchasing some hardy vegetables, the groceries purchased were all largely processed, shelf stable and easy to cook. The household bought two chickens as well as beef, which they dry after boiling as **a means of no-refrigeration preservation**.

Key food and infrastructure insights:

Food purchases reflect **responses to existing infrastructure deficits.** The larger quantities of beef were as a result of the in-home processing for preservation in order to counter infrastructural deficits. The in-home processing **serves as a preservation measure**, but **also serves as energy serving** as the future meat dishes only requires preparation of the stew ingredients to add to the almost-ready meat.

Dzivarasekwa Extension, Zimbabwe

Emerging insights on DZ food and infrastructure connections

The Dzivarasekwa examples reflect the residents' response to poor infrastructure. The many hours of power cuts have forced residents to cut their losses by avoiding refrigeration as a way of storing food. Unless one can afford back-up power, other means of food preservation are being applied across all sampled households.

The entire food retail system is changing, and this research found a high prevalence of dried food products, but also reductions in packaging sizes, particularly for packages of fresh perishable foods. Research also found a significant increase in the availability and subsequent purchase of tinned foods, along with a wide variety of new food items available - all items that were shelf stable and had a long shelf life.

The protein trade across all settlement typologies that make up DZ has changed significantly. Many vendors were found selling live chickens. In the past the preference had been for dressed chickens. Residents prefer to buy live chickens which they can feed and keep for a few days until they are ready to consume them.

Lessons learnt

The state and condition of infrastructure influences food choices and is reflected in a community's food choices, but also, in how the retail and wider food environment is transforming in response to these infrastructural deficits. .

Unreliable and poor infrastructure forces residents to resort to diversifying food purchase choices, but at the same time, also innovating to ensure food availability..

Poor infrastructure was found to impact household budgets. For residents in DZ, infrastructural challenge made life significantly more expensive. All households described how they may have to invest in diverse back-up infrastructure options for them to lead decent lives.

Dzivarasekwa Extension, Zimbabwe

Policy and research suggestions

Policy suggestions

- Despite the complicated status, and jurisdictional contestations, of Dzivarasekwa Extension different actors have engaged and assisted in delivery of certain infrastructural support. However, this has not been uniform and remains partial and is further aligned to wider structural challenges facing the country and the economy. Despite this, far greater focus needs to be given to infrastructure. Different infrastructure systems are having a direct impact on food system related outcomes.
- Political and administrative leadership need to pay far greater attention to how multiple urban systems intersect in contexts such as Dzivarasekwa Extension. Greater collaboration between development partners, local government actors and communities is needed to avoid food systems related challenges being compounded.
- The revised master planning process evolving across Zimbabwe offers a unique opportunity to re-think and re-plan the intersections between food and infrastructure, in ways that support positive food and infrastructure outcomes.

Areas of further research

- Using food as a lens to understand the social and material infrastructures in specific contexts offered unique insights into contextual food and infrastructural issues. The food plate work only touched the surface, and the food plate method offers a unique launchpad for other work looking at the food and infrastructure intersections.
- Given the infrastructural challenges, and the challenges faced as a result of the nature of griddedness in Dzivarasekwa Extension, the site offers a unique “laboratory” to investigate and document innovative coping methods and grid “innovations”. These offer insights for contexts well beyond just Dzivarasekwa Extension or Zimbabwe.
- There are undeniable food system challenges in Zimbabwe, challenges that could potentially be better addressed if engaged across silos and disciplines. This work has offered great utility when infrastructure and food systems are considered collectively. This poses novel research avenues for further work, with implications for theory and policy learning.

Tamale
Ghana

Tamale, Ghana

Household 1

Household profile:

Household is composed of an extended family, headed by a male. There are eight members in the household, made up of the head, his wife and three children, his mother and two brothers. They live in their own house which was inherited from the late father of the household head. The household head has multiple sources of livelihood. The main livelihoods are working as an untrained teacher (untrained teachers are mostly employed in private schools, earning far less than their trained counterparts in government schools) and farming (open farming and gardening in the peri-urban area close to their neighbourhood.). The household does not benefit from any form of grant. Consequently, the household experiences an unstable financial situation.

Household food purchase details:

The household employs many strategies to allocate their limited budget to purchase as many food items as possible. These include buying food within their neighbourhood, adjoining neighbourhoods, at the Tamale central markets and in distant farmers' markets.

Integral to these strategies is drawing on established social relations to overcome barriers such as distance and occasional income shortages. The household's typical food basket (per the image) consists of whole grain maize, unprocessed yam, local rice (parboiled), red meat, canned mackerel, fresh tomatoes, tin tomatoes, onions, garden eggs, and *maggi* cubes.

Tamale, Ghana Household 1: Continued

Household 1 also buy ingredients like pepper powder, dawadawa*, salt, etc., but they buy these items in very small quantities, and as needed. Maize is the main staple in the area, so when a household has maize in stock, there is a sense of security against hunger and, per the respondent "*a feeling of tranquility*". The household prepares many meals from maize including "tuo zaafi" (TZ), banku, porridge, etc. They eat red meat when they can afford it, while rice is increasingly becoming popular, especially with children.

