Food security and diets in urban Asia: How resilient are food systems in times of Covid 19?

An analysis and characterization of 8 urban food systems in selected cities in Asia
Authorship
This report was written by Heather Ohly (Dikoda, food system researcher consultant), Martyn Clark (Dikoda, urban planner consultant), Sonja Read (Dikoda, nutrition researcher consultant), Severine Frison (Dikoda, nutrition researcher consultant), and Sophie Goudet (Dikoda, managing director).
It was reviewed by Nicolas Bidault (WFP RBB VAM), Britta Schumacher (WFP RBB nutrition), Anusara SINGHKUMARWONG (WFP RBB nutrition), and supervised by Sophie Goudet.

Acknowledgements
We thank the WFP staff of Afghanistan, Bangladesh (Jo Jakobsen, Head of Nutrition Colleen O’Connor, Nutrition Officer), Cambodia, Indonesia (Saidamon Bodamaev, Head of Vulnerability Analysis and Mapping Unit Kautsar Tandipanga, Vulnerability Analysis and Mapping Associate), Pakistan (Ifikhar Abbas, Head of Vulnerability Analysis and Mapping), the Philippines (Ms. Brenda Barton, Country Director and Representative, Mr. Giorgi Dolidze, Head of Programme, Mr. Juanito G. Berja Jr., Vulnerability Analysis and Mapping Officer, Mr. Martin Parreno, MD, Programme Policy Officer, Dr. Corazon Barba, Nutrition Consultant) for their support and collaboration throughout the urban food system analysis. We also thank the respondents from city level actors to consumers who gave their time to participate in the urban food system analysis survey.

Disclaimer
The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of WFP nor Dikoda.

Contact us: info@dikoda.com
About Dikoda
We provide nutrition focused impact solutions, technical support and actionable insight for the public and private sector. Our technical focus is addressing malnutrition in urban areas. Our geographical focus is in Asia and the Pacific.
## List of contents

Executive summary ........................................................................................................................................... 6

**Section 1. Introduction** ........................................................................................................................... 13

Section 2. Methodology ............................................................................................................................... 17
2.1 A conceptual framework for urban food systems .............................................................................. 18
2.2 Selection of cities in partnership with WFP ..................................................................................... 19
2.3 Overview of study methods ............................................................................................................... 20
2.4 Purpose and development of City Briefs ......................................................................................... 24
2.5 Purpose and development of typology ............................................................................................. 24

**Section 3. Impacts of COVID-19 on urban food systems in Asia and the Pacific** ...................... 27
3.1 External drivers ..................................................................................................................................... 28
3.2 Food supply chains ............................................................................................................................. 30
3.3 Food environments ............................................................................................................................ 37
3.4 Individual factors and consumer behavior ..................................................................................... 44
3.5 Diet outcomes ..................................................................................................................................... 49

**Section 4. City Briefs** .......................................................................................................................... 51

**Section 5. Resilience** ............................................................................................................................ 84

**Section 6. Conclusions and recommendations** ................................................................................. 89

**Appendices:**
Appendix 1. Results of Dikoda surveys ................................................................................................ 95
Appendix 2. Cultivated land per 100,000 persons .................................................................................. 111
Appendix 3. Methodological approach to defining urban areas ............................................................ 113
List of tables

Table 1. Summary of surveys conducted

Table 2. Available indicators from DHS data

Table 3. Households using crisis (in blue) and emergency (in red) coping strategies based on LCSI data collected before and during the pandemic

Table 4. Scoring matrix for the typology of urban food systems resilience

List of figures

Figure 1. Food Systems Dashboard Framework

Figure 2. Map of eight cities included in this study.

Figure 3. Timeline for consultations and data collection

Figure 4. Defining cities

Figure 5. Resilience as the result of absorptive, adaptive, and transformative capacities

Figure 6. Indicators used in the typology of resilience

Figure 7 (A and B): Availability of cultivated land in close proximity to Phnom Penh

Figure 8. Location of most suppliers for city-based SMEs in the food sector

Figure 9. Actions taken to reduce operational costs

Figure 10. Types of technical assistance required to cope with the impact of the pandemic

Figure 11. The dual impacts of COVID-19 on food affordability and food insecurity

Figure 12. Food price changes in 2020 (%) showing highest and lowest values for foods included in our average calculation in the typology

Figure 13. Monthly food price fluctuations for key commodities in Quezon City in 2020

Figure 14. Comparison of eight city typologies showing levels of resilience (or capacity) to respond to the COVID-19 crisis

Figure 15. Example spider plots for two cities
This report provides an analysis and characterization of urban food system across 8 selected cities in Asia. This research is the Component 1 (C1) of a series of knowledge building products supported by Dikoda. Additional components include:

- Component 2 (C2) 4 deep dive case studies that aim to 1) provide rich in depth examples to feed into the evidence on nutrition-specific and sensitive interventions in poor urban areas to promote food security and prevent malnutrition, 2) provide an opportunity to evaluate urban interventions, learn from the process and offer collaboration opportunities for WFP to support upgrading and scaling up.

- Component 3 (C3) rapid market assessment in 3 selected cities that aim to 1) understand the market environment and stakeholders in the urban contexts, 2) specifically focusing on informal food sector actor, characterize their offer and their level of resilience during COVID-19.

The outputs from C1 to C3 can be shared upon request by WFP or Dikoda's team.
Vulnerable populations in urban areas globally have been among the worst hit by the global COVID-19 crisis. The pandemic has upended normal life and the food systems that support urban populations have been significantly disrupted. To date, insufficient evidence exists on the impact on availability, access and use of foods for vulnerable urban populations. The gaps in evidence of urban food system weaknesses during the COVID-19 crisis, and the likely consequences on food security and nutrition in poor urban populations, requires better understanding urban to shape potential interventions for WFP.

This research study conducted between January and April 2021, assessed the level of resilience of urban food systems in the face of the COVID-19 crisis in eight selected cities in the Asia/Pacific region. It used a range of methods and data sources to characterize urban food systems and explored external drivers, food supply chains, food environments, individual factors, consumer behaviour and diet outcomes. The Food Systems Dashboard Framework1 developed by Johns Hopkins University, the Global Alliance for Improved Nutrition and other international collaborators was used as the conceptual framework to guide the analysis. Key data sources were:

1) **Primary quantitative data**: Surveys with urban food system stakeholders (n=2,528) including private sector, local government actors, UN agencies and NGOs.

2) **Primary qualitative data**: Key informant interviews (n=30) with representatives from local government, UN agencies, national/international NGOs, Food Security and Nutrition Cluster Coordinators, private sector actors in the food industry and community-based organizations involved in supporting the food system during the pandemic.

3) **Secondary data analysis**: Analysis of reports and online databases for selected indicators of vulnerability relating to components/outcomes of food systems and national Demographic and Health Surveys (DHS) data to produce city-level indicators.

4) **Geospatial data**: Analysis of peer-reviewed urban datasets combined with primary data collection.

Eight cities were selected in collaboration with WFP Regional Bureau Bangkok and Country Offices in the region. Inclusion criteria were primarily based on where WFP Country Offices are located, to facilitate rapid data collection and networking.

---

with relevant stakeholders. Using the materials collected, we developed eight city briefs to provide snapshots of the city-level food systems and COVID-19 related impacts and vulnerabilities in the following cities:

1. Chittagong, Bangladesh
2. Cox’s Bazar refugee camps and communities, Bangladesh
3. Dhaka, Bangladesh
4. Jakarta, Indonesia
5. Kabul, Afghanistan
6. Peshawar, Pakistan
7. Phnom Penh, Cambodia
8. Quezon City, Philippines

Pre-COVID-19 data has been used to as a baseline to highlight vulnerability in the food system that existed before the crisis. The city briefs aim to provide meaningful comparison of data across cities, but some disparity in secondary data inevitably exists.

A typology of resilience in urban food systems has been developed, to show how different parts of the food system exhibit different capacities during the pandemic. Based upon the Food Systems Dashboard Framework, we selected one key indicator for each of the following dimensions: external drivers, food supply chains, food environments, individual factors, consumer behaviour and diets (outcomes). For each indicator, we developed cut-offs for absorptive capacity, adaptive capacity and transformative capacity. These capacities may also be interpreted as low, medium and high levels of resilience respectively.
This typology offers a simplified classification of resilience in urban food systems, which can be used to compare cities and identify priorities and opportunities to strengthen resilience. It is intended as an operational tool, which may be modified and adapted.

Main findings

The study findings are presented in the context of external drivers, the components of food systems (food supply chains, food environments, individual factors, consumer behaviors) and diet outcomes. The eight city briefs provide a visual representation of the available data and highlight areas of vulnerability and resilience in city food systems. The COVID-19 pandemic has increased levels of vulnerability and food insecurity in cities through three main mechanisms, which varied geographically between cities and temporally throughout the pandemic:

- Disruptions to food supply chains
- Increased food prices
- Loss of income

Food supply chains have been disrupted (in some cases for multiple, prolonged periods) due to transport and movement restrictions during the pandemic. Urban areas typically have longer and more complex supply chains than rural areas, which makes them more susceptible to disruption. A range of government and private sector interventions helped to protect supply chains and keep food moving from rural areas into major cities. Many food sector businesses lost a large proportion of their income, and some were forced to close, reduce costs, or adapt in other ways. We found that many SMEs were unable to access financial support and technical assistance they needed during the pandemic. Responses and adaptations developed by SMEs (often with no external support) may contribute to longer term resilience, such as diversification, online sales and home deliveries.

The combination of increased food prices and loss of income affected food affordability for the urban poor. Food prices increased during the pandemic in all eight cities, with considerable variations between cities and between food groups. Daily wage earners and informal sector workers were most affected by loss of income and their access to food was compromised when local markets and street food vendors were subject to restrictions. Many of these people were not registered for social protection programmes and had no financial buffer, making them highly susceptible to food insecurity.

Urban inequity has increased with wealthier households adopting coping strategies that may improve longer term resilience, while poorer households are adopting unsustainable negative strategies. Average household income declined by at least 40% in all cities, with the largest decline (75%) reported in urban slums in Bangladesh (from February to April 2020). Governments adapted, supplemented and scaled up their existing social protection programs in response to the pandemic to support people who became vulnerable in cities. Poor urban households reduced their food basket (diet diversity) and meal frequency, prioritized children over adults or begged for food. Wealthier households in cities adapted by engaging with online shopping using larger supermarkets.

The typology suggests that food systems in the eight cities did not show high levels of resilience (or transformative capacity) to respond effectively to the COVID-19 crisis. Individual factors, represented by reduced income, were particularly affected and remained at the absorptive level (i.e. lower level of resilience characterized by coping rather than adapting or transforming). Combined with even moderate rise in food prices, this loss of income raises concerns regarding the resilience of households and is eventually likely to reflect in diet and nutritional outcomes.
The spider plots in the city briefs illustrate our assessment of urban food system resilience using the selected indicators. This enables comparisons between cities to identify strong or vulnerable parts of the food system. In the two examples below, Dhaka shows better availability of data (hollow circles indicate lack of data) and a higher level of resilience overall compared to Jakarta. However, Dhaka shows vulnerability in relation to food supply chains (indicated by proximity to cultivated land) and individual factors (indicated by reduction in average household income during the pandemic).

**Comparison of the 8 city typologies:**
low level of resilience to cope with the COVID-19 Crisis

<table>
<thead>
<tr>
<th>External Drivers</th>
<th>Food supply chains</th>
<th>Food environments</th>
<th>Individual factors</th>
<th>Diets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chittagong</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cox's Bazar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dhaka</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jakarta</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kabul</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peshawar</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phnom Penh</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quezon City</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Example of typology for Jakarta**

**Example of typology for Dhaka**
Positive opportunities for transformation of urban food systems exist. Innovative transformations represent an area that could be strengthened on the supply side to increase the resilience of the economy and the livelihoods of those working in the food system by protecting income and the access of vulnerable individuals to the food system. Interventions are needed to shorten food supply chains to make city food systems more sustainable and resilient.

The following recommendations are potential entry points for governments and development actors to consider in the response to COVID-19 and to strengthen the resilience of urban food systems against inevitable future shocks. The targeted recommendations for WFP are listed below. The full list of recommendations for other stakeholders are included in Section 6.

Program and policy recommendations:

Provide financial support through grants and technical assistance to SMEs in the food sector to protect the integrity of food supply chains:

- Use WFP’s expertise in cash transfer to support e-voucher grants for SMEs to support a sustainable and resilient food systems. Business loans or grants to business with low or no interest (targeting could be done either based on location or products sold). Advertise existing support schemes more widely, especially those that are accessible to unregistered vendors.

- To increase street food vendors’ resilience, provide skills development to street food vendors to make transformative changes to their business that allows greater resilience, notably through online sales, delivery platforms and marketing in general, or support to diversify their business. Skills training could be provided together with financial support.

- Support vendors to use technology to move to online
orders via collective channel (sales platform at low cost) or improve connections and communication with consumers. Support e-commerce that can reach poor urban-dwellers. Specifically for the case of Pasar Mitra Tani intervention in Jakarta, support targeted action to reach low-income residential areas and involve Jakarta's poor population more actively.

Support dynamic urban food supply chains:

- Supporting vendors to access wholesalers and pool resources to coordinate shared deliveries and negotiate better prices.

- Connect small urban vendors with small rural suppliers and bypassing the big operators.

- Set up COVID-19/pandemic safe logistics processes that put in place systems and safety to facilitate movement of goods while meeting safety requirements and tracking provenance.

- Support the development of communication platforms reaching poor urban dwellers. These platforms could support information sharing targeting poor households on where food at most affordable price can be found in their community.

- Support government and municipalities initiatives during the crisis, such as the Ministry of Agriculture led intervention in Dhaka, to bring markets and foods closer to poor urban dwellers (refer to the deep dive case studies C2) and explore new approaches such as mobile markets. For these interventions, advocate to increase the nutrition-sensitivity of the project by promoting nutritionally higher quality foods. WFP supply chain could work with programme and relevant government counterparts to explore more effective supply chain and logistical solutions (e.g., for transporting goods to overcome difficulties encountered when using public transportation systems, liaising with Department of Agriculture Marketing about warehousing, cold chain, distribution mechanisms). This would however require broad-based consultation and intensive support from the different stakeholders (including, ministries, departments and NGOs). Mobile markets can support access of fresh products in poor urban areas during lockdowns and physical restrictions.

Social protection and safety net programs that are adaptive and responsive to shocks and support those worst affected, including the urban poor:

- Demonstrate the impact of cash transfers on food diversity for the current WFP led cash back intervention in Dhaka slums (refer to deep dive case studies C2) and promote the potential of cash incentives for Government and agencies to implement nutrition-sensitive social safety net programmes that have both food and nutrition security benefits for the target group.

- Increase the sustainability of cash transfer/assistance programmes by leveraging the potential of the programme to influence other components of the food system, including producers, retailers and consumers, as part of a systemic approach to food value chains. This can be achieved by ensuring that the cash is spent towards reinforcing the food supply chain (for example, via accredited street food vendors selling healthy foods).