Key food and infrastructure insights:

Food-enabled infrastructure is a challenge in the household. This is reflected in the disproportionate purchase of dry food items and/or those that have long shelf life. The 100kg bag of maize bought does not need any special infrastructure for storage. The household does not have a fridge; therefore, they cannot do bulk purchase of refrigerable items.

They explained that due to excessive use of chemicals for production, yam easily spoils when stored for long. However, if they had a fridge, they would buy plenty yam and store it in "slides" in the fridge to last them longer.

The household head has a motorbike which makes it easy to buy food at different markets in Tamale. They had in-house water connection, but they were disconnected due to unpaid bills.

They have access to electricity; however, it is only used for lighting. Cooking is done by the use of fuelwood and charcoal. They harvest fuelwood from their family tree plantation (not a large plantation but a few trees. They thanked the household's late father for this).

The household also likes eating beans and pigeon peas, but they cannot buy these in large quantities due to lack of storage facilities. Therefore, they either buy these is small quantities, or barter for them when needed but have no cash to buy. They make use of a traditional open cooking area.

Dawadawa: The Hausa name for the fermented seeds of the African locust bean tree.
Tuo zaafi: T.Z can be prepared using maize or millet. This millet is sub-divided into two: early millet called "nara" and guinea corn called "kemolega".
Banku: Fermented cornmeal mixed with cassava (the cassava may or may not be fermented) that is cooked into a ball.

Tamale, Ghana

Household 2

Household profile:

The household is headed by a widowed mother of three. The mother and children lost their accommodation upon the death of their husband and father. Therefore, she had to move to her father's house with her children. She is unemployed, and so she engages in head portering in the markets of Tamale and in the occasional sale of water, which she carries around on foot.

Household food purchase details:

The household buys food items from the Aboabo market (the biggest market in Tamale) because that is where food is most affordable. To get to the market, she uses a **tricycle taxi**. The household's food basket consists of rice, cooking oil, tin tomatoes, *maggi*, onions, canned and dry fish, tea, sugar, salt, spaghetti, spice-type ingredients and charcoal for cooking. She bought a large quantity of rice because that is what her children like.

Key food and infrastructure insights:

Most of the food items purchased have a **long shelf life**. They **have a fridge**, but it is not functioning well due to a combination of **irregular power** supply and the fridge being very old. Therefore, they **do not prioritise buying food items that require refrigeration**. Their main **energy for cooking is charcoal** because they cannot afford electricity and **gas and fuelwood has become more expensive** than charcoal. The shared nature of their accommodation means that the **household has limited space for cooking and also for storing** even dry food items.

Tamale, Ghana

Household 3

Household profile:

The household is made up of five members. It is headed by a widowed mother who serves as the breadwinner of her four children. After the passing of her husband, the woman relocated to her family home to live with her brother and his children. However, she maintains separate cooking arrangement from her brother and his nuclear family. She is unemployed and does odd jobs to earn an income. She sometimes travel down south to Accra to engage in head portering to raise money to take care of her children, one of whom is studying at the university.

Household food purchase details:

This household's food basket consists of maize flour, maize dough, cassava dough, rice, spaghetti, cooking oil, tea, sugar, mackerel, fresh tomatoes, tin tomatoes and charcoal. Many of **these food items were processed** and the explanation was that the **mother barely stays at home**, therefore, the children do not have to struggle with the idea of buying maize and having it **ground at a hammer mill**. A significant proportion of the staple food items belong to the wet category, requiring **refrigeration.**

All food items were bought in two supermarkets within their neighbourhood. In the absence of their mother, **food purchase decisions rest with the elder son**.

Tamale, Ghana

Household 3: Continued

Key food and infrastructure insights:

This household has **access to electricity**, a **fridge** and **a gas stove**. This was why they bought significant quantities of food items that required refrigeration for storage (the fresh tomatoes, maize and cassava dough). For food preparation, the **household uses different energy sources strategically**. **Due to high cost of electricity, the family only uses electricity to prepare breakfast**, which is about heating water with a kettle to make tea. They prepare **their lunch and supper using charcoal** and **occasionally LPG gas**. Their main source of energy for cooking is charcoal which is deemed cheaper than gas.

The household does **not have a designated kitchen**. **They prepare their food in the open compound**, suspending cooking during the rains. Aside the challenge of the rains, cooking in the open compound also exposes the food to particulate matter in the atmosphere, and that can cause contamination of the food.

There is **no in-house water connection** in the household. However, there is **a mechanised public borehole located just outside of the house**. The household draws water from this borehole like any other community members in the neighbourhood. The **borehole was provided by the MP for Tamale Central with funding from Salam Charity UK**.

Tamale, Ghana

Household 4

Household profile:

This is a female-headed household. It is made up of four members, a widowed mother and her three children. They live in a rented accommodation, the rent of which is paid for by the support of extended family members, friends and benevolent persons. She is unemployed and receives no social grant. All three children are in school. She struggles to provide adequate food for the household. As a result, they sometimes skip meals.

Household food purchase details:

The food basket image of the family reflects the limited diets. When they were given money as part of the food plate exercise, she allocated the money to the basic elements in the household's food basket. These include rice, maize, cooking oil, onions, dawadawa, dry fish, mackerel, maggi cubes and fuelwood. They also bought small quantities of fresh tomatoes and fresh pepper, but these did not feature as they were being stored elsewhere.

She explained that the household's daily meals revolve around rice and maize. They prepare many different meals from rice and maize. Therefore, their diet does not feel monotonous despite the over reliance on the two main food items. They barely buy red meat because it is unaffordable. Instead, their main source of protein comes from dry fish (locally known as *yurayura*). The traditional condiment (*dawadawa*) enhances the taste of the food, so she buys that as well.

They prefer buying food in bulk when they have the money because the unit price is lower when they buy in bulk.

Tamale, Ghana

Household 4: Continued

Household 4 buys their food at the Aboabo market, located about 4 km from their home. They prefer travelling this distance to buy food because food is cheaper at the Aboabo market than other markets in the city. Their main concern is the frequent rise in food prices.

"everybody knows that food prices are reasonable in Aboabo market. "Tarimba daa n-nyeli" (it is the market for the poor or less privileged).

Key food and infrastructure insights:

The household is **connected to the electricity grid**. They **have a fridge**. However, **due to the high cost of electricity, they barely use the fridge**, which is why they cannot store fresh or perishable foods in the fridge. For example, for the household of four members, GHC150 (about $11) worth of electricity cannot see them through the month if they use the fridge.

Fuelwood is the main source of energy for cooking. When they can afford it, they also **buy charcoal**. Using **electricity and gas** to cook is too expensive. The household cannot afford allied infrastructure that enables the use of electricity and gas to cook, such as stoves.

With regard to water, **the household is located in one of the most deprived neighbourhoods in Tamale**, Vitin. There is **no in-house connection in the house** and **even those who have in-house connection can go months without experiencing a drop of water** from their taps. Therefore, **the household buys water at a considerably higher cost**, and that stretches the household's budget.

Transportation is also a challenge as far as the household's food and infrastructure interaction is concerned. **Buying food about 4 km away at the Aboabo market implies a transport cost**. Yet, lower price at the Aboabo market compensates for the transport costs.

The **household does not have a designated kitchen**. They cook their food in the open compound and their veranda.

Tamale, Ghana

Insights on the Tamale food and infrastructure connections – market systems

At the city scale, there is an infrastructure challenge regarding the proper functioning of the dominant traditional market system. Infrastructural challenges range from a lack of adequate trading spaces, inadequate provision of decent and secure storage facilities, poor transport infrastructure, poor sanitation, unavailability of water in the markets, and low access to electricity. The hybrid local governance system in Tamale has not been effective in dealing with the problem.

When local governance is deployed to improve the infrastructure in the market, the process ends up being captured by a few privileged individuals and groups to the disadvantage of traders. During fieldwork, traders in the various markets in Tamale described many instances where they were "deceived" into accepting and supporting market expansion and upgrading programmes, all ending in regret.

The main complaint was that the redeveloped stores were smaller in size and overpriced beyond what they could afford. The pricing was determined solely by the contractor who had been given the contract to build, operate and transfer the facilities to the Assembly after 25 years. Traders who were unable pay these market fees vacated their stores, being displaced from the market. The redevelopment and subsequent displacement in the markets, especially the Aboabo market where food items are thought to be cheaper, is leading to the emergence and growth of non-food retail businesses in the traditional food retail and distribution spaces. Food traders are locating elsewhere, outside these food markets.

A related challenge is the acute lack of relevant infrastructure for fresh foods including vegetables, frozen foods and meat. Generally, vegetable sellers locate themselves close to the roads or strategic intersections so that they have access to the moving traffic. The meat sector also suffers from a serious lack of appropriate infrastructure along the value chain. The main abattoir is located about 4 km away from the city centre, yet there are no suitable vehicles to cart the carcasses to the various city distribution points. Instead, meat products are transported in poorly maintained tricycles.

Tamale, Ghana

Emerging insights on the Tamale food and infrastructure connections

The results from across the research approaches applied in the LOGIC Project in Tamale, show **interesting connections between the city's food system and infrastructure**. As illustrated by the Food Plate exercise, **infrastructure had a significant influence on the composition of households' food baskets**.

The food purchase details of the participating households demonstrated the diverse food and infrastructure connections.

Among other factors, **most households' food purchase decisions were influenced by storage infrastructure**. The food items that were bought in large quantities were dry products that did not require special storage infrastructure, such as fridges, because households did not have these facilities.

Similarly, **most households in Tamale depend on traditional energy sources (fuelwood and charcoal) for cooking**. This was confirmed across all the workstreams of the LOGIC project in Tamale. For example, over 90% of IDI respondent households reported that they did not have electric or gas stoves of any kind. A trend confirmed in the food plate exercise. Coupled with this is the absence of designated kitchens in many households, leading to households preparing their food in the open compound where they face the vagaries of the elements.

Transportation is very important to the food system of Tamale, along which are webs of economic and social relations that facilitate the stability of the city's food system. For example, the emergence of cheap tricycle transport has made it easy to convey vegetables from the three irrigation sites that are located within 10 km of the city. The same tricycles facilitate the distribution of food from the centrally located Aboabo market to all parts of the city.

A network of trucks also contributes to the stability of the city's food system by carrying food (cereals, legumes and yam) from production areas within a 150 km radius of the city. This is dependent on a network of big traders, middlemen/women and aggregators in the production areas. Some households deploy their social capital to buy food cheaply directly from the production areas through transport operators.