- Promote the use of targeting and modalities that are urban and nutrition sensitive – recommend using Multi Dimensional Poverty Index (MDPI) for targeting, complement with SBCC tackling barriers of purchasing healthy foods, and include cash modality matching the cost of a healthy diet.

Urban agriculture programs to enable city residents and communities to grow their own food and generate extra income:

- Advocate for the inclusion of the urban poor and particularly families that are at risk of malnutrition (such as families with young children) into urban agriculture programmes (specifically in Quezon City where an urban agriculture programme is already operational – refer to the deep dive
• Provide technical guidance on increasing nutrition-sensitivity of the urban agriculture programmes.

• Provide strategic guidance on what foods make sense to do as urban agriculture and where things will not be competitive with rural suppliers, for example specialist foods that are highly nutritious and/or can be sold as specialist cash crops.

• Consider technical guidance on urban farming solutions (hydroponics, fertilizer) and provide specialist support lines and websites for problems solving and sale of cheap equipment. Create a city urban farming platform that links suppliers, transporters, equipment suppliers, consumers, technical experts, people providing loans/grants.

• Demonstrate the impact of the current urban agriculture programme in Quezon City on dietary diversity (Grow QC).

Methodological recommendations:

• Standardised indicators of resilience and vulnerability are needed to facilitate comparisons between cities, especially for individual factors and consumer behaviour. In future assessment, the indicators included in the urban analysis should be considered and can be adjusted depending on the type of shock in question or depending on local priorities. These include: Cultivated land within 50 km of city (km2 per 100,000 persons), proportion of food sector businesses with most suppliers located within the city, average change in food prices during a specific time frame based on 4 selected food items, reduction in average household income, Minimum Dietary Diversity for Women of Reproductive Age (MDD-W). For individual factors, child Food Insecurity Experience scale indicator should be used to capture the level of food insecurity experienced by children and adolescents, as research has shown that their experience is different to the household’s head. More research should be undertaken to provide guidance on a standardized indicators relevant to consumer behaviour.

• Further development and application of the typology of urban food systems resilience, which may be used as an operational tool to identify priorities and opportunities to strengthen resilience.

• Innovative approaches to defining urban areas and collecting city-specific data, such as combining local surveys with spatial, remotely sensed data that can bring unique insights: Approaches that support and improve government’s existing assessment, monitoring and surveillance tools and systems are recommended.
Section 1

Introduction
Background on urban food systems in the Asia and Pacific region

Food systems should promote equitable and affordable access of safe, and nutritious food in adequate amounts. They are by nature at the confluence of many different sectors and areas of expertise, and need to be understood through comprehensive analytical frameworks that can holistically interpret complexities, such as sustainable use of natural resources, agriculture, food, nutrition and resilience. At the global level, initiatives from international declarations (such as the New Urban Agenda), policies and conferences have contributed towards an increased focus on the role that urban food systems can play in enhancing nutrition, food security and promoting sustainable and resilient cities.

Before COVID-19, many countries in Asia and the Pacific region had faced sustained high malnutrition rates in urban areas despite significant reductions in poverty and a rise in per capita income. Calories have been made cheap and nutrients expensive due to a narrow focus on affordable grain production in these countries. Food systems have been focused on increasing food availability and often on facilitating the maintenance of rice self-sufficiency, but this has come at the expense of nutrient-dense diets. The focus on the grain production also contributed to degrading the environment and making food systems more susceptible to shocks.

Efforts to transform existing food systems that focus on the provision of affordable, nutritious and high-quality diets for all have remained insufficient. In Asia and Pacific countries, the urban poor spends most of its income on food, and poor families often cannot afford a nutritious diet. Street food is a cheap and convenient source of food for millions of urban people, but it also contributes to the development of obesity and non-communicable diseases (NCDs) and may be lacking in food safety and hygiene. Additionally, poor regulation of the nutritional content of packaged foods, unfavourable taxes and tariffs imposed on healthier foods, and an abundance of junk food outlets, means that consumers are not informed or protected. Insufficient national policies aimed at eradicating malnutrition and transforming food systems have been implemented with the objective of making nutritious diets available and accessible to everyone. At the individual level, food-related behaviours are influenced by socio-economic and cultural factors, including traditions and taboos, cost and purchasing power, gender inequality, education, the decision-making power of women at household level, and investment in women’s nutrition.

---

2 Prepared or cooked food sold by vendors in a street or other public location
Overview of main impacts of COVID-19

The agriculture sector and key food supply chains actors under the food systems globally have been protected by governments during the crisis due to their role in delivering essential services. The dimension of food security that has been most affected is accessibility due to the disruption in physical access to food outlets in urban areas, and affordability due to a decline in people’s income. Insufficient evidence exists on the impact on availability and use of foods. Issues around stability of food availability are reflective of resilience dimensions; although staple foods are mostly not affected, labour intensive/perishable crops and animal source foods are likely to experience more disruption. This is mainly due to a lack of manpower in farming and challenges taking produce to markets, leading to large scale food wastage. Big grocery stores and supermarket chains have been able to meet COVID-19 guidelines and remain open and have consequently survived and for some, benefited from the COVID-19 crisis, whereas small and informal food system actors often lacked support or social protection. These smaller providers are recognized as key suppliers of foods in poor urban areas of LMICs; they reportedly faced longer lead times in sourcing supplies, reduced labour capacity, greater challenges in meeting COVID-19 measures and overall increased running costs.

Poor urban populations, particularly women, are likely to be the most vulnerable to the health and economic impacts of the COVID-19 crisis due to a decline in food security (UN-HABITAT 2020).

Rationale for this study

Based on growing urban needs, WFP aims to support countries in achieving their vision and plans for 2030, as outlined in the WFP Strategic Plan (2017–2021). Urban programming can contribute to the achievement of SDG 2 (on zero hunger) and SDG 17 (on partnerships for the goals). WFP Regional Bureau Bangkok provides strategic guidance and technical support to WFP country operations in the region to support analysis, testing and the application of innovative programmatic approaches.

The gaps in evidence of urban food system weaknesses during the COVID-19 crisis and the likely consequences on food security and nutrition in poor urban population indicate a need to better understand urban food system dynamics and identify areas of interventions for WFP. Dikoda has been contracted by WFP to support urban food system analysis in its operational areas. Additional research will explore the effectiveness of interventions for strengthening nutrition-sensitive food systems and the development of mechanisms to enhance data collection from urban informal sectors.

Aims and objectives

The aim of this research is to assess the level of resilience of urban food systems in the face of the COVID-19 crisis in eight selected cities in the Asia and Pacific region. The geographic focus is in poor urban and peri-urban areas where vulnerable populations live.

The objectives are to:

1. Characterize the urban food systems by exploring external drivers, food supply chains, food environment, individual factors, consumer behaviour and dietary outcomes.

2. Assess the level of resilience using a typology of resilience.

3. Identify at-risk areas where populations are vulnerable and food systems weak.

4. Develop a food system data collection and analysis methodology that can evaluate change over time.

5. Consolidate WFP’s programmatic work in urban areas and recent evidence collected during COVID-19 to contribute to the evidence base.
Methodology

This study was conducted between January 2021 and April 2021. All data collection and stakeholder engagement activities were conducted online due to global travel restrictions associated with the pandemic. The core research team was based in Europe and the Pacific, with support from national researchers in Bangladesh, Indonesia and the Philippines.

2.1 A conceptual framework for urban food systems

In this study, we used the Food Systems Dashboard Framework as the conceptual framework for our analysis of urban food systems (Figure 1). This framework depicts food systems in terms of external drivers (macro-level factors), four interrelated components of food systems (food supply chains, food environments, individual factors and consumer behaviour) and outcomes of food systems (including diet, nutrition and health). The dashboard was developed by Johns Hopkins University, the Global Alliance for Improved Nutrition and a range of international collaborators, as a tool for comparing country food systems; it is populated with country-level data for selected indicators. We applied the same conceptual framework to this study of urban food systems at city level. We used the framework to guide our analysis and examine the impacts of COVID-19 on urban food systems.

FIGURE 1.
FOOD SYSTEMS DASHBOARD FRAMEWORK

[Diagram of the Food Systems Dashboard Framework]

Adapted from WFP (2020), Urban food systems: a report by the high-level panel of experts on food security and nutrition of the committee on world food security, Rome, Italy.
2.2 Selection of cities in partnership with WFP

A list of potential cities was developed in collaboration with WFP Regional Bureau Bangkok and Country Offices in the region. Inclusion criteria were primarily based on where WFP Country Offices are located, to facilitate rapid data collection and networking with relevant stakeholders.

The multi-agency SDFU (Status and Determinants of Food insecurity and Undernutrition) study was completed in the Philippines, Indonesia and Myanmar in 2020. Therefore, Quezon City (Metro Manila) and Jakarta were included in this study due to known data availability from SDFU. It was not possible to include Yangon after the military coup in February 2021.

Focus on poor urban areas, slums, informal settlements
and peri-urban areas within these cities was prioritized in the selection and use of data through primary and secondary data collection efforts.

Consultation meetings were completed with each of the WFP Country Offices to explain the purpose of the study and what would be involved. This was an opportunity to assess levels of activity and engagement in relation to urban food systems, using an online questionnaire and an interactive online map to highlight areas of vulnerability.

After these meetings, the final list of eight cities was finalised (Figure 2):

1. Chittagong, Bangladesh
2. Cox’s Bazar refugee camps and communities, Bangladesh
3. Dhaka, Bangladesh
4. Jakarta, Indonesia
5. Kabul, Afghanistan
6. Peshawar, Pakistan
7. Phnom Penh, Cambodia
8. Quezon City, Philippines

For Bangladesh, a decision was made in collaboration with the Country Office to include two cities and Cox’s Bazar refugee camps (Kutapalong Mega Camp and host communities) for several reasons:

• Bangladesh has one of the highest rates of urbanization in the world and is experiencing rapid growth in its secondary cities
• A high level of experience of urban programming
• Cox’s Bazar is the largest refugee operation worldwide with Kutapalong mega camp hosting close to 900,000 refugees.

2.3 Overview of study methods

A combination of primary data collection and secondary data analysis was used to assess the impacts of COVID-19 on urban food systems in the eight cities (Figure 3).

Primary data collection:
Surveys were conducted with three groups of stakeholders:
• Private sector – businesses in the food sector
• Local government actors
• UN agencies, NGOs, charities and other development actors

In total, 2,528 respondents were included.

<table>
<thead>
<tr>
<th>Stakeholder group</th>
<th>Survey sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private sector Round 1</td>
<td>1,181</td>
</tr>
<tr>
<td>Private sector – Round 2</td>
<td>575</td>
</tr>
<tr>
<td>Local government actors</td>
<td>274</td>
</tr>
<tr>
<td>UN agencies, NGOs, charities and other development actors</td>
<td>498</td>
</tr>
<tr>
<td>Total</td>
<td>2,528</td>
</tr>
</tbody>
</table>
Survey instruments were designed to investigate the impacts of COVID-19, strengths and vulnerabilities in the city food systems, and response priorities in each city. They were translated into local languages and administered by national call centres in local languages using an online data entry system. The contact lists were based on numbers from phone books, online searches and street maps, based on agreed criteria.

For the private sector, we conducted two survey rounds. The first was a short questionnaire to assess the impacts of the pandemic on SMEs, supply chains and business income. Respondents were asked if they would be willing to participate in a more detailed survey. In the second round, we used a modified version of the questionnaire developed by GAIN and WFP (as co-conveners of the SUN Business Network)\(^9\), which was used in 17 countries in May 2020. This included questions on business adaptations to mitigate the effects of the pandemic and ability to access financial and technical support.

Secondary data analysis:
Data were obtained from reports and online databases for selected indicators of vulnerability relating to components/outcomes of food systems (aligned to the Food Systems Dashboard Framework). WFP VAM staff assisted researchers to identify the most relevant and up-to-date sources of data.

The following types of data were prioritized:
- Standardized indicators to facilitate comparisons between cities
- Baseline (pre-COVID) and data collected during the COVID-19 pandemic (2020-21)
- City-level data (alternatively, district or regional data)

We used national Demographic and Health Surveys (DHS) data to produce city-level indicators for Chittagong, Dhaka, Jakarta, Kabul, Peshawar, Phnom Penh and Quezon City. We included the most recent surveys for each country (Table 2). We then selected the urban district (admin2) level data.

---

corresponding to the city of interest. Many of the indicators selected were missing for Quezon City and data on anaemia was only collected in Phnom Penh. All analyses were performed in Stata version 16.1, using appropriate survey-weighting techniques with Stata’s svyset command.

We recognize the limitations of using DHS data when conducting city-level analysis datasets used for this analysis because it was not designed for looking at urban district level data alone, but data availability with the granularity required is very limited. It was important to frame a discussion of food security and food system resilience around the best available information. We were hoping to compile urban district level data for populations from the lowest wealth quantile, but sample sizes were too small.

Spatial data:
To complement data on vulnerability, a number of spatial datasets were used to provide context to the analysis on food security for each city. City-specific data is in general inadequate for cities in the region, however a number of global data products exist that help to describe the context in

**TABLE 2. AVAILABLE INDICATORS FROM DHS DATA**

<table>
<thead>
<tr>
<th>DHS indicators</th>
<th>Chittagong</th>
<th>Dhaka</th>
<th>Jakarta</th>
<th>Kabul</th>
<th>Peshawar</th>
<th>Phnom Penh</th>
<th>Quezon City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wasting in children &lt;5 years</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Stunting in children &lt;5 years</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Overweight in children &lt;5 years</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Exclusive breastfeeding (0-5 months)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Early initiation of breastfeeding within 1 hour</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Minimum diet diversity (MDD) 6-23 months</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Minimum meal frequency (MMF) 6-23 months</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Minimum acceptable diet (MAD) 6-23 months</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Different food groups consumed by breastfed 6-23 months old: Fruit and vegetable rich in vitamin A, other fruit and vegetable, meats, and eggs</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Anaemia in women (15-49 years)</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>
which food security issues can be considered. We have used a number of peer-reviewed datasets that provide data specific to towns and cities, based on the use of remotely sensed, satellite imagery. Specifically, data from the Global Human Settlements Layer (GHSL) project has been used to describe the extent built-form, and population density of the focal cities. This data is important as it grants an appreciation of cities that transcends a purely administrative definition of a city and the land that surrounds it – appropriate to the study of urban food systems.

Where DHS and other statistical data may be limited by its granularity and representation, GHSL and other types of spatial data provide location-based information relating to population trends and dynamics and in relation to land-use changes, the presence of infrastructure, natural hazards, and other external drivers that may influence food security and vulnerability. It is also possible to identify the location of specific components of the food system in relation to the population – for example, food markets, modern grocery outlets.