Tamale, Ghana

Policy and research suggestions

Policy suggestions

- This work highlighted not just the challenges associated with the functioning of market systems, but how these challenges are amplified when linked to infrastructure and food system challenges. Policy actors should work to ensure far greater understanding of the impacts at the intersection between these systems. Silo-ed interventions will continue to operate in sub-optimal ways.
- Vendors and households face significant precarity in terms of infrastructure access. Policy needs to support the adaptive strategies applied by vendors (and households), ranging from storage to display infrastructure, transportation and vending spaces and places where vendors engage a constant process of repair, despite policy and market management processes that often run counter to this.
- Viewing food vending as a pursuit that should only take place in designated locations results in conflict and contestation, with poor food system outcomes. New modes of food sensitive and food specific planning, and governance are required.
- Political and administrative leadership need to acknowledge how multiple urban systems intersect in vulnerable and marginalized contexts.

Areas of further research

- Traditionally food systems research has focused on the food system, nutrition research on nutrition, planning research on planning, infrastructural research on infrastructure, etc. The food plate exercise has showed great utility in deepening the understanding of processes at the intersection between systems. Far greater collaborative research is needed to build on this work, but also counter the imitations of earlier modes of research.
- Monitoring food system outcomes through the lens of infrastructure requires diverse methods and approaches. However, contextual knowledge and insights are as valuable as the detailed quantitative work. This elevates the importance of the knowledge held by different food systems actors, these actors are key to the research processes – they are also specialists. Engaging these actors, as research partners, not just respondents, holds significant potential.
- Food and infrastructural challenges reflect contextual challenges and contextual knowledge. Key to understanding the complexities of specific sites are local researchers. Caution is needed when such researchers are not part of research processes.
- Research should also focus on the forms of city governance that could make a greater impact on the proposed intersectional research involving food systems, infrastructure and other urban systems.

Mossel Bay
South Africa

Mossel Bay, South Africa

Household 1:

Household profile:

Household 1 is headed by a single, young man who is a student. He is renting a shack (informal dwelling) in Growing Hope informal settlement. The accommodation allowance that he receives as part of the National Student Financial Aid Scheme (NSFAS) is not sufficient to cover rent for an apartment in the formal rental market. Renting a shack in an informal settlement allows him to stretch his accommodation allowance a bit further.

Household food purchase details:

The student's weekly grocery basket consists of three tins of baked beans, three tins of Lucky Star Pilchards tinned fish, two kilograms of Spekko rice, three packs of red meat, Macaroni pasta, two and a half kilograms of White Star maize meal, one kilogram of sugar, and one kilogram of SASKO baking flour. He also buys vegetables such as cabbage, carrots, and potatoes twice a month. The student usually buys a five-kilogram pack of frozen chicken as part of his monthly grocery purchases, but when he feels like having red meat, he adds this to the groceries for variety.

Key food and infrastructure insights:

The student **does not have a fridge** to store fresh food products. He has **an agreement with his neighbour**, who is also a tenant in the same yard, keeping his meat in his neighbour's fridge for free. This limits the quantity of fresh foods that he can buy as he relies on his neighbour's goodwill to store his products and can therefore not take up too much space. He **relies on a communal standpipe**, which is **shared by approximately five hundred households** in Growing Hope informal settlement. This means that he often must wait in a queue to be able to access water when he forgets or does not have time to store water in a bucket for cooking and washing. The participant uses his **2-plate electric stove for cooking**. The only **source of energy he has is illegally connected electricity** since Growing Hope does not have formal access to electricity. He waits for the electricity supply to be restored when it has been disrupted. The landlord buys the connection wires when these need replacement after disconnection, with resultant delays in access for the tennant.

Mossel Bay, South Africa

Household 2:

Household profile:

Household 2 is headed by a single mother of two small girls. She is employed by a private company in Mossel Bay.

Household food purchase details:

Her weekly grocery basket consists of three kilograms of potatoes, one kilogram of sugar, half a litre of cooking oil, five hundred grams of coffee, one kilogram of samp, five kilograms of rice, and one kilogram of tomatoes. She buys vegetables that **do not perish quickly**, such as carrots, potatoes, tomatoes and onions. She is **unable to buy vegetables such as spinach and cabbage because they spoil too quickly**. The household also buys meat about four times a month because she buys only the quantity they are going to consume that day - **due to the electricity supply problem**. They keep the maize meal in a **bucket** to prevent it from being eaten by rats. The significance of rice in the diet of the household is that of bringing "diversity" into the diet, swopping between rice and maize meal. **Rice also cooks faster**.

Key food and infrastructure insights:

Despite having a fridge, **electricity supply is irregular**, which impacts on what foods are purchased and how food is stored.

Firstly, the household relies on **illegal electricity connections to the substation**, which is tenuous as electricity cables are frequently confiscated by the municipality. However, even if the wires are not confiscated, the **supply is still weak** as a result of the high number of households who depend on these connections. For example, their electricity goes off when people return from work around 17:00 and only gets restored around midnight. This means that if the **fridge defrosts**, and stored meat often goes bad. Therefore, when the household does buy meat, she cooks everything on the day and consumes it on the day or the next day. Her **fridge was damaged by the high voltage of the illegal electricity connection**. The main source of energy for cooking is **a paraffin stove because the electricity supply is not powerful**.

Household 2 Continued:

Key food and infrastructure insights (continued):

Due to poor, irregular and "weak" energy supply **many households in Growing Hope rely on a paraffin stove or a paraffin heater**. The heater is better than the paraffin flame stove, because the heater takes 5 litres of paraffin, and it lasts, and it is **not dangerous like the paraffin flame stove**. The heater is very slow though.

"You should not be in a hurry when you use it to cook, you should start early to cook".

When she is going to cook *samp* (made from dried corn kernels that have been pounded and chopped until broken) she uses paraffin because samp takes time to cook. If she is going to cook the samp in the morning, she puts it in boiled water the previous night so that it gets soft and does not take long to cook. **Families who do not have these appliances, use firewood and cook outside**.

The electricity supply problem has a significant impact on the household. For example, she has a small baby. If she did not wake up in the early hours of the morning and prepare the baby's big flasks, she is compelled to use the paraffin flame stove to boil water for the baby's food. **When she does not have money for paraffin, she usually goes to one of the formal houses and request to boil water for the baby's food.** Sometimes she has to pay R20 ($1) to her neighbour for electricity.

"No one can just allow you to boil water for free".

The household accesses water via the water pipes from the communal toilets, situated in neighbouring eMfuleni informal settlement. **As neighbours they pooled money, bought pipes and hired a plumber to connect them because the water source is very far from them.** She then **connected from the neighbourhood water standpipe to install a water standpipe in her shack**. Like the electricity connection, **the supply of the water is weak and erratic**. If someone else is using the neighbourhood water standpipe the water does not come out from her tap. She must wait for the person using the neighbourhood water standpipe before she can access water. If there are many people using the neighbourhood water standpipe, she cannot get water from her standpipe at all. That is why **she always has to have a bucket full of water stored in her home**.

Mossel Bay, South Africa Household 3:

Household profile:

Household 3 is headed by a single mother of three girls. She lives in Growing Hope informal settlement and is employed in the Community Works Programme (CWP). The CWP is an initiative of the national government and is aimed at providing a safety net for the unemployed or underemployed.

Household food purchase details:

This household's weekly grocery list consists of two kilograms of baking flour, one packet of onions, two and a half litres of *amasi* (soured milk), ten kilograms of maize meal, five kilograms of red meat, half a kilogram of mincemeat, three kilograms of tomatoes, two and a half kilograms of samp, one packet of salt, one packet of macaroni, two litres of cooking oil, and ten kilograms of rice. She buys meat twice a month when she has money to buy it and buys a chicken soup pack from the "Somalian spaza shops" when she has money. It costs R30 ($1,50). She buys vegetables such as cabbage, potatoes, onions and carrots three times a month. She likes to feed her baby pumpkin, but she seldom buys it as it goes bad quickly. Cabbage lasts longer and she prefers to eat it, even when it is raw.

Mossel Bay, South Africa

Household 3 Continued:

Key food and infrastructure insights:

This household **connects to the electricity substation illegally**. The **quality of electricity supply is not good** because there are times when the supply is weak and there are times when the supply is strong due to high voltage, and **when the supply is strong it damages the appliances.**

"You must have a breaker in your shack. The breaker reduces the strong electricity supply".

When there is **no electricity due to loadshedding or confiscation of the illegal wires** by the municipality, she **borrows a flame paraffin stove from her neighbour**. Her neighbour has electricity access most of the time because they are connected to a formal house. Her **neighbour buys electricity but uses the paraffin flame stove** when there is loadshedding.

She does not own a fridge but **stores her meat in her neighbour's fridge for free**. She **stores the vegetables in the open** without the packaging so that it gets fresh air so that it does no go bad quickly. They store the vegetables in the open during daytime but **put it in buckets in the evening to prevent it from being eaten by rats**.

For access to water, **she relies on a connection from the eMfuleni toilets to have a water standpipe inside her shack**. She bought the pipes and **hired a plumber to install the standpipe in her shack.** There are six households who share this connection. Most of them are employed and therefore at work during the day. **She makes sure to fill her buckets during the day when others are at work**. This does not affect food preparation/cooking because she makes sure to have a bucket full of water. That is important during the weekend because she struggles to get water from the tap on weekends when more people are at home.

Mossel Bay, South Africa Household 4:

Household profile:

Household four is a male-headed household. He lives in Growing Hope informal settlement, but also has another home in eMfuleni informal settlement. The groceries get divided between the two households. The second home is for his eldest son who will soon undergo the rite of passage into adulthood (*Ulwaluko*) and will therefore need a place of his own. The father is employed outside Mossel Bay.

Household food purchase details:

The weekly grocery list for this household consists of three kilograms of tomatoes, ten kilograms of *samp*, one kilogram of margarine, one loaf of bread, seven kilograms of potatoes, ten kilograms of maize meal, two litres of cooking oil, two litres of cooldrink concentrate that is normally mixed with water, six tins of Lucky Star Pilchards fish, six tins of baked beans and six tins of Bull Brand meat, cabbage, a six pack of one litre milk cartons, two kilograms of polony, seven hundred and fifty grams of sliced cheese, one kilogram of Morvite instant porridge, three kilograms of carrots, a pack of thirty eggs, spinach, ten kilograms of baking flour, macaroni, seven kilograms of butternut and three kilograms of onions.