This can aid in identifying the location of more vulnerable populations both within and on the fringes/outside the official city limits. Clearly there are limits to defining the relationship between people and their susceptibility to food insecurity from satellite images – the goal here being to help WFP and its partners to contextualize how they think about urban food systems and more generally about targeting vulnerable urban populations.

This data is also important as it can facilitate regional-level comparisons providing common observations at both a spatial and temporal level. To allow for replicability open source data and tools have been used throughout, much of which was developed by the European Copernicus space program10. The focus here has also been on simple, rapid ways of assessing urban areas against factors that are likely to contribute to the resilience of the urban food system.

---

**FIGURE 4. DEFINING CITIES**

This map highlights one of the basic chainages of programming in urban settings – how to define the city. More often than not the functional urban area, or the population that is actively contributing to the economy of a city extends far beyond the administrative jurisdiction of a city administration. The grey shaded area here shows the urban “footprint” of Dhaka – and clearly the urban area extends outside of the formal boundary of Greater Dhaka. The implication here is that there are many 10s or 100s of thousands of people outside of the purview of city administrations, and perhaps not benefitting from the services and support that urban local governments provide. In Dhaka this may amount to c. 6 million + persons.

Mapping the footprint of settlements using satellite data provides a objective way of identifying patterns of growth and location of potentially vulnerable populations i.e. with poorer access to quality urban infrastructure and services (WASH etc.), insecurity of tenure etc.

10 See for more info: https://ghsl.jrc.ec.europa.eu/
Key informant interviews:
WFP Country Offices provided contact details or introductions to food systems stakeholders in each city. These included representatives from local government, UN agencies, national and international NGOs, SUN Business Networks and Food Security and Nutrition Cluster Coordinators. Additional stakeholders were identified by the research team, such as private sector actors in the food industry and community-based organizations involved in supporting the food system during the pandemic.

A topic guide was developed to explore the impacts of COVID-19 on urban food systems, the support provided to vulnerable groups during the pandemic, and priorities to improve the resilience of urban food systems. The research team completed key informant interviews with up to five stakeholders in each city (30 in total). Recordings of the interviews were used to make notes on key findings, data sources and any other relevant information.

We also conducted short, on-site interviews with small business owners in Quezon City (n=3), Dhaka (n=3) and Jakarta (n=2) to explore the impacts of COVID-19 on their businesses and livelihoods. They included food factory owners, marketplace vendors and street food vendors.

2.4 Purpose and development of the COVID-19 city briefs

The COVID-19 City Food System Briefs aim to provide snapshots of the city-level food systems and COVID-19 related impacts and vulnerabilities. The city briefs are based on the conceptual model of the Food Systems Framework (Figure 1) with focus on available data and components that are likely to be impacted by COVID-19. The city briefs are not trying to comprehensively describe the food systems; rather, they are to highlight important aspects of urban food systems that have been, or risk being, negatively affected by COVID-19.

The city briefs source data from primary and secondary materials. The methods for primary data collection are detailed in the Overview of study methods (2.3). Secondary sources include WFP's food price monitoring and surveys on COVID-19 impacts carried out by development actors. Pre-COVID-19 data has been used to highlight vulnerabilities in the food system that existed before the crisis. Available data from secondary sources varies across cities as levels of analysis (city, district, urban, national) and metrics used differ. The city briefs aim to enable meaningful comparison of data across cities, but some variation in secondary data inevitably exists. Even within a city, pre-COVID and recent data may not have been collected using the same metric or level of analysis, but data has been contrasted with each other where reasonable. The nature of the pandemic has led to data collection often taking place over the phone and organizations using proxy indicators.

The indicators in the ‘External drivers’ section of the city briefs have been mostly derived and calculated from Global Human Settlements Layer (GHSL) data (as described above). The data source for each indicator is quoted at the end of the briefs. DHS data has been disaggregated to strata level to obtain figures specific to the city.

The development of the food system typology, presented in the briefs as a spider plot, is detailed below.

2.5 Purpose and development of typology

We used the data gathered in this study to develop a typology of resilience in urban food systems. We assessed resilience in relation to the COVID-19 pandemic, but the same typology could be adapted to assess resilience to other types of shocks and disasters.

Resilience is the ability of a system to adapt and recover after a shock has occurred. This complex and dynamic process depends on the severity and intensity of the shock and the vulnerability of the system. We hypothesized that different parts of the food system may exhibit different levels of resilience and adapt and recover at different rates to the COVID-19 pandemic.
In the context of food security and nutrition, resilience has been described\(^\text{11}\) as an emergent process resulting from a combination of three capacities and responses:

1. **Absorptive capacity** – leading to persistence (or coping with the shock)
2. **Adaptive capacity** – leading to incremental adjustments/changes/adaptations
3. **Transformative capacity** – leading to transformational responses

\(\text{FIGURE 5. RESILIENCE AS THE RESULT OF ABSORPTIVE, ADAPTIVE, AND TRANSFORMATIVE CAPACITIES}^{10}\)

Figure 5 illustrates that more intense or severe shocks demand a greater degree of flexibility and change to enable systems to adapt and transform – rather than merely cope with the shock. Therefore, resilience reflects the capacity to develop and implement strategies and responses to counter the conditions of vulnerability.\(^\text{10}\)

\(^{11}\) Béné et al. (2016) Is resilience a useful concept in the context of food security and nutrition programmes? Some conceptual and practical considerations. https://doi.org/10.1007/s12571-015-0526-x
We combined this conceptualisation of resilience with the Food Systems Dashboard Framework to examine resilience in urban food systems (Figure 6). We selected one key indicator for each dimension of the Food Systems Dashboard Framework: external drivers, food supply chains, food environments, individual factors, consumer behaviour and diets (outcomes). For each indicator, we developed cut-offs for absorptive capacity, adaptive capacity and transformative capacity. These capacities may also be interpreted as low, medium and high levels of resilience respectively. This categorization is somewhat reductionist because the three types of capacity are interdependent, and a combination is needed for resilience. However, we felt that viewing them as levels of resilience, or steps on the pathway to resilience, would help to identify areas of urban food systems where adaptations may be happening – but transformation may be needed.

The indicators we selected were influenced by data availability. Nevertheless, there were still gaps in the typology due to heterogeneous data collection and reporting between cities and/or lack of 2020 data showing the impact of COVID-19.

The values and cut-offs for each indicator are presented in Section 5. These values were used to create a spider plot for each city, which are included in the city briefs (Section 4). This typology offers a simplified classification of resilience in urban food systems, which can be used to compare cities and identify priorities and opportunities to strengthen resilience. It is intended as an operational tool, which may be modified and adapted. For example, the selected indicators may be adjusted depending on the type of shock in question or depending on local priorities.

**FIGURE 6. INDICATORS USED IN THE TYPOLOGY OF RESILIENCE**

<table>
<thead>
<tr>
<th>External Drivers</th>
<th>Food supply chains</th>
<th>Food environments</th>
<th>Individual factors</th>
<th>Consumer Behaviour</th>
<th>Diet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultivated land within 50 km of city (km² per 100,000 persons)</td>
<td>Proportion of food sector businesses with most suppliers located within the city (%)</td>
<td>Average change in food prices (during pandemic) based on 4 selected food items (%)</td>
<td>Reduction in average household income (%)</td>
<td>NO INDICATOR FOR ALL CITIES**</td>
<td>Minimum Dietary Diversity for Women of Reproductive Age (MDD-W) (%)</td>
</tr>
</tbody>
</table>

**Indicators used in this study**

**Data were available for consumer behaviour for only two cities.**
Section 3
Impacts of COVID-19 on urban food systems in Asia and the Pacific
Our study findings are presented in the context of external drivers, the four components of food systems and diet outcomes (Figure 1). We applied this conceptual framework at city level to explore the impacts of the COVID-19 pandemic and implications for the resilience of urban food systems. These dimensions of food systems are multi-dimensional, overlapping and interrelated. This study is not a comprehensive analysis of the complexity of urban food systems. However, it provides a regional overview using available data and case studies from eight cities in the Asia and Pacific region. This section concludes with eight city briefs, which provide a visual representation of the available data and highlight areas of vulnerability and resilience in city food systems. They also enable comparisons between the eight cities and highlight data inconsistencies.

3.1 External drivers

External drivers are macro-level factors that ‘push or pull’ at the food system, including climate change, globalization and trade, income distribution and growth, urbanization, population growth and migration, politics and leadership, and socio-cultural context. During Covid-19, migration or lack of movement due to COVID-19 lockdown and movement restrictions is also an important factor worth noting influencing food system form demand side. These factors influenced how and why the coronavirus originated and spread around the world, how people and governments responded, and its impact on food systems. In-depth analysis and exploration of external drivers is beyond the scope of this study. However, some external drivers of urban food systems are represented in our city maps to provide context for our analysis (see Section 4).

We used proximity to cultivated land in our typology because we felt this was an important driver in relation to food supplies during the COVID-19 pandemic (see 3.2). Historically, cities and city growth relied on a surplus from nearby food sources to feed their citizens. Many of the cities in this study and most cities in low and lower middle-income countries in Asia continue to enjoy a symbiotic relationship with the rural hinterlands that surround them – which provide, among other things, food, labor, and land, to satisfy demand in cities. There is somewhat of an inevitability that as urbanization proceeds and cities grow and incomes rise, there is likely to be a loss of cultivated land near cities.

The characteristics of urbanization – urban density and urban growth – are important determinants of the economic success of a city and the contribution cities make to a national economy. The interaction of households and firms, sharing costs, labor, and ideas, and engaging in increasingly higher value-added economic activities, and the conversion of rural/agricultural land to that with higher value uses. The economic pull of cities is generally what attracts migration from rural areas and the transition from farm-based to off-farm jobs.

Evidence from a global study of cities suggests though that as incomes rise, cities tend to expand outwards, in a fragmented manner, with average densities falling over time. This suggests both an inefficiency in the way land is used and a likely growth in inequality, as those who can afford to consume more land do so, restricting supply for others, who must then live on smaller plots, often in marginal locations in overcrowded conditions.

Very high density living – that can be observed in many of the study cities – is also associated with overcrowding resulting in diseconomies of scale – congestion, contamination and contagion. COVID-19 has been an urban pandemic, with high density, overcrowded neighborhoods – more likely to be the home of the urban poor – disproportionately affected. On the fringes of cities, in peri-urban areas, settlements may expand outside the formal administrative area, where residents may not benefit from formal urban services, despite contributing to the economy of the city. On average an additional 12% of each city’s population live outside the formal city boundaries but within a contiguous urban area – that with urban form and characteristics.

---

Equally, as agricultural land on the fringes of cities is converted to higher-value urban uses, cities become more reliant on global food supply chains. With many millions of urbanites at the mercy of global food prices, the urban poor are likely to remain the most vulnerable, typically spending a higher proportion of earnings on food.

The eight cities included in this study are affected by a multitude of external drivers. Migration and extreme weather events caused by climate change are two examples that may have contributed to and/or compounded the effects of the COVID-19 pandemic in urban areas. For example, 30% of the urban study population is at risk from flooding (average across the eight cities). The city most susceptible to flooding is Phnom Penh, where around 90% of the population is increasingly affected by climate change. The city most recently experienced severe flooding in October 2020.15

Migration as external driver: the example of Cox’s Bazar

Flows of refugees from conflict often strain food availability in host communities. Between August and October 2017, 671,000 Rohingya fled violence and persecution in Myanmar for the safety of Cox’s Bazar District in the Chittagong region of southeastern Bangladesh. There, they joined Rohingya who had fled earlier violence during the previous 20 years.16

The impact of the sudden increase of refugees, from 169,000 to about 910,600, on the Bangladeshi host community has been immense. The overall population in Ukhiya and Teknaf sub-districts has almost tripled and refugees outnumber local residents by a ratio of 3:117. The crisis has affected the host community significantly, through loss of natural resources, increases in food, cooking fuel and transport costs, and a highly competitive labor market with greatly decreased wages18.

The impact of COVID-19:

The economy in Bangladesh started experiencing the impacts of the COVID-19 crisis in early to mid-March 2020, with the first case reported on March 7. A full countrywide lockdown followed from March 26 to May 28. Cox’s Bazar municipality, the urban center of the district, has a non-agricultural economy (97%). Trade and services comprise almost 70% of the local economy, followed by industrial and manufacturing jobs, such as in construction and miscellaneous non-agricultural labor. The increase in market prices observed as a result of lockdown movement restrictions had a huge impact as most people depend on day-to-day wage labor19. Lockdown meant no income for many and difficulty accessing markets to buy food. Before COVID-19, the food security and nutritional status of the poorest amongst the host community was already a growing concern. In November 2018, 39% of households were vulnerable to food insecurity, of whom 11% were highly vulnerable20. In late 2020, the number of households highly vulnerable to food insecurity had risen to 51%. The food consumption situation remained stable for the Rohingya community in camps as humanitarian aid adapted to the situation and continued providing assistance21,22 but overall vulnerability increased in both the host community and the Rohingya community as a result of the COVID-19 crisis23.

This example illustrates the complexity and influence of external drivers of urban food systems, which are unique to every context. The following sections consider the impacts of COVID-19 on the components of urban food systems, including three key factors introduced above: food supply chains, food prices and income.

17 IFPRI/BIDS, Economic Activities of the Forcibly Displaced Rohingya Population – An Analysis of Business Enterprises in Southeastern Bangladesh, September 2018
19WFP Cox’s Bazar Urban Vulnerability Assessment - 2020
20WFP Refugee influx Emergency Vulnerability Assessment (REVA 2) 2019
21WFP in Cox’s Bazar | Information Booklet October 2020
22FEX 63 (ennonline.net)
23 WFP Refugee influx Emergency Vulnerability Assessment (REVA 4) 2020
3.2 Food supply chains

Food supply chains refer to the steps involved in producing food and transporting it to where it is consumed, and include agricultural production, storage and distribution, processing and packaging, retail and marketing. During the COVID-19 pandemic, food supply chains around the world have been disrupted (in some cases for multiple, prolonged periods) by transport and movement restrictions imposed by governments. Urban food systems have been disproportionately affected by these restrictions because they rely on food brought into the city from rural areas, where most food production occurs.

Urban areas typically have longer and more complex supply chains than rural areas, which makes them more susceptible to disruptions during shocks. Specifically in poor urban and peri-urban areas, weak infrastructure and recurrent exposure to external shocks mean that food supply chains are likely to be less resilient compared to wealthier urban areas. There are many factors that influence the complexity of food supply chains, including geographical or agri-environmental factors. As explained in the previous section, proximity to cultivated land is a key indicator of resilience in terms of whether a city will be able to feed its population when food supply chains are compromised.

Phnom Penh is surrounded by a much greater area of cultivated land than the other cities included in this study (7,212 km² within 50 km of the city compared to 2,959 average for 7 cities). Its relatively short supply chains proved to be an asset during the pandemic and food supplies remained relatively stable, with a diverse range of fresh and non-perishable goods available in most shops and markets. Many people in the city have connections to family members living in nearby rural areas. An NGO stakeholder witnessed

---

food exchanges between rural and urban households after movement restrictions were lifted, such as bags of rice brought into the city from rural areas where they are cheaper.