Meat is bought once a week or every two weeks, depending on the price. Beef is usually cheaper than lamb and chicken is the cheapest. They usually spend R120 (US$6,50) on chicken which would last for the week. Finance is the main consideration; storage is not that much of a challenge as he **owns a fridge**, **except for when the electricity wires are confiscated**. Vegetables are bought twice a month, in bulk at either Shoprite or Food Lover's Market (two South African supermarkets) where they can buy a "combo" of seven kilograms of butternut, sweet potatoes and onion.

Mossel Bay, South Africa Household 4 Continued:

Key food and infrastructure insights:

The residents of Growing Hope **rely on their friends or family in eMfuleni for connection to their electricity** meter or they **connect to the electricity substation in the neighboring formal settlement**. Electricity is expensive though and some people refuse to let residents of Growing Hope connect from their meter boxes. For this reason, **most residents of Growing Hope rely on connections from the electricity substations**. Whilst this **family does have a fridge** for storing perishables, **they do not have stable electricity supply** as they could go for between two and five hours without electricity during loadshedding or **up to a full day when the wires get confiscated by the municipality** and they need to wait for someone to reconnect them.

Due to the illegal electricity connection, there **is no guarantee that there will be electricity** when the household head wakes up in the morning or when he comes back from work. Even when they are connected, the **quality of the connection is not consistent** and, **on several occasions, the wires catch fire**. They **use electricity for lighting, but they also keep candles**. **Gas is used for cooking** when electricity is not available. **They do not use paraffin due to fear of paraffin**. **Firewood is the other alternative** when there is no electricity or no money to buy gas. The gas does not last long because sometimes they depend on it most of the time. The price of a three-kilogram cylinder of gas is R100 (US$5,50) to refill. When there is no electricity, they are unable to use the fridge and therefore **adjust the quantities of perishables that they buy**. **For example, only buying one kilogram of polony**.

"You rather have cash in your pocket instead of wasting your money, buying everything and putting it in your fridge".

With regards to water, **they fill their buckets from the nearby water standpipe located in Marikana informal settlement**. They cross the stream between the two informal settlements and get water from that standpipe. **The water is not clean**. Sometimes they see a green residue in the bucket of water. So, they must wait for the residue to get to the bottom of the bucket before using the water. **In some instances, the municipality fills up the JoJo water tanks for the Growing Hope community to use when there is no water available**.

Mossel Bay, South Africa

Emerging insights on the Mossel Bay food and infrastructure connections

This food plate exercise confirms that the three main types of foods bought and consumed by households that were identified through the household interviews (HHIs) – maize meal, rice, and baking flour - are bought by all the four participants except participant four, who bought samp instead of rice.

Maize meal is mainly used to cook soft porridge for the morning meal, crumbly maize meal that is mostly eaten with *amasi* (sour milk) for the midday meal, and stiff *pap* for the evening meal. Rice is eaten either for the midday or evening meal.

The three households that do buy rice, do so to bring some diversity into their diet and because it cooks quickly and therefore does not consume a lot of electricity.

The household food purchase profiles suggest that vegetables are less important. However, the food plate exercise demonstrated that all the four participating households buy vegetables, but infrastructure issues relating to storage have an impact on the types and amounts of vegetables bought.

For example, household one buys the types of vegetables that do not go bad easily, such as carrots and potatoes. Tomatoes and onions are prepared as a gravy with most meals and therefore gets consumed quickly, reducing the need for storage. Meat did not feature prominently during the household food profile surveys. The food plate analysis however shows that whereas all the participants buy meat, infrastructure issues related to storage, as well as cost, have an impact on the quantities of meat bought. Other factors such as dietary diversity and meat being a special treat for Sunday lunch also play a role.

Mossel Bay, South Africa

Emerging insights on the Mossel Bay food and infrastructure connections

The Mossel Bay food plate exercise highlighted a range of hybrid electricity and water connections. Electricity access is irregular and unstable due to loadshedding, confiscation of illegal electricity wires, or when supply is disrupted due to an overload on the electricity substation. When this happens, households rely on a mix of paraffin, gas and firewood for cooking, with candles being and option for lighting.

An essential household item, used by all households is the bucket. Two types of buckets are used – one for storing food items like rice, flour and maize to prevent rats from destroying these household items and a bucket for storing water. This item is essential as a buffer during times when water is not available, for example when residents return from work in the afternoon or in the mornings when they prepare for work or on weekends when most people are at home and there is a high demand on communal services.

The household interviews revealed a range of careful negotiations, forward planning as well as a constant need to "make a plan" that these tenuous and unstable infrastructure connections demand. This was confirmed and further demonstrated by the food plate exercise.

The food plate exercise captured the chronic every day waiting – waiting for the electricity to be restored, waiting in line for water, waiting to use the communal toilet. Waiting signifies people's lives in informal settlements and the strategies which they use to meet their food and other needs in the meantime.

The food plate exercise revealed how households' food choices – what to buy, how much to buy, and when to buy, are intimately connected to and structured around infrastructure access. Social relationships which enable infrastructure access play a central role in each households' food choices – for example, the use of neighbour's refrigerators to store meat. Relationships with friends and family in neighbouring settlements also impact access to electricity meters and connections to communal water standpipes.. These social relationships, like the physical infrastructure connections, can be unstable and fragile and need careful maintenance and repair.