The other cities included in this study are more dependent on more distant food supplies. The COVID-19 pandemic exposed vulnerabilities in food supply chains and highlighted opportunities for strengthening the resilience of urban food systems. Examples from Peshawar, Jakarta and Quezon City will be considered later in this section.

The following selected survey findings offer insights into the extent and nature of disruption to food supply chains and the impact on businesses in the food sector. The city briefs include disaggregated data for each city (Section 4).

In the UN/NGO survey, 43% of respondents reported that food supply chains in their city were disrupted by the pandemic (n=469). Respondents said all major food groups were in short supply compared to normal times: fruit and vegetables (50%); animal source foods (38%); staple grains (42%); nuts and seeds (43%); manufactured, packaged or processed foods (62%).

The first round of our private sector survey included 1,181 businesses across the food sector including food production (17%), manufacturing and processing (11%), storage and suppliers (20%), retailers and caterers (21%) and other food-related businesses (31%). The survey respondents were mostly owners of small businesses (classified as SMEs); over half (57%) had fewer than 10 employees, and 93% had fewer than 50 employees. In this sample, 40% of SMEs reported that their suppliers are primarily located outside the city in which they are based (Figure 8).

As expected, food retailers and caterers primarily used suppliers located within the city (73%). This was true for about half of the agricultural producers, manufacturers and suppliers. Agricultural producers and food suppliers were each served by a fifth of suppliers from other regions in the country. Most business owners reported that supply chains were moderately (55%) or severely (24%) disrupted by the pandemic, and access to customers and markets was moderately (56%) or severely (27%) disrupted. Three quarters of
SMEs had experienced lower income during the pandemic. Business owners had to find ways to reduce operational costs, with downsizing staff the most common action taken (48%) (Figure 9). Over 80% of business owners said they were unable to access financial support during the pandemic (n=344). Marketplace vendors in Quezon City explained how their businesses were affected by supply chain disruptions and loss of customers/revenue. They survived by adapting and diversifying their businesses to attract new customers.
“The COVID greatly affects us because our income and sales went down. The decrease was more than half. Ever since COVID, there were lots of restaurants that closed. These restaurants are major customers of our products – fruits. When they closed, our sales also went down ... The adjustments we made, we first looked and identified what people need. When our sales of fruits went down, we diverted into selling other products like fruit shake ... We have not received any financial assistance. We were able to survive in our own ways since we do not have any other source of income, that’s why we need to adapt with the situation in this time of COVID. What people need, that’s what we will sell.”

Elpedio Serapion (aged 45)

“The effect on us was more negative since our patron customers were gone. Our income really went down, meaning our income from what we sell now is only a quarter [of our usual income]. It is now more difficult to get products from our suppliers. There were times that prices are high, other times, prices are low ... Currently, what we do is posting [our products] on Facebook so that people will order only from us then we deliver to them door-to-door. At least with the delivery, we are getting 5 pesos since we are using motorbike.”

Melissa C. Baluyot (aged 28)
Transport restrictions threatened food supply chains serving urban areas, especially during the early stages of the pandemic. A range of government and private sector interventions helped to protect supply chains and keep food moving from rural areas into major cities.

Peshawar is one of the largest cities (population wise) in Pakistan’s Khyber Pakhtunkhwa (KP) Province, with a population of 4,267,198, almost two times higher than the second largest city. It is surrounded by mountain ranges on three sides and food production is seasonal (due to cold winters) including wheat, potatoes and a small variety of fruits and vegetables. Peshawar relies on food supplies from more productive agricultural areas such as Punjab Province, especially for wheat (the staple grain) and fresh fruits and vegetables.

Food supply chains were initially disrupted during the first wave of the COVID-19 pandemic, however, the Government of Pakistan responded by relaxing transport restrictions to keep food supplies moving around the country. The situation stabilized and supply chain disruptions were minimal thereafter. In April 2020, UN agencies reported no major food supply or availability concerns in most parts of the country.25 In Peshawar, food markets remained open and well supplied.

The Government of Pakistan and other food system stakeholders recognize the need to protect food supply chains from future shocks and emergencies. One stakeholder in Peshawar referred to ‘supply chain smoothening’ to improve the resilience of the food system. Improved storage facilities are needed to reduce post-harvest losses from local production (during the short growing season) and preserve food transported from Punjab Province. Investments have been made in grain storage facilities and seed silos, to support wheat supply chains. Further investment is needed in affordable cold storage solutions.

Jakarta is a megacity with a population of more than 10 million, and over 30 million in the Greater Jakarta area. It is highly dependent on food imported from rural areas of Java, other islands/regions of Indonesia and other countries. Jakarta experienced a high burden of COVID-19 cases (described as the red zone) and transportation of food into the city was disrupted at the beginning of movement restrictions in 2020.

The Government of Indonesia identified a range of challenges impacting food supply chains, such as poor post-harvest handling, lack of cold storage facilities and high logistics costs for inter-island trade – all of which were exacerbated by movement restrictions. In the city of Jakarta, priority access was granted for trucks delivering nutritious and perishable foods such as fruits and vegetables. Food trucks were marked with stickers to indicate which commodities they were transporting and what level of access they were permitted. These drivers were also exempt from isolation requirements.

Online marketplaces are helping to improve food supply chain logistics in Indonesia. An example is TaniHub, an e-commerce platform established in late 2015 to enable consumers and businesses to buy fresh produce directly from farmers at fair prices and sustainable quantities. The company experienced six-fold growth in 2020 as the demand for online marketplaces increased during the pandemic. When Jakarta implemented large-scale social restrictions, TaniHub collaborated intensively with the local government at the supply and demand side of food and agricultural products. The company aims to complete and deliver all orders within 48 hours. Packages are placed in front of the customer’s house to minimize contact between customers and couriers. TaniHub has also established a warehouse near Jakarta to ensure food supply and delivery speed to Jakarta and its satellite cities are not disrupted. In the forthcoming deep dive case study on TaniHub, the access and its use by poor urban populations is questioned and recommendations are proposed to overcome barriers identified.

Similarly, the National and Provincial Food Security Agency, under the Ministry of Agriculture, established an online food market, Pasar Mitra Tani (Farmers Partner Market) in two Jakarta sub-districts, targeting public and low-income families. The market connects farmers directly with customers, so that food commodities can be sold at affordable prices and delivered by local taxi motorbikes.

The trend of urban farming has increased since Jakarta implemented a work-from-home policy. Many people have started to grow their own vegetables, fruits and traditional medicinal plants such as ginger and turmeric, since their prices spiked in the markets. The government responded positively and supported this community-based initiative by providing seeds and growing media, which can be ordered online and delivered. The government aims to expand this initiative to dedicate 30% of the available open space in the city, including the rooftops of several mosques, to horticulture crops.

In October 2020, the Government of Indonesia passed a new Omnibus Law, which aims to create jobs and stimulate domestic and foreign investment. It includes measures to simplify the importation and distribution of food products and agricultural inputs coming into the capital, while supporting local food production and diversification, to reduce overall dependence on imported goods. It is hoped that this new law will help to strengthen food supply chains and stabilize food prices, thereby improving food availability and affordability.

---

Interventions are needed to shorten food supply chains to make city food systems more sustainable and resilient. Urban agriculture is one solution that is gaining popularity and delivers a host of other sustainable urbanization benefits, such as increasing access to recreational spaces, greening neighborhoods, and influencing microclimates through urban cooling.

Quezon City is the gateway of food from rural provinces to the whole of Metro Manila. When travel restrictions were imposed in March 2020 to control the spread of coronavirus, the flow of food commodities from agricultural production areas to urban markets was significantly disrupted. This affected the supply of vegetables, fruits, meats, and other agricultural produce into Quezon City and Metro Manila.

This disruption to food supply chains resulted in unstable food prices, reduced food availability and concerns about food quality and safety. Combined with the impact of the pandemic on food access (due to movement restrictions) and affordability, this situation increased the risk of food insecurity especially among vulnerable population groups. In response, the Quezon City Government established a Food Security Task Force (QC-FSTF) in May 2020. This is part of the city’s economic recovery plan from the COVID-19 pandemic. The task force aims to mitigate the impact of the pandemic through initiatives on food security and self-sufficiency by promoting urban agriculture, the development of agricultural zones and food zones, and through overall improvements to the city’s food systems.

The QC-FSTF’s objective is to ensure that food in Quezon City is always available, accessible, and used for better health and nutrition among its citizens. A key part of its strategy is the Urban Agriculture Program, which builds on an existing initiative – the Joy of Urban Farming. This initiative started 10 years ago to help low-income households grow their own food, reduce their household expenses and serve as source of livelihood and extra income.

Throughout the pandemic, the QC-FSTF’s Urban Agriculture Program has supported households and communities to cultivate their own vegetable gardens and urban farms. It has distributed over 42,000 seed starter kits – containing seeds, seedlings, and garden tools. The program also provides training and seminars to households and communities to build their capacities in establishing and sustaining household gardens and urban farms. Produce from the household gardens and community farms are used by the families for their consumption and for generating income.

The QC-FSTF is developing four models of urban agriculture: a) household gardens, b) community gardens and farms, c) institutional gardens, and d) commercial farms. Other key projects and activities are also planned, such as Community Kitchens, which would help to raise demand for produce from urban farms, and the development of Agri Zones and Food Zones in the city.

Garden of ASF Victims, Brgy. Bagong Silangan, Quezon City.
Photo Credit: Rowena Campo.
3.3 Food environments

The food environment is where consumers interact with the food system to acquire food, including physical locations where food is bought (such as markets, shops and restaurants) and factors that influence the way people access foods. 30

In this section we focus on food availability and food affordability – two important aspects of urban food environments that were affected by COVID-19.

**Food availability** refers to the sufficiency of food (quantity and quality) supplied to the population, including domestic food production and imports. Food availability was affected by disruption to food supply chains during the pandemic (as described in 3.2). In most cities, food supplies stabilized after the initial shock and sufficient food was available for those who could afford it. However, food availability was also affected by market closures and this has fundamentally altered the way people interact with the food system.

Food affordability refers to the cost of food and whether people can afford an adequate and nutritious diet. Even before COVID-19, affordability of healthy diets was a significant constraint; it is well known that healthy diets cost more than basic staples and energy sufficient diets. 31-32 In the State of Food Security and Nutrition in the World (SOFI) 2020 report using 2017 price data from 170 countries, showed that a healthy diet cost 60 percent more than a diet which only met essential nutrients, and five times more than a diet which only satisfied energy needs via a starchy staple. 33

---

The affordability of a nutritious diet may be limited by high food prices or low household income or a combination of both. In our UN/NGO survey, 65% of respondents reported that food affordability was disrupted by the COVID-19 pandemic (n=469). The urban poor were affected by the dual impacts of increased food prices and loss of income (Figure 11). This made food less affordable and contributed to food and nutrition insecurity among groups of people that were not previously vulnerable.

**Food prices increased during the pandemic in all eight cities, with considerable variations between cities and between food groups.**

Food commodity prices are influenced by a multitude of macro-level factors (external drivers of the food system) including currency fluctuations, energy prices, inflation, government subsidies, food production shortfalls, seasonal variations, and natural disasters, to name but a few. It is beyond the scope of this study to assess how all these factors came into play during 2020-21.

National statistics authorities and WFP VAM teams have monitored retail and wholesale food prices of key commodities in urban markets throughout the pandemic. These data have been summarized in the city briefs (Section 4), showing the year-on-year price change for selected food items in each city.

We also used these data to calculate the average price change between January 2020 and December 2020 (based on four commonly consumed food items). This was our selected indicator for food environments in our typology of resilience in urban food systems. All eight cities showed an average increase in food prices in 2020, but there was considerable variation between the food groups used in the calculation (Figure 12). It is important to acknowledge that the average value used in the typology is an oversimplification of a complex situation.

There was also considerable variation between cities. The lowest average increase in food prices was in Phnom Penh and the highest increase was in Accra.

---

Schmidhuber J, Shetty P. The nutrition transition to 2030 Why developing countries are likely to bear the major burden. 2005.
FIGURE 12. FOOD PRICE CHANGES IN 2020 (%) SHOWING HIGHEST AND LOWEST VALUES FOR FOODS INCLUDED IN OUR AVERAGE CALCULATION IN THE TYPOLOGY (SEE TABLE 4).

(+2% based on four selected food items: rice, vegetable oil, morning glory and snakehead fish). This may be in some part attributable to its shorter supply chains and relatively stable food supplies during the pandemic (as discussed in 3.2). The greatest average increase in food prices was in Quezon City (+47% based on four selected food items: rice, oil, tomatoes and fish).

Figure 13 shows the monthly price fluctuations for these and other food items in Quezon City in 2020. All vegetables increased in price (ranging from +25% for carrots to +250% for cabbage). Animal source foods varied with some increasing in price (fish +18% and pork belly +42%) and others stable (eggs 0%) or declining in price (chicken -6%). Other key commodities also varied with some increasing in price (rice +9% and cooking oil +9%) and others declining in price (sugar -9%).

We cannot explain these food price fluctuations, but such differences are likely to undermine diet diversity by making some foods less affordable than others. This has been observed in Quezon City. Minimum Diet Diversity in children (aged 6-23 months) was 7.7% in 2020 (SDFU Philippines Urban Survey) compared to 25.1% in 2018 (Expanded National Nutrition Survey data for Quezon City). Pre-COVID data were not available for women’s diet diversity (MDD-W) in Quezon City. However, the SDFU 2020 survey conducted in urban slums reported that only 16% of women achieved the minimum diet diversity of 5/10 food groups (see 3.5).

Loss of income during the pandemic meant that food was unaffordable for many people in cities who were not previously considered vulnerable.

Peshawar was initially affected by supply chain disruptions (as described in 3.2) but the situation quickly stabilized, and food markets were well stocked after they reopened. Food affordability has been a much greater challenge than food availability in Peshawar during the pandemic. The average food price increase in Peshawar from January 2020 to December 2020 was 17% (calculated from WFP VAM data using four key commodities).

In addition to food price increases, many people lost their incomes, making a diverse and nutritious diet unaffordable. This affected daily wage earners and people working in the informal sector, such as street vendors, construction workers and taxi drivers. However, it also affected some private sector employees who were not paid for several months. A report by the Pakistan Bureau of Statistics found that 55% of the working age population in KP Province were either affected by job losses or reduced income during the pandemic. The financial implication at household level was 67% reduced household income in urban areas (compared to 63% in rural areas) in KP.

A new category of urban poor emerged in the city – households that were not previously considered vulnerable were suddenly experiencing food insecurity. A UN stakeholder in the city observed increased numbers of men and women (including some well-dressed people) begging on the streets because they could not afford to buy food. Data are not yet available showing the impact on diet quality in Peshawar. However, a nutrition cluster stakeholder reported that families were coping by reducing diet diversity and consuming staple foods to meet energy needs. Essential items were distributed, including wheat flour, ghee, lentils and other dry rations.
The Government of Pakistan responded to this crisis by launching the Ehsaas Emergency Cash Programme in April 2020. This reinforced the Benazir Income Support Programme (BISP) with more inclusive eligibility criteria to account for increasing vulnerability in urban areas. A web-portal and SMS service were launched so that people could check their eligibility and register for the benefits using their national identity number.

The next section of this report highlights the role of social protection to support people affected by loss of income (3.4).

Daily wage earners have experienced loss of income, indebtedness and food insecurity – many are struggling to rebuild their livelihoods.

Dhaka residents have endured two months of lockdown and prolonged restrictions since the start of the COVID-19 pandemic. Many people lost their incomes and livelihoods, with informal sector workers and daily wage earners among the hardest hit. Loss of income was greater for men (76%) than women (69%) reported in the rapid response research 35. Garment factories were closed. Street vending was not permitted. Marketplaces were initially closed, then later re-opened with reduced opening hours and fewer customers. The following direct quotes illustrate the impacts of the pandemic on street vendors and market vendors.

Microsoft Word - 20 May_PPRC-BIGD Final April Survey Report.docx (bracu.ac.bd)
Lockdown became a severe burden for me and left no option for generating income nor even any savings to survive. Before pandemic, I used to earn 800-1000 BDT daily which [was] enough to survive my business with meeting daily necessities. To combat economic crisis, in the first week of this restriction, I borrowed money as there was a hope that everything will be normal in the coming week. However, the restriction was extended, leaving me in uncertainty. To survive, I coped with different mechanisms including selling vegetables in residential areas to keep my business viable, but the affluent [were] more dependent on online shopping or super shops. Poor people were not able to spend money on vegetables or fresh items and they depended on rice and potatoes. I had no money to send my family back to [my] hometown, so I borrowed money from my father, and am also eating less and sometimes neighbors share food with my children. When government lifted the lockdown, I returned to street vending, but the revenue was down three-fold despite doubling my business time. I am not looking for any financial assistance but hope that to avoid more suffering and hunger the government will not impose any further restrictions.”

Zakir Hossain, 37, is a street food vendor in the Amtali, Mohakhali area of Dhaka city. He has survived the financial hardship of the pandemic by borrowing money, reducing his own food consumption, and accepting food from neighbors for his children. He faces new challenges as some customers have changed their behavior and purchasing patterns.
This sudden lockdown severely affected revenue, which dropped to a third of what it was before the pandemic. The marketplace is not clean and safe and due to fear of infection, customers are starting to visit supermarkets. The markets are almost closed down. The city government relocated the perishable goods shops in the market to the nearest park. Only the grocery shops stayed at the market. The number of customers increased slowly but not same as before. We established an alternate home delivery service for people who call, but it is not as convenient as the service offered by supermarkets or online grocery businesses. As the park is an open place, when there are two customers at the same time and I suggest that one keeps their distance and waits, they go to another vendor and I lose customers. It will take time to recover. To tackle the next pandemic, I recommend that markets be renovated to provide customers with a good environment.

“Before the pandemic my shop was in the market area but after the lockdown started, the shop shifted to nearest playground. We faced lots of difficulties because of this change. My revenue dropped to 3,000 BDT instead of 7,000-8,000 BDT daily before pandemic. We didn’t have as many customers as before. I borrowed money with interest and survived during that time. Still I have debt of 50,000 BDT. I don’t know how I will cope if there is another lockdown. I am not asking for any financial assistance, but proper market planning is required so people could easily access the market.”

Samar Chandra, 32, is a market vendor in Banani Kacha Bazar. He said fewer people were visiting the market because they believe that supermarkets offer a safer environment. He has adapted by offering home deliveries, but he faces competition from larger online retailers. He hopes that markets will be improved to encourage more customers to return safely.

Md. Riaz Mia, 29, is a market vendor in Mohammadpur Kacha Bazar. His shop was relocated due to lack of space for social distancing in the bazaar. He also borrowed money to survive and his earnings remain over 50% lower than before the pandemic.
In Jakarta, we spoke to two small business owners who have survived by adjusting and adapting to the situation. Financial and technical support are needed to help these and other businesses to diversify and develop new opportunities.

Mrs Lilis, 66, runs a tofu factory and distribution company in East Jakarta. Her business sells fresh tofu directly to individuals and markets, and raw soybeans to the tempe processing industry. Her business has been affected by the increased cost of raw materials (soybeans) and reduced turnover when the markets were closed. She stayed in business by reducing the number of employees (from 30 to 15) and taking a loan from the bank. She has also started supplying directly to catering companies, but this comes with additional requirements to meet hygiene and health standards. Her son helped her to set up an online delivery service using local motorbike couriers.

Mrs Elda, 45, runs a small Padang food restaurant in one of the slums in West Jakarta. It has been established for decades but she does not have an official business license. Before the pandemic, she usually sold out of food by 2 pm. Now there are always leftovers. Many of her customers were people working nearby who have lost their jobs. The cost of raw ingredients (such as chilies and meat) has increased, and her business income has halved. She would like to develop an online delivery service, but she does not have the knowledge or expertise and would like to receive technical assistance with marketing.

“Although the cooking ingredients are not as expensive as before, the price is still higher than before the pandemic. We cannot increase the price or reduce the food's size because we do not want to lose more of our customers. Now, more customers choose to cook at home … We did not do much, only open the food stall longer until 5pm, where the leftovers will be sold for the next day. Fewer customers mean less revenue. What we do is to cut the salary of our employees.”
3.4 Individual factors & consumer behavior

These two components of the food system have been combined into one section of this report, partly because they are closely related. Individual factors influence what foods a person buys and eats, such as income and purchasing power (economic factors), information and knowledge (cognitive factors), values and preferences (aspirational factors), home and work environment (situational factors). Consumer behavior includes people’s food decisions related to buying, preparing, storing and consuming food.

Data availability limits national and sub-national comparisons for individual factors and consumer behavior – except for economic factors (such as income and expenditure). The Food Systems Dashboard highlights the need for more high-quality data and key indicators, which would strengthen understanding of the relationship between food systems and diets.

The COVID-19 pandemic has limited opportunities for data collection at individual and household level. Household income was the only indicator for which we found comparable data (for 7/8 cities) showing change before/during the pandemic. We selected this as our key indicator for individual factors in our typology of resilience in urban food systems.

We did not identify an appropriate indicator for consumer behaviour for all eight cities. Only for two cities, Jakarta and Quezon City, data on consumer behaviour showed that households dramatically altered the way they purchased food due to COVID-19 – including by reducing purchases of nutritious foods (SDFU P and I 2021). During the pandemic, many households in Jakarta reduced the purchase of nutritious foods such as meat, poultry and fish (62 per cent), eggs (47 per cent), fruit (49 per cent) vegetables (28 per cent) and beans, pulses and tofu (30 per cent) due to limited purchasing power. In Quezon City, among the food items that households stopped buying because of lack of money were: meat (16 per cent) and meat organs (23 per cent); seafood (40 per cent); and corn (33 per cent). The households also resorted to buying cheaper foods as substitute; however, this was only practised by a few households and was most noticeable for rice, breast milk substitutes, dairy milk and fish, for which cheaper replacements were used.

Average household income declined by at least 40% in all cities, with the largest decline (75%) reported in urban slums in Bangladesh (from February to April 2020). The previous section highlighted the dual impacts of loss of income and increased food prices on food affordability in urban areas (Figure 11). Food system stakeholders in all eight cities emphasized the vulnerability of daily wage earners and informal sector workers, who were unable to generate income during the pandemic. Household capacity to access markets has been a major influence in reduced economic activity in Jakarta. Lower income, rather than food unavailability or inability to physically access markets, has been driving lower consumption. Fear of COVID-19 is also influencing consumer purchasing behaviour (SDFU I 2021). In Quezon City, both economic and physical access factors were associated with low dietary diversity, consumption of unhealthy foods and consumption of zero fruits and vegetables (SDFU P 2021).

Governments adapted, supplemented and scaled up their existing social protection programs in response to the pandemic to support people who became vulnerable in cities. Phnom Penh has a large workforce of daily wage earners, including garment factory workers and construction

---

37 Fanzo et al. (2020) The Food Systems Dashboard is a new tool to inform better food policy. https://doi.org/10.1038/s43016-020-0077-y
workers, who lost their jobs in 2020 when these industries were forced to close. Many of these workers are young men and women who migrated from rural areas to find work in the city. During the pandemic, some of these migrant workers returned to their home villages, while others remained in the city hoping to find alternative employment.

An economic impact survey conducted in four provinces in Phnom Penh municipality (n=1,087) found that average household income decreased by 40% between January 2020 and April 2020. 39 The main reasons reported by workers were temporary closure of businesses/factories (34%), reduced working hours (26%) and lack of overtime (19%).

The Cambodian government’s main strategy to support poor and vulnerable households during the pandemic was to expand its poverty identification and social protection program. The Identification of Poor Households (IDPoor) program was launched in 2007, with support from the German and Australian governments, and has made a significant contribution to poverty reduction in Cambodia.

IDPoor benefits include conditional cash transfers for pregnant women and children, school meals and scholarships. It was originally designed for rural areas, using a community-based participatory process to identify very poor (IDPoor1) and poor (IDPoor2) households. The IDPoor On-Demand system was piloted in 2018, with a new mobile interface to directly input household data for quicker turnaround. Implementation in urban areas began in 2019.

During the first phase of the COVID-19 pandemic, the government recognized the extent of the impact in urban areas. The implementation of the IDPoor On-Demand system was rapidly scaled up to improve coverage in urban areas. In June 2020, the government launched a relief cash transfer program for poor and vulnerable households. IDPoor households received an extra $30 a month, with supplementary payments for vulnerable household members such as the elderly, people with disabilities and people living with HIV (World Bank 2020).

A High-Frequency Phone Survey of households in Cambodia (including 1,184 IDPoor households) found that the proportion of IDPoor households receiving social assistance increased from 50% in June 2020 to 92% in October 2020. 40 This was mostly in the form of direct cash transfers. Survey respondents reported spending the money they received on food (100%) as well as other essential items (58%) and loan repayments (15%).

The cash transfer relief program has helped to alleviate food insecurity in Cambodia during the pandemic. Prevalence of moderate or severe food insecurity in IDPoor households declined from 67% in August 2020 to 39% in October 2020.

Kabul has experienced a similar income crisis among its informal sector workforce due to restrictions imposed during the COVID-19 pandemic. This has been compounded by returning migrants (mainly from Iran) who also lost their jobs and incomes. IPC projections suggested that 30% of Kabul's population would experience crisis or emergency levels of food insecurity from November 2020 to March 2021.

The Government's Dastarkhwan-e Meli 41 program (roughly translated as National Food Table) supports households with incomes of $2 a day or less, or twice the national poverty line. This equates to over 90% of the population of Afghanistan.

During the pandemic, this program has been supplemented by the COVID Relief Effort for Afghan Communities and Households, which aims to help households to withstand the economic impacts of the pandemic and encourage them to follow social distancing guidelines. This project has been implemented through grants to Community Development Councils, to provide food and sanitation packages for

41 Dastarkhwan-e Meli https://dastarkhanmili.org/
households in their communities. These packages contain items procured from local wholesalers and retailers, thereby supporting local businesses as well.

In Kabul Municipality, about 630,000 households have received relief packages worth 8,000 AFN (about US$100 equivalent) during the pandemic. It is not known to what extent this additional support has helped to alleviate food insecurity in the city.

**WFP Bangladesh with the Government of Bangladesh has recently piloted a new cash assistance program in the Dhaka slums, using a digital cash back system to incentivize healthier choices.**

During the COVID-19 pandemic, WFP piloted a 10-month program in Dhaka slums, in partnership with BRAC (Building Resources Across Communities) and financially assisted by USAID. This innovative program combines cash assistance with cash incentives and nutrition behaviour change communication to promote health diets through enhanced dietary diversity.

A total of 7,607 households in low-income urban areas of Kalyanpur and Sattala Bost (Mohakhali) received 3,000 BDT (35 USD) monthly cash assistance, which has the potential to meet up to 60% of daily calorie intake needs.

Thirty local vendors agreed to provide a stable supply of food items in seven selected food groups: 1. fortified rice, 2. green leafy vegetables, 3. fortified oil, 4. eggs, 5. pulses, 6. orange flesh fruits (vitamin A rich foods) and 7. other fruits and vegetables.

A digital system monitors how beneficiaries spend their cash assistance (using individual IDs). If beneficiaries spend a minimum of 150 BDT (1.8 USD) per food group for at least five out of the seven selected food groups (750 BDT in total), a cash bonus, or cashback, is received the following month along with the regularly-scheduled cash incentive.

**The maximum amount of cashback available per month is 750 BDT in both slums.** However, recognizing that beneficiaries have a number of non-food needs, WFP decided to test out two different thresholds for the maximum cashback to assess if they resulted in different purchase patterns. Therefore, the amount that beneficiaries need to spend on the healthy food groups to receive the maximum amount of cashback is 3,000 BDT in Sattala Bosti and 2,000 BDT in Kalyanpur.

The cashback amount is calculated as a percentage of the money a beneficiary spends on the designated healthy foods, which is 25% in Sattala Bosti and 37.5% in Kalyanpur.

Limits were placed on the amount of cashback available for buying fortified rice and fortified oil to mitigate over-consumption and promote dietary diversity and particularly consumption of fresh foods.

Beneficiaries were also invited to participate in interactive sessions to improve their knowledge about the importance of a healthy diet. The pilot is now in a process of data analysis to generate evidence for potential replication and scaling up. More information can be found in the deep dive case study on this intervention.

Although social protection programs have been a lifeline for millions of households during the pandemic, for many the loss of income exceeded the amount of financial support received. Therefore, individuals and households (or consumers) have also used coping strategies and changed their food acquisition and consumption behaviours in response to the pandemic.

The Coping Strategies Index (CSI) is an indicator of how people respond and how their behaviour changes when they cannot access enough food. It can be used for rapid assessment and monitoring during emergencies when collecting data on food consumption is not practical. The Livelihood Coping Strategies Index (LCSI) was reported by 5/8 cities included in this study. However, the data suggest that this indicator may have been applied and reported inconsistently between cities (Table 3). Other cities used different indicators to assess coping strategies and food security – as shown in the city briefs (Section 4).
Food system stakeholders from a range of government and non-government organizations provided additional insights into how consumer behaviour has changed in urban areas. They observed that consumer behaviour adaptations to the pandemic were dependent on the extent to which household income was affected and opportunities to access alternatives.