Mossel Bay

Policy and research suggestions

Policy suggestions

- Urban policy actors and administrators have clear infrastructure related mandates and responsibilities, with assigned fiscal allocations. Given infrastructure links to food and nutrition outcomes, local governments have a clear food system mandate.
- Multiple societal and contextual factors create different food system related challenges. Households and food managers manage multiple social and economic networks to ensure food access. Disrupting these, through upgrade projects or other such disruptions, results in negative outcomes. Local governments need to ensure that these challenges are mitigated.
- Political and administrative leadership need to pay far greater attention to how multiple urban systems intersect, and the nature of these intersections, in vulnerable and marginalized contexts. Notions of good governance by local government actors cannot ignore these processes, processes that are largely different to those of formal areas.

Areas of further research

- Using food as a lens to understand the social and material infrastructures in specific contexts offered unique insights into contextual food and infrastructural issues. This offers a unique lens to better understand these complexities.
- However, silo-ed research methods do not offer the necessary depth to fully engage the complexities of socio-material infrastructure intersections – new and diverse research methods are required.
- Evidence emerges at a variety of scales, from the micro household and even individual household member scale to national and global policy. Context influences these in diverse ways. Understanding these is essential and need to guide appropriate food system and wider urban development responses and inform research and theorization.
- Food has offered a lens to understand infrastructures, but also other urban challenges, including violence, social processes, site politics, gatekeepers and many more. Food offers a useful tool to understand site specific dynamics and epistemologies.

Insights and reflections from the food plate methodology

While there are multiple drivers influencing the choices household make in respect of food purchases, infrastructure is seldom offered as a driver of choice. Equally, engaging questions of food security frequently renders responses aligned to availability – the quantity of foods in the system. The availability paradigm results in a default response that argues that more food needs to be produced. In urban areas that production consideration results in a default to urban agriculture.

From the preceding accounts from the different households and their city-wide reflections, producing more food is clearly not a viable response. Multiple other factors are at play.

Recently the Commission on World Food Security (CFS) High-Level Panel of Experts (HLPE) published an updated version of the definition of food security. Accordingly, "food security exists when when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life".[5] This definition rests of six food security dimensions; availability, accessibility, utilisation, stability, sustainability and agency. As has been questioned by others, how then do we measure and understand food security when it involves the intersection of these multiple dimensions? Further, these dimensions cannot be viewed in isolation of the different systems that influence, dictate, mediate and at times, confound, the responses to these dimensions. The urban system is one such system.

These questions presented a challenging methodological question: How best can researchers understand not only the household food system, and the ways in which the household engages the food system, but how can researchers effectively capture the consequences of the interactions between the food system and the urban system, and specifically the urban infrastructure system?

Our research applied multiple methodological modalities to better understand the intersections between the infrastructure grid (as part of the urban and wider infrastructure system) and the food system. We used in-depth interviews and key informant interviews. Detailed reviews of existing data were conducted and engagements with policy makers, acting at various governance scales, were conducted. These processes, and methods, generated interesting insights but the intersection between the grid and the food system remained opaque. Other methods were needed.

Required was a method that allowed researchers insights into the infrastructure assemblages. Assemblages which included the material (physical and technological), as well as the political and systemic factors that 'govern' how infrastructure is developed and used. We also needed to understand the social and relational processes associated with infrastructure.

Importantly, and while there are many contributing factors, the challenges faced in the cities in which we engaged meant that there was an evident normalisation of hunger and food insecurity, a processes whereby "hunger is tolerated because key stakeholders do not exercise their power to eradicate it".[6]

On reflection and following engagement with multiple research partners, it was agreed that we would test the "food plate" methodology as a means to make evident the detailed and complex intersections, or assemblages, and the social material and political processes that dictate and mediate the food choices and the intersection between these choices and infrastructure.

The food plate methodology was also deployed as a tool to better understand the agency of the household, and how the household and context interacted.

This is an experimental methodology and is not without its challenges. Food security and hunger are often experienced in private; these are often embodied. The use of images could potentially expose vulnerabilities. Further, culture and relationships with food needed far greater interrogation. A key example of this was the cultural processes associated with polygamous households in Ghana and how, as a result of this, we actively avoided engaging such households.

However, it is felt that the detailed evidence and the utility in being able to examine, through both the image, and through the conversations solicited as a result of the image, offered a methodology that served to expose the intricate, strategic, deeply thoughtful, often carefully negotiated intersections between food and infrastructure.

As a result of the foot plate exercise critical learnings and/or insights are evident. The LOGIC project argued that "one of the underlying premises of the Living Off-Grid Food and Infrastructure Collaboration is that greater understanding of food and nutrition in relation to infrastructures is essential to engage in effective urban food, urban governance and nutrition planning in Southern cities." This food plate exercise offered significant utility in deepening that understanding.

As part of this deepening process, it was interesting to note that while contexts were different, and that cultures and histories of the research sites were different, similar food types, largely processed starchy foods, appeared in the food plates of all households. Infrastructure was clearly playing a far greater role in the food choices of each of the cities and research sites than literature or general policy acknowledges. While the samples are admittedly small, it is possible to argue that the nutrition transition taking place in the three research sites are not necessarily being driven by a desire for a western diet or sedentary lifestyles. Rather, infrastructure has a far greater role to play in this transition than previously acknowledged.