**Wealthier urban households whose incomes were minimally or not affected:**
- Avoided wet markets due to concerns about safety and risk of infection
- Shopped in supermarkets because they can afford higher prices
- Switched to online shopping and/or home delivery
- Dietary diversity not affected (other than times when certain foods were not available)

**Poor urban households who lost some/all their income:**
- Some people returned to rural areas (family networks and lower cost of living)
- Reduced non-food spending, sold assets, borrowed money
- Shared food with neighbours
- Reduced food basket – focus on staple foods (less protein, fruits and vegetables)
- Reduced meal frequency
- Prioritized children over adults
- Begged for food

Food safety and hygiene in wet markets must be improved to reduce the risk of transmission of COVID-19, encourage customers to return safely and protect food access for the urban poor.

---

**TABLE 3. HOUSEHOLDS USING CRISIS (IN BLUE) AND EMERGENCY (IN RED) COPING STRATEGIES BASED ON LCSI DATA COLLECTED BEFORE AND DURING THE PANDEMIC**

<table>
<thead>
<tr>
<th>Location</th>
<th>LCSI 2019</th>
<th>LCSI 2020</th>
<th>LCSI 2021</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cox's Bazar*</td>
<td>50%</td>
<td>45%</td>
<td>58%</td>
</tr>
<tr>
<td></td>
<td>5%</td>
<td>2.5%</td>
<td>4%</td>
</tr>
<tr>
<td>Chittagong</td>
<td>NO DATA</td>
<td>NO DATA</td>
<td>NO DATA</td>
</tr>
<tr>
<td>Dhaka</td>
<td>NO DATA</td>
<td>NO DATA</td>
<td>NO DATA</td>
</tr>
<tr>
<td>Kabul</td>
<td>9.0%</td>
<td>20.0%</td>
<td>51.2%</td>
</tr>
<tr>
<td></td>
<td>6.8%</td>
<td>NO DATA</td>
<td>NO DATA</td>
</tr>
<tr>
<td>Jakarta**</td>
<td>NO DATA</td>
<td>6.9%</td>
<td>NO DATA</td>
</tr>
<tr>
<td>Peshawar</td>
<td>NO DATA</td>
<td>NO DATA</td>
<td>NO DATA</td>
</tr>
<tr>
<td>Phnom Penh</td>
<td>NO DATA</td>
<td>30.3%</td>
<td>NO DATA</td>
</tr>
<tr>
<td></td>
<td>5.3%</td>
<td>NO DATA</td>
<td>NO DATA</td>
</tr>
<tr>
<td>Quezon City**</td>
<td>NO DATA</td>
<td>42.1%</td>
<td>NO DATA</td>
</tr>
<tr>
<td></td>
<td>3.2%</td>
<td>NO DATA</td>
<td>NO DATA</td>
</tr>
</tbody>
</table>

*Rohingya refugee population

**Households with child aged 0-59 months**
Wet markets in Dhaka were once the heart of the city but have become much quieter. Many of their previous customers have avoided using them during the pandemic due to concerns about safety and risk of infection. Wealthier households may have opted to buy food in different ways, but these options are unlikely to be accessible to poor urban households who depend on wet markets and street food vendors for daily food needs.

The Global Alliance for Improved Nutrition (GAIN) has implemented a pilot project in Dhaka's wet markets, under its Keeping Food Markets Working workstream. The COVID-19 pandemic has highlighted the issue of food safety in wet markets around the world. Dhaka's wet markets are no exception with overcrowding, poor draining and ventilation, and lack of appropriate hygiene and sanitation. It is essential to improve food safety in this environment to enable wet markets to survive and recover from the pandemic.

GAIN has worked in partnership with Dhaka South City Corporation to implement this pilot project in two wet markets: New Market Bazar and Islambagh Bazar. A COVID-19 response unit was formed from members of the bazar committee in each market. They consulted with customers and vendors to understand the challenges. They requested better safety equipment, social distancing systems, hand washing facilities, drinking water supply and proper drainage. In response, the project has taken steps to restructure the markets and improve safety for vendors and customers. A total of 500 vendors have been provided with sets of face masks. Hand washing points and access to drinking water have been installed. Drainage systems have been renovated and improved. Separate washrooms for women and areas for breastfeeding have been added. FAO has provided training sessions for vendors on food safety and hygiene. This project will be completed in December 2021 and the lessons learned will be implemented in other wet markets.
3.5 Diet and Food Security Outcomes

The outcomes of food systems include diet outcomes, nutrition and health outcomes, environmental impacts, economic impacts and social impacts. In this study we focused primarily on diet and nutrition outcomes, as they are the focus of WFP. In the preceding sections of this report, we considered the impacts of the COVID-19 on food security, food-related behaviors, diet diversity and how the pandemic has altered the dynamics of urban vulnerability in relation to diets and nutrition outcomes. The city briefs provide details for each city and highlight differences in data quality and availability. In many cases, we were unable to obtain data to compare key indicators before and during the COVID-19 pandemic. Here we summarize what is known from our analysis.

The impact of COVID-19 on key indicators

Food consumption score and livelihood-based coping strategies:
The proportion of households with a poor food consumption score doubled between 2019 and 2020/21 in Kabul province (from 14% in 2019 to 19% in May 2020 just as the COVID crises started, and 29% in January 2021; city level data not available). In Cox's Bazar, the proportion of households with poor or borderline food consumption score increased from 31% in 2019 to 41% in 2020.

In May 2020, 20% of the population used livelihood-based coping strategies in Kabul province, compared to 9% in 2019. In June 2020, 2.5% households used emergency coping strategies versus 5% in 2019 in Cox’s Bazar. The number of households having only two meals a day increased from 8% in pre-COVID times to 38% June 2020. After a peak in market prices in April, they returned to normal in June, corresponding to the lift in movement restrictions (the weekly cost of

---

44 Source for Kabul province: Pre-Lean Season Assessment 2021, Pre-Lean Season Assessment 2020 and Seasonal Food Security Assessment 2019; for Cox’s Bazar: Cox’s Bazar Urban Vulnerability Assessment July 2020 and Refugee influx emergency vulnerability assessment 2020
a food basket increased from 922 BDT in January 2020 to
1,062 BDT in April 2020 and went back down to 974 BDT in
June 2020 in Cox’s Bazar). 

**Infant and young child feeding practices:**
Availability of data on breastfeeding practices, minimum
diet diversity (MDD), minimum meal frequency (MMF) and
minimum acceptable diet (MAD) only allowed the compa-
rison pre-COVID/COVID in Jakarta and Quezon city slums
where the situation worsened for all indicators.

Early breastfeeding initiation fell slightly from 72% in 2018
to 67% in 2020 in Jakarta slums, while exclusive breastfee-
ding prevalence remained the same (36%). The proportion
of children 6-23 months old receiving MDD and MAD fell
sharply from 2018 (pre-COVID) to 2020 (COVID) with a decli-
ne from 81% to 31% and from 76% to 28%, respectively. The
proportion with MMF also declined from 94% to 84%.

In Quezon City slums, the proportion of children 6-23 mon-
ths old receiving MDD and MAD estimated in urban areas of
the Philippines in 2020 was extremely low (7.7% and 6.6%
respectively) down from 25% and 15% respectively measu-
red for Quezon City in 2018.

**Women’s diet diversity:**
Data (pre-COVID and COVID) on women’s diet was avail-
able in Jakarta slums, where the proportion of women who
consumed at least five out of ten defined food groups the
previous day or night (MDD-W) declined from 79% in 2018 to
64% in 2020.

Although pre-COVID data were not available for Quezon City,
slum areas in Quezon City (SDFU Philippines Urban Survey)
in 2020 showed an alarmingly low prevalence of MDD-W
(16%).

**Food insecurity:**
The SDFU Philippines Urban Survey in 2020 reported that
71% of households with moderate or severe food insecurity
were severely impacted by COVID-19. Similarly, the prevalen-
ce of households in Jakarta slums with severe food insecuri-
ty increased greatly from 2% in 2018 to 23% 2020.

**Nutritional status:**
With the COVID-19 crisis, many nutrition surveys were can-
celled or postponed due to difficulties with anthropometric
measurements.
Section 4

City Briefs

1. Chittagong, Bangladesh
2. Cox’s Bazar, Bangladesh
3. Dhaka, Bangladesh
4. Jakarta, Indonesia
5. Kabul, Afghanistan
6. Peshawar, Pakistan
7. Phnom Penh, Cambodia
8. Quezon City, Philippines
External drivers

The landcover and urbanisation maps illustrate some key external drivers that shape the food system in Dhaka. These include the use of land and indications of where population density and growth are most intense, highlighting the relationship cities have with food production, and suggesting areas of higher vulnerability during crises that affect the food system.

Greater Dhaka is surrounded by fertile, agricultural land which covers around 35% of the land within 50km of the city. The city is expanding northward along main roads, though the wider urban agglomeration expands well beyond the formal administrative boundary adding another 40% to the city population, c. 6.5 million people in 2015. Dhaka is one of the most densely population cities on earth, with population densities reaching approaching 250,000 persons/km2 in some of the central thanas (districts). Urban growth continues along the main transport corridors, extending the reach of the city into its rural hinterland.

Food supply chains

The following table illustrates the location of the suppliers and customers of surveyed private sector entities, giving an indication of the proximity of food supply chains to the city.

The proximity of food supply chains to the city

<table>
<thead>
<tr>
<th></th>
<th>Markets/Customer locations</th>
<th>Supplier locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within the city</td>
<td>92.4 %</td>
<td>611 %</td>
</tr>
<tr>
<td>Surrounding region</td>
<td>23 %</td>
<td>8.3 %</td>
</tr>
<tr>
<td>Other regions of the country</td>
<td>21 %</td>
<td>27.1 %</td>
</tr>
<tr>
<td>Internationally</td>
<td>3.5 %</td>
<td>3.5 %</td>
</tr>
</tbody>
</table>
4. Outcomes & Pre-COVID-19 vulnerability

Nutritional status, dietary diversity and consumption of unhealthy foods

The following figures date from pre-COVID-19 and indicate vulnerabilities before the crisis, unless recent figures are available in which case a comparison between pre-COVID-19 and recent data is presented.

**Women**

Prevalence of minimum dietary diversity (MDD-W) among women and adolescents, Dhaka division

- Pre-COVID women: 42%
- During COVID male and female adolescents: 30%

**Children, 6-23 months**

Food Consumed by breastfeeding children (6-23 month), Dhaka city

- Fruits and vegetables rich in Vitamin A: 24.8%
- Thier fruits and vegetables: 18.4%
- Meat, Fish, Poultry: 25.2%
- Eggs: 28.1%

**Children under 5 years**

Portion of wasted and stunted children, Dhaka City

- Wasting: 9% (High Severity 10%)
- Stunting: 28% (High Severity 30%)

**Food security**

Changes in the food security levels of Dhaka’s population before and during COVID-19 is presented based on the available data, using the Food Consumption Score (FCS) and the Food Insecurity Experience Scale (FIES). Data using the Livelihood Coping Strategy Index (LCSI) was not available.

- Minimum acceptable diet (Dhaka Division): 33%
- Poor to borderline Food Consumption Score (FCS), Dhaka division:
  - Poor FCS: 13%
  - Borderline FCS: 26%
- Prevalence of moderate or severe food insecurity (Food Insecurity Experience Scale) in adolescents:
  - Pre-COVID (National): 31.5%
  - During COVID (Dhaka Division): 55%
5. COVID-19 impact & response

This section explores the effects of COVID-19 on Dhaka’s food system, examining supply chains, food prices and responses.

![COVID-19 impact & response diagram]

### Extent of disruption of the COVID-19 pandemic on markets and supply chains

- **Yes – Severely**: 11.0%
- **Yes – Moderately**: 66.2%
- **No**: 22.8%

#### Change in food prices since COVID-19

Change in food prices from January to December 2020 on four selected food items, BDT

- **Palm Oil**: +9%
  - January 69.11, February 89.95, March 72.5
- **Masur**: +5%
- **Rice**: +51%
  - January 33,085, February 43,58
- **Wheat**: +3%
  - January 28,94, December 34

### Foods that were short in supply

- **Fruits and vegetables**: 55%
- **Animal Source Foods**: 28%
- **Staple Grains**: 2%
- **Manufactured or processed foods**: 11%
- **Nuts and Seeds**: 2%

### Proportion of surveyed businesses whose income decreased between 25% and 50%

24%

### Data Sources

- **MDD-W FSNP 2015** for Pre-COVID-19 among women only; Second rapid assessment of food and nutrition security in the context of COVID-19 in Bangladesh: May – July 2020, FAO for during COVID-19, includes adolescent males and females.
- **Foods consumed by breastfeeding children (6-23 months)** Secondary analysis of the DHS 2017-18
- **Minimum acceptable diet MICS 2019**
- **Proportion of wasted and stunted children** Secondary analysis of the DHS 2017-18. Wasting and stunting prevalence are each classified as medium by WHO standards, but in absolute numbers this represents a large cohort of children that already have a suboptimal nutritional status (in Dhaka division this represents a staggering 1.3 million stunted children).
- **Food Consumption Score (FCS), Dhaka division** Analysis of Food Security and Vulnerability in the Urban and Rural Areas in Bangladesh, WFP
- **Prevalence of moderate or severe food insecurity (Food Insecurity Experience Scale) in adolescents** Second rapid assessment of food and nutrition security in the context of COVID-19 in Bangladesh: May – July 2020, FAO
- **Monthly food prices, Dhaka division WFP VAM**
- **Sections Food supply chains, Food environment, COVID-19 impact and response**: Dikoda 2021

Produced by Dikoda. For more information contact Sophie@dikoda.com
Responses and coping mechanisms

Impacts of COVID-19 on the food system are mitigated by responses by development partners and the government and by adaptations taken by food companies to changing conditions. This section illustrates some of these adaptations and responses, highlighting possible vulnerabilities and opportunities presented by the crisis.

Private sector's methods to cope with lower income with breakdown of reduced costs

- Reduced Costs 53.90%
- Business loan 2%
- Sold Business Assets 5.90%
- Invested Personal Money 34.30%
- Lower Quality Food 5.77%
- Cheaper Suppliers 8.77%
- Reduced Sales hours or days 29.8%
- Downsized Staff 26.3%
- Reduced Products 17.5
- Cheaper Distribution 8.75
- Other 3.9%

Other Methods of Adaptation by companies during COVID-19

- New Food Products 50%
- Diversification of products 15.4%
- Reduced Sales hours or days 29.8%
- Downsized Staff 26.3%
- Reduced Products 17.5
- Cheaper Suppliers 8.77
- Cheaper Distribution 8.75
- Other 3.9%

Response by Development Partners to food insecurity

- Food vouchers 7.0%
- Food aid 11.6%
- School meals 2.3%
- Urban agriculture 18.6%
- Cash transfer 39.5%
- Other 20.9%

Methods and data sources

The brief describes the city's food system based on the Food Systems Framework presented in the report, with focus on available data and components that are likely to be impacted by COVID-19. All data is on city level unless indicated otherwise. Sources for the city brief include primary and secondary data and are listed after each figure or table. DHS data has been disaggregated to strata level to obtain figures specific to the city. Dikoda surveys took place in March 2021 and were carried out on governance, NGO and private sector stakeholders. The development of the typology and the full survey methodology is detailed in the report. Key spatial indicators apart from slum population are from 2015 because data was consistently available across cities.

Population density, persons per km²

- Calculated from GHSL data.

Slum population

- Slum census 2014

Cultivated land in 50km radius, km²


Cultivated land in 50km radius per capita, km²

- Copernicus as above

Number of markets/supermarkets per 100,000 persons

- Calculated using OS and OpenStreetMap data for each city.

Typology

The typology contains one core indicator for each dimension, giving an indication to the food system's vulnerability and resilience in the face of COVID-19. No indicator was chosen for consumer behaviour.

External Drivers

Food Supply Chains

Food Environment

Consumer behaviour

Medium resilience

High resilience

Diets

Absorptive capacity

Adaptive capacity

Transformative capacity
**External drivers**

The landcover and urbanisation maps illustrate some key external drivers that shape the food system in Chittagong. These include the use of land and indications of where population density and growth are most intense, highlighting the relationship cities have with food production, and suggesting areas of higher vulnerability during crises that affect the food system.

**Landcover 2015**

**Urbanisation trends**

**Key spatial indicators**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Dhaka</th>
<th>Average, 7 cities (excl. CXB)</th>
<th>Average, similar size LMIC cities in the region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population density, persons per km²</td>
<td>6,626</td>
<td>9,468</td>
<td>9493</td>
</tr>
<tr>
<td>Slum population</td>
<td>493,441</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total built-up area in 2015, km²</td>
<td>157.8</td>
<td>471.0</td>
<td>304.8</td>
</tr>
<tr>
<td>Total resident population in 2015</td>
<td>5,283,804</td>
<td>11,002,460</td>
<td></td>
</tr>
<tr>
<td>Surface of the built-up area per person in 2015, m²</td>
<td>28.8</td>
<td>37.3</td>
<td>45.6</td>
</tr>
<tr>
<td>Proportion of total resident population potentially exposed to floods in 2015 (%)</td>
<td>65%</td>
<td>38%</td>
<td></td>
</tr>
<tr>
<td>Proportion of cultivated land in 50km radius</td>
<td>15.4%</td>
<td>33.3%</td>
<td></td>
</tr>
<tr>
<td>Cultivated land in 50km radius per 100,000 persons, km²</td>
<td>18.0</td>
<td>44.0</td>
<td></td>
</tr>
<tr>
<td>Number of supermarkets per 100,000 persons</td>
<td>0.7</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>GDP per capita</td>
<td>3,932.2</td>
<td>4,200.4</td>
<td></td>
</tr>
<tr>
<td>Growth rate</td>
<td>1.3</td>
<td>2.4</td>
<td>1.8</td>
</tr>
<tr>
<td>Proportion of population of the urban agglomeration living outside the formal boundaries of the city</td>
<td>129%</td>
<td>37%</td>
<td></td>
</tr>
</tbody>
</table>

**Food supply chains**

The following table illustrates the location of the suppliers and customers of surveyed private sector entities, giving an indication of the proximity of food supply chains to the city.

**The proximity of food supply chains to the city**

<table>
<thead>
<tr>
<th>Markets/ Customer locations</th>
<th>Supplier locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within the city</td>
<td>72.5%</td>
</tr>
<tr>
<td>Surrounding region</td>
<td>17.6%</td>
</tr>
<tr>
<td>Other regions of the country</td>
<td>8.5%</td>
</tr>
<tr>
<td>Internationally</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

Chittagong (or Chattogram) is the second-largest city in Bangladesh and the location of the country’s busiest international port – one of the world’s oldest and largest in south-east Asia. The city is located on the Bay of Bengal and banks of the Karnaphuli River which have constrained growth of the city to the west and the south. However, urban development has extended along major transport routes north of the city and across the river to the south. More than half of the population of this urban agglomeration live outside the formal, Chattogram City Corporation area.
4. Outcomes & Pre-COVID-19 vulnerability

Nutritional status, dietary diversity and consumption of unhealthy foods

The following figures date from pre-COVID-19 and indicate vulnerabilities before the crisis, unless recent figures are available in which case a comparison between pre-COVID-19 and recent data is presented.

**Food system actors & foods available in the local market**

**Children, under 5 years**
- Proportion of wasted and stunted children, Chittagong city
  - Wasting: 7%
  - Stunting: 10%
- Minimum acceptable diet (Chittagong Division): 23%

**Food security**

Changes in the food security levels of Dhaka's population before and during COVID-19 is presented based on the available data, using the Food Consumption Score (FCS) and the Food Insecurity Experience Scale (FIES). Data using the Livelihood Coping Strategy Index (LCSI) was not available.

**Children, 6-23 months**
- Foods consumed by breastfeeding children (6-23 months), Chittagong city
  - Fruits and vegetables rich in Vitamin A: 26.5%
  - Ther fruits and vegetables: 15.7%
  - Meat, Fish, Poultry: 24.1%
  - Eggs: 27.5%

**Women**
- Prevalence of minimum dietary diversity (MDD-W) among women and adolescents, Dhaka division
  - Pre-COVID women: 44%
  - During COVID male and female adolescents: 35%

**Children under 5 years**
- Prevalence of moderate or severe food insecurity (Food Insecurity Experience Scale) in adolescents
  - Poor FCS: 48%
  - Borderline FCS: 56%
  - Pre-COVID (National): 31.5%
  - During COVID (Dhaka Division): 38.9%
This section explores the effects of COVID-19 on Chittagong’s food system, examining supply chains, food prices and responses.

### COVID-19 Type of effect on food system
- **Food Safety**: 8.1%
- **Food Supply chains**: 32.4%
- **Food Access**: 51.4%

### Change in food prices since COVID-19
Change in food prices from January to December 2020 on four selected food items, BDT

- **Palm Oil**: +13%
  - January: 82.5, February: 92.8
- **Masur**: -7%
  - January: 72.5, February: 67.5
- **Rice**: +30%
  - January: 33, February: 43.0
- **Wheat**: 0%
  - January: 33, February: 33.0

### Foods that were short in supply
- **Fruits and vegetables**: 17%
- **Animal Source Foods**: 5%
- **Staple Grains**: 0%
- **Manufactured or processed foods**: 2%
- **Nuts and Seeds**: 76%

### Data Sources
- Secondary analysis of the DHS 2017-18
- MICS 2019
- Analysis of Food Security and Vulnerability in the Urban and Rural Areas in Bangladesh, WFP
- Monthly food prices WFP VAM

### Extent of disruption of the COVID-19 pandemic on markets and supply chains

<table>
<thead>
<tr>
<th>Effect</th>
<th>Yes - Severe</th>
<th>Yes - Moderate</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to customers/markets</td>
<td>18.3%</td>
<td>59.2%</td>
<td>22.5%</td>
</tr>
<tr>
<td>Supply chains</td>
<td>14.1%</td>
<td>54.9%</td>
<td>31.0%</td>
</tr>
</tbody>
</table>

### Effects of COVID-19 on company supply chains

- **Shortage of supplies**: 24%
- **More suppliers**: 6%
- **Suppliers closing down**: 17%
- **Reduce product lines and or ingredients**: 8%
- **Production stoppage**: 11%
- **Production change focus**: 5%
- **No impact/Other**: 7%
- **Transportation disruption**: 12%

### Proportion of surveyed businesses whose income decreased between 25% and 50%

- 37%

### Data Sources

- Chittagong division this represents a staggering 1 million stunted children.
- Food Consumption Score (FCS) Analysis of Food Security and Vulnerability in the Urban and Rural Areas in Bangladesh, WFP
- Proportion of wasted and stunted children Secondary analysis of the DHS 2007-18, WFP VAM
- Food Insecurity Experience Scale (FIES) in adolescents Second rapid assessment of food and nutrition security in the context of COVID-19 in Bangladesh: May – July 2020, FAO

Produced by Dikoda. For more information contact Sophie@dikoda.com
Responses and coping mechanisms

Impacts of COVID-19 on the food system are mitigated by responses by development partners and the government and by adaptations taken by food companies to changing conditions. This section illustrates some of these adaptations and responses, highlighting possible vulnerabilities and opportunities presented by the crisis.

Private sector’s methods to cope with lower income with breakdown of reduced costs

- Reduced Costs 40.8%
- Sold Business Assets 19.4%
- Business loan 10.7%
- Invested Personal Money 25.2%
- Lower Quality Food 2.6%
- Cheaper Distribution 15.1%
- Reduced Suppliers 12.3%
- Reduced Sales hours or days 9.4%
- Cheaper Suppliers 8.8%
- Downsized Staff 22.6%

Other methods of adaptation by companies during COVID-19

- New Food Products 26.8%
- Diversification of products 38.0%
- New distribution methods 28.2%
- Sharing workforce with other companies 7.0%
- Reduced Suppliers 12.3%
- Lower Quality Food 2.6%
- Cheaper Suppliers 8.8%
- Reduced Sales hours or days 9.4%
- Cheaper Distribution 15.1%

Response by Development Partners to food insecurity

- Urban agriculture 26.7%
- School meals 6.7%
- Food aid 3.3%
- Food vouchers 10.0%
- Cash transfer 50%

Methods and data sources

The brief describes the city’s food system based on the Food Systems Framework presented in the report, with focus on available data and components that are likely to be impacted by COVID-19. All data is on city level unless indicated otherwise. Sources for the city brief include primary and secondary data and are listed after each figure or table. DHS data has been disaggregated to strata level to obtain figures specific to the city. Dikoda surveys took place in March 2021 and were carried out on governance, NGO and private sector stakeholders. The development of the typology and the full survey methodology is detailed in the report. Key spatial indicators apart from slum population are from 2015 because data was consistently available across cities.
External drivers

The landcover and urbanisation maps illustrate some key external drivers that shape the food system in Quezon City. These include the use of land and indications of where population density and growth are most intense, highlighting the relationship cities have with food production, and suggesting areas of higher vulnerability during crises that affect the food system.

Landcover 2015

Urbanisation trends

Quezon City is the largest city in the Philippines by population though sits within the Manila Metropolitan Area. The city is highly urbanised with c. 85% urban land cover, very little cultivated land (<3%) and the remaining land area mainly open water and forest, in the northern most corner of the city. Much of the urban fabric was built during the period between 1975 and 2000, with the city densifying as population has grown at around 1.4% per annum. The city is inextricably linked to the wider Metropolitan area, representing around 17% of the contiguous area of the Manila urban agglomeration which covers around 650km².

Key spatial indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Quezon City</th>
<th>Average, 7 cities (excl. CXB)</th>
<th>Average, similar size LMIC cities in the region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population density, persons per km²</td>
<td>16,943</td>
<td>9,468</td>
<td>11,677</td>
</tr>
<tr>
<td>Slum population</td>
<td>appr. 810 780</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total built-up area in 2015, km²</td>
<td>115</td>
<td>471.0</td>
<td>776.0</td>
</tr>
<tr>
<td>Total resident population in 2015</td>
<td>2,505,917</td>
<td>11,002,460</td>
<td></td>
</tr>
<tr>
<td>Surface of the built-up area per person, m²</td>
<td>45.9</td>
<td>37.3</td>
<td>37.5</td>
</tr>
<tr>
<td>Proportion of total resident population</td>
<td>31%</td>
<td>38%</td>
<td></td>
</tr>
<tr>
<td>potentially exposed to floods in 2015 (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion of cultivated land in 50km radius</td>
<td>15.8%</td>
<td>33.3%</td>
<td></td>
</tr>
<tr>
<td>Cultivated land in 50km radius per 100,000</td>
<td>6.0</td>
<td>44.0</td>
<td></td>
</tr>
<tr>
<td>persons, km²</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of supermarkets per 100,000 persons</td>
<td>25.7</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>GDP per capita</td>
<td>3,607.6</td>
<td>4,200.4</td>
<td>3,607.6</td>
</tr>
<tr>
<td>Growth rate</td>
<td>1.4</td>
<td>2.4</td>
<td>1.8</td>
</tr>
<tr>
<td>Proportion of population of the urban</td>
<td>0%</td>
<td>37%</td>
<td></td>
</tr>
<tr>
<td>agglomeration living outside the formal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>boundaries of the city</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Food supply chains

The following table illustrates the location of the suppliers and customers of surveyed private sector entities, giving an indication of the proximity of food supply chains to the city.

The proximity of food supply chains to the city

<table>
<thead>
<tr>
<th></th>
<th>Markets/Customer locations</th>
<th>Supplier locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within the city</td>
<td>25.9%</td>
<td>37.0%</td>
</tr>
<tr>
<td>Surrounding region</td>
<td>59.3%</td>
<td>37.0%</td>
</tr>
<tr>
<td>Other regions of the country</td>
<td>14.8%</td>
<td>25.9%</td>
</tr>
<tr>
<td>Internationally</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Produced by Dikoda. For more information contact Sophie@dikoda.com
4. Outcomes & Pre-COVID-19 vulnerability

Nutritional status, dietary diversity and consumption of unhealthy foods

The following figures date from pre-COVID-19 and indicate vulnerabilities before the crisis, unless recent figures are available in which case a comparison between pre-COVID-19 and recent data is presented.

- **Prevalence of minimum dietary diversity (MDD-W) during COVID-19, Quezon City slums**
  - Women
  - Children under 5 years

- **Foods consumed by breastfeeding children (6-23 months) during COVID-19, Quezon City slums**
  - Fruits and vegetables rich in Vitamin A: 22.2%
  - Egg or Flash Foods: 38.2%

- **Change in minimum acceptable diet (6-23 months), Quezon City and slums**
  - Pre-Covid Quezon City Slums 2020: 63%
  - During Covid Quezon City 2018: 38.2%

- **Consumption of unhealthy foods by children, Quezon City slums**
  - Children 0-23m: 63%
  - Children 24-59m: 56%

- **Proportion of wasted and stunted children, Quezon City**
  - Wasting: 7%
  - Stunting: 30%

- **Food security**
  - Changes in the food security levels of Quezon City’s population before and during COVID-19 is presented based on the available data, using the Food Insecurity Experience Scale (FIES) and the Livelihood Coping Strategy Index (LCSI). The Food Consumption Score (FCS) was not available.
  - Prevalence of moderate or severe food insecurity (Food Insecurity Experience Scale), Quezon City slums
  - Livelihoods coping strategy index (LCSI) in households with children 0-59m, Quezon City slums, 2020

- **Livelihoods coping strategy index (LCSI)**
  - Crisis Coping: 42.1%
  - Stress Coping: 42%
  - No Coping: 12.7%
  - Emergency Coping: 3.2%
This section explores the effects of COVID-19 on Dhaka’s food system, examining supply chains, food prices and responses.