Further, it is clear from these processes that food choices are clearly being made in respect of both household and wider contextual infrastructure. This evidence poses significantly important questions about the framing of the "food environment". Factors impacting the food environment cannot simply be viewed as a linear flow between producer, to processing and on to retail and then to the consumer. The key determinant of how the food environment functions is in fact the household and infrastructure environment of a specific context. Put plainly, if there is an energy deficit in the household, the foods purchased will respond to the amelioration of that deficit. This is a strategic and highly sophisticated choice, one imbued with deep knowledge of costs, budgets, risks and politics. Educational initiatives about healthy diets will not generate the desired outcomes in the household if neighbourhood infrastructural deficits are not effectively considered.

These decisions, the trade-offs, the compromises, are not neutral. Households are constantly engaging in social processes to build assemblages, maintain relationships (using a neighbour's fridge), offering exchange (paying to boil a kettle), but also waiting (for the energy to return, for water pressure to build, etc.) that impact choice and societal processes in ways that are not effectively captured in traditional food security and food system aligned survey findings.

A key insight from the food plate exercise is a distinct and clear transition in diets. Despite the diversity of contexts, each city reflects similar foods being consumed. Common foods across all sites are processed pasta and par-boiled rice. In addition to this, each city reflects flavouring or food additives being used, in the form of stock cubes (maggi) or other flavourings such as mayonnaise or tomato sauce. Further all households are consuming protein, often evident in the animal protein purchased, but for infrastructural reasons, more processed foods are being consumed, particularly soya chunks or tinned food, and in some instances dried fish. Emerging are more ultra processed shelf stable protein foods such as polony.

The links between these foods and the costs and reliability of energy is clear. Some households were still purchasing what might be described as more traditional grains and pulses, but cooking of these items and the fuels needed, results in significant trade-offs and compromises.

However, the infrastructure considerations were not vested in energy alone. In all cities, water access and availability, transport, and markets were all key infrastructures that determined and mediated what foods were being purchased, prepared and consumed.

Many urban policy actors, be these officials or politicians, abdicate any responsibility for urban food governance and food systems engagement, often claiming no urban food mandate and resultant absent fiscal allocations. However, as is evident here, key urban governance aspects, specifically the entire basket of infrastructures detailed, are explicit urban governance issues. As such, it is fair to argue that cities and city governments play a fundamental role in food systems and food security outcomes. Cities and city governments play a fundamental role in nutrition and health outcomes. The reluctance to act and engage these issues means that urban governance actors are directly implicated in the rise in diet related non-communicable diseases.

Technical and policy related questions cannot be divorced from the social processes that are aligned to not only the decision-making processes, but also the everyday interactions between the city, space, society, infrastructure and the households.

Conclusion

Seeking out methods and research processes that effectively illustrate the intersection between the food system and multiple other systems is an essential endeavour. As LOGIC argued:

"The list of food and infrastructure dependencies is long and complex and relates to all parts of the food system; this complexity cannot be used as an excuse for ignorance of these infrastructural dependencies. Simply trying to chart urban systems separately can lead to top-down visions of and responses to urban issues."

The food plate exercise exposed how households were engaging this complexity, how households in the three African research sites interacted with both the food system and the urban system. The weekly food plate process enables a foregrounding of the everyday contestations and experience of food within infrastructure assemblages, through an active engagement in urban systems rooted in everyday realities. This clearly demonstrates clear strategic processes and the everyday trade-offs that are being made. Of great utility in this process was how the respondents were able to reflect on and describe their interactions with the wider structures (e.g. provisioning systems, policy, etc.), the interactions between top-down forces, and the adaptations and negotiations that arose in response to these.

Far more detailed engagement in these responses will take place and will be detailed in city specific descriptions of this work.

Image: Samantha Reinders for Consuming Urban Poverty

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Living Off-Grid Food & Infrastructure Collaboration

Food Plate Research Report: Africa Project

The Africa LOGIC team would like to extend our sincere thanks to all the research participants who opened their home and allow the LOGIC team access to the daily food and nutrition struggles encountered. We hope that their generosity in allowing us to engage their struggles, generates active and appropriate policy responses.

For more information on the Living Off-Grid Food & Infrastructure Collaboration, please see the following:

LOGIC Project details:
https://www.ids.ac.uk/projects/rethinking-the-off-grid-city/

LOGIC Project output and activity wakelet:
https://wakelet.com/wake/pEELxaxH40evGXzJaNA1X

LOGIC Paper Working Paper:
https://opendocs.ids.ac.uk/opendocs/bitstream/handle/20.500.12413/17975/LOGIC_Working%20Paper%201_vF.pdf?sequence=4&isAllowed=y

LOGIC Project article in Agriculture and Human Values Journal:
https://link.springer.com/article/10.1007/s10460-023-10507-6

Partner linkages:
Institute for Development Studies (UK): https://www.ids.ac.uk
Indian Institute for Human Settlements: https://iihs.co.in
Colombo Urban Lab: https://www.csf-asia.org/colombo-urban-lab/
University of Ghana: https://www.ug.edu.gh
African Centre for Cities: https://www.africancentreforcities.net

LIVING OFF-GRID
FOOD & INFRASTRUCTURE
COLLABORATION

Thank you