### Extent of disruption of the COVID-19 pandemic on markets and supply chains

<table>
<thead>
<tr>
<th>Type of effect on food system</th>
<th>Food Affordability 27%</th>
<th>Food Supply chains 16.2%</th>
<th>Food Safety 24.3%</th>
<th>Food Access 32.4%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of effect on food system</td>
<td>Yes - Severely</td>
<td>Yes - Moderately</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Access to customers/markets</td>
<td>55.6%</td>
<td>11.1%</td>
<td>33.3%</td>
<td></td>
</tr>
<tr>
<td>Supply chains</td>
<td>51.90%</td>
<td>22.2%</td>
<td>25.9%</td>
<td></td>
</tr>
</tbody>
</table>

### Foods that were short in supply

- Fruits and vegetables: 0%
- Animal Source Foods: 48%
- Staple Grains: 19%
- Manufactured or processed foods: 19%
- Nuts and Seeds: 2%

### Change in food prices since COVID-19

- Fish: +18%
- Tomato: +150%
- Rice: +9%
- Cooking oil: +10%
- Other: 6%
- No impact/Other: 3%
The brief describes the city's food system based on the Food Systems Framework presented in the report, with focus on available data and components that are likely to be impacted by COVID-19. All data is on city level unless indicated otherwise. Sources for the city brief include primary and secondary data and are listed after each figure or table. DHS data has been disaggregated to strata level to obtain figures specific to the city. Dikoda surveys took place in March 2021 and were carried out on governance, NGO and private sector stakeholders. The development of the typology and the full survey methodology is detailed in the report.

**Methods and data sources**

The brief describes the city’s food system based on the Food Systems Framework presented in the report, with focus on available data and components that are likely to be impacted by COVID-19. All data is on city level unless indicated otherwise. Sources for the city brief include primary and secondary data and are listed after each figure or table. DHS data has been disaggregated to strata level to obtain figures specific to the city. Dikoda surveys took place in March 2021 and were carried out on governance, NGO and private sector stakeholders. The development of the typology and the full survey methodology is detailed in the report.

Key spatial indicators apart from slum population are from 2015 because data was consistently available across cities.

**Responses and coping mechanisms**

Impacts of COVID-19 on the food system are mitigated by responses by development partners and the government and by adaptations taken by food companies to changing conditions. This section illustrates some of these adaptations and responses, highlighting possible vulnerabilities and opportunities presented by the crisis.

**Typology**

The typology contains one core indicator for each dimension, giving an indication to the food system’s vulnerability and resilience in the face of COVID-19. No indicator was chosen for consumer behaviour.

**Other methods of adaptation by companies during COVID-19**

- **New distribution methods**: 23.1%
- **Sharing workforce with other companies**: 7.7%
- **Reduced Costs**: 64.7%
- **Invested Personal Money**: 17.6%
- **Cheaper Suppliers**: 2.7%
- **Reduced Products**: 18.9%
- **Business loan**: 11.8%
- **Reduced Sales hours or days**: 48.7%
- **Downsized Staff**: 18.9%
- **Cheaper Distribution**: 2.7%
- **Cheaper Suppliers**: 2.7%
- **Reduced Sales hours or days**: 48.7%
- **Downsized Staff**: 18.9%

**Response by Development Partners to food insecurity**

- **Cash transfer**: 9.8%
- **Food aid**: 44.3%
- **Food vouchers**: 18.8%
- **School meals**: 1.6%
- **Urban agriculture**: 3.3%
- **Diversification of products**: 7.7%
- **New Food Products**: 61.5%
- **Reduced hours or days**: 48.7%
- **Downsized Staff**: 18.9%
- **Reduced Products**: 18.9%
- **Cheaper Distribution**: 2.7%
- **Cheaper Suppliers**: 2.7%
- **Sharing workforce with other companies**: 7.7%
- **Reduced Costs**: 64.7%
- **Invested Personal Money**: 17.6%

**Private sector’s methods to cope with lower income with breakdown of reduced costs**

- **Business loan**: 11.8%
- **Reduced Sales hours or days**: 48.7%
- **Downsized Staff**: 18.9%
- **Reduced Products**: 18.9%
- **Cheaper Suppliers**: 2.7%
- **Reduced Sales hours or days**: 48.7%
- **Downsized Staff**: 18.9%

**Population density, persons per km²**

Calculated from GHSL data.


**Slum population**


**Cultivated land in 50km radius, km²**


**Cultivated land in 50km radius per capita, km²**

Copernicus as above

**Number of markets/supermarkets per 100,000 persons**

Calculated using GIS and OpenStreetMap data for each city

**Responded by Development Partners to food insecurity**

- **Cash transfer**: 9.8%
- **Food aid**: 44.3%
- **Food vouchers**: 18.8%
- **School meals**: 1.6%
- **Urban agriculture**: 3.3%
- **Diversification of products**: 7.7%
- **New Food Products**: 61.5%
- **Reduced hours or days**: 48.7%
- **Downsized Staff**: 18.9%
- **Reduced Products**: 18.9%
- **Cheaper Distribution**: 2.7%
- **Cheaper Suppliers**: 2.7%
- **Sharing workforce with other companies**: 7.7%
- **Reduced Costs**: 64.7%
- **Invested Personal Money**: 17.6%

**Population density, persons per km²**

Calculated from GHSL data.


**Slum population**


**Cultivated land in 50km radius, km²**


**Cultivated land in 50km radius per capita, km²**

Copernicus as above

**Number of markets/supermarkets per 100,000 persons**

Calculated using GIS and OpenStreetMap data for each city

**Typology**

The typology contains one core indicator for each dimension, giving an indication to the food system’s vulnerability and resilience in the face of COVID-19. No indicator was chosen for consumer behaviour.
**External drivers**

The landcover and urbanisation maps illustrate some key external drivers that shape the food system in Jakarta. These include the use of land and indications of where population density and growth are most intense, highlighting the relationship cities have with food production, and suggesting areas of higher vulnerability during crises that affect the food system.

### Landcover 2015

![Landcover Map](image)

### Urbanisation trends

![Urbanisation Map](image)

**Key spatial indicators**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Jakarta</th>
<th>Average, 7 cities (excl. CXB)</th>
<th>Average, similar size LMIC cities in the region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population density, persons per km²</td>
<td>7,249</td>
<td>9,468</td>
<td>11,677</td>
</tr>
<tr>
<td>Slum population</td>
<td>approx. 791,813</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total built-up area in 2015, km²</td>
<td>1,889.1</td>
<td>471.0</td>
<td>778.0</td>
</tr>
<tr>
<td>Total resident population in 2015</td>
<td>38,312,539</td>
<td>11,002,460</td>
<td></td>
</tr>
<tr>
<td>Surface of the built-up area per person in 2015, m²</td>
<td>52.0</td>
<td>37.3</td>
<td>37.5</td>
</tr>
<tr>
<td>Proportion of total resident population potentially exposed to floods in 2015 (%)</td>
<td>2%</td>
<td>38%</td>
<td></td>
</tr>
<tr>
<td>Proportion of cultivated land in 50km radius</td>
<td>28.7%</td>
<td>33.3%</td>
<td></td>
</tr>
<tr>
<td>Cultivated land in 50km radius per 100,000 persons, km²</td>
<td>7.9</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Number of supermarkets per 100,000 persons</td>
<td>1.1</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>GDP per capita</td>
<td>11,766.8</td>
<td>4,200.4</td>
<td></td>
</tr>
<tr>
<td>Growth rate</td>
<td>2.2</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td>Proportion of population of the urban agglomeration living outside the formal boundaries of the city</td>
<td>33%</td>
<td>37%</td>
<td></td>
</tr>
</tbody>
</table>

**Food supply chains**

The following table illustrates the location of the suppliers and customers of surveyed private sector entities, giving an indication of the proximity of food supply chains to the city.

<table>
<thead>
<tr>
<th></th>
<th>Markets/Customer locations</th>
<th>Supplier locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within the city</td>
<td>52.2%</td>
<td>46.6%</td>
</tr>
<tr>
<td>Surrounding region</td>
<td>22.4%</td>
<td>36.0%</td>
</tr>
<tr>
<td>Other regions of the country</td>
<td>23.6%</td>
<td>15.5%</td>
</tr>
<tr>
<td>Internationally</td>
<td>1.9%</td>
<td>1.9%</td>
</tr>
</tbody>
</table>

Jakarta is Indonesia’s largest city, the nation’s capital, and one of the world’s largest metropolitan areas by population. Around a third of the population, c. 3 million people, live outside the formal, Greater Jakarta Metropolitan area. The city is located on Jakarta Bay, the Java Sea, to the north and the city has sprawled east and west along the coast, as well as south into West Java. The city is under threat from the sea a combination of subsidence and storm surges with around a quarter of the population affected by the latter. Population densities reach up to 21–25,000 persons per square kilometre in the some central parts of the city.

Produced by Dikoda. For more information contact Sophie@dikoda.com
### 4. Outcomes & Pre-COVID-19 vulnerability

#### Nutritional status, dietary diversity and consumption of unhealthy foods

The following figures date from pre-COVID-19 and indicate vulnerabilities before the crisis, unless recent figures are available in which case a comparison between pre-COVID-19 and recent data is presented.

#### Prevalence of minimum dietary diversity (MDD-W), Jakarta slums

- **Pre-COVID**
  - Women: 78.9%
  - Children, 6-23 months: 63.9%

- **During COVID**
  - Women: 63.9%
  - Children, 6-23 months: 63.9%

*only data for either mother of or children 12-23 months

#### Foods consumed by breastfeeding children (6-23 months), Jakarta

- Fruits and vegetables rich in Vitamin A: 40.7%
- Thier fruits and vegetables: 14.5%
- Meat, Fish, Poultry: 23.6%
- Eggs: 22.0%

#### Consumption of unhealthy foods by children, Jakarta slums

- **Children (24-59m)**: 92%
- **Children (0-23m)**: 74%

#### Food security

Changes in the food security levels of Jakarta’s population before and during COVID-19 is presented based on the available data, using the Food Insecurity Experience Scale (FIES) and the Livelihood Coping Strategy Index (LCSI). Data using the Food Consumption Score (FCS) was not available.

#### Prevalence of minimum acceptable diet in Jakarta slums, children 6-23m

- **Pre-Covid**
  - Children under 5 years: 75.8%

- **During Covid**
  - Children under 5 years: 27.5%

#### Proportion of wasted and stunted children, Jakarta city.

- **Wasting**
  - Medium Severity: 10%
  - High Severity: 10%

- **Stunting**
  - Medium Severity: 18%
  - High Severity: 20%
5. COVID-19 impact & response

This section explores the effects of COVID-19 on Jakarta’s food system, examining supply chains, food prices and responses.

### Extent of disruption of the COVID-19 pandemic on markets and supply chains

- **Yes – Severely**
  - Transportation disruption: 39%
  - Food supply chains: 34.4%
  - Access to customers/markets: 34.8%
  - Supply chains: 6.2%

- **Yes – Moderately**
  - Transportation disruption: 7%
  - Food supply chains: 56.5%
  - Access to customers/markets: 54.7%
  - Supply chains: 39.1%

- **No**
  - Transportation disruption: 19%
  - Food supply chains: 8.7%
  - Access to customers/markets: 39.1%
  - Supply chains: 30.4%

### Foods that were short in supply

- **Fruits and vegetables**: 32%
- **Animal Source Foods**: 16%
- **Staple Grains**: 52%
- **Manufactured or processed foods**: 0%
- **Nuts and Seeds**: 0%

### Change in food prices since COVID-19

Change in food prices from November 2019 to November 2020 on four selected food items

- **Chicken**: -5.5%
- **Shallots**: +5.4%
- **Vegetable Oil**: +17.1%
- **Rice**: +6.0%

### Effects of COVID-19 on company supply chains

- **Suppliers closing down**: 10%
- **Production stoppage**: 10%
- **More suppliers**: 3%
- **Shortage of supplies**: 8%
- **Reduce product lines and/or ingredients**: 1%
- **Move production**: 1%

### Proportion of surveyed businesses whose income decreased between 25% and 50%

45%
Responses and coping mechanisms

Impacts of COVID-19 on the food system are mitigated by responses by development partners and the government and by adaptations taken by food companies to changing conditions. This section illustrates some of these adaptations and responses, highlighting possible vulnerabilities and opportunities presented by the crisis.

Private sector’s methods to cope with lower income with breakdown of reduced costs

- Reduced Costs 58.6%
- Other 41.4%
- Lower Quality Food 0.8%
- Reduced Sales hours or days 5.2%
- Reduced Products 4%
- Reduced Suppliers 6.4%
- Cheaper Distribution 27.8%
- Cheaper Suppliers 9.5%

Other Methods of Adaptation by companies during COVID-19

- Diversification of products 13.7%
- New distribution methods 80.4%
- Downsizing Staff 46.8%
- Sharing workforce with other companies 3.9%
- Reduced Costs 58.6%
- Cheaper Distribution 27.8%
- Cheaper Suppliers 9.5%

Response by Development Partners to food insecurity

- Cash transfer 76.6%
- Food aid 14.9%
- School meals 4.3%
- Food vouchers 2.1%
- New distribution methods 80.4%

Typology

The typology contains one core indicator for each dimension, giving an indication to the food system’s vulnerability and resilience in the face of COVID-19. No indicator was chosen for consumer behaviour.

Methods and data sources

The brief describes the city’s food system based on the Food Systems Framework presented in the report, with focus on available data and components that are likely to be impacted by COVID-19. All data is on city level unless indicated otherwise. Sources for the city brief include primary and secondary data and are listed after each figure or table. DHS data has been disaggregated to strata level to obtain figures specific to the city.

Dikoda surveys took place in March 2021 and were carried out on governance, NGO and private sector stakeholders. The development of the typology and the full survey methodology is detailed in the report.

Key spatial indicators apart from slum population are from 2015 because data was consistently available across cities.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population density, persons per km²</td>
<td>Calculated using 21.8% as a proportion of the urban population in Indonesia (SDFU 2020) of total population</td>
</tr>
<tr>
<td>Slum population</td>
<td>Slum census 2014</td>
</tr>
<tr>
<td>Cultivated land in 50km radius per capita, km²</td>
<td>Copernicus as above</td>
</tr>
<tr>
<td>Number of markets/supermarkets per 100,000 persons</td>
<td>Calculated using GIS and OpenStreetMap data for each city</td>
</tr>
</tbody>
</table>

Produced by Dikoda. For more information contact Sophie@dikoda.com
**External drivers**

The landcover and urbanisation maps illustrate some key external drivers that shape the food system in Kabul. These include the use of land and indications of where population density and growth are most intense, highlighting the relationship cities have with food production, and suggesting areas of higher vulnerability during crises that affect the food system.

**Landcover 2015**

**Urbanisation trends**

Kabul is Afghanistan’s largest city and the nation’s capital. The city population has expanded considerably over the last two decades with population growing at an average 4% per annum, with the footprint of the city almost trebling in size since 1975. The amount of cultivated land in close proximity to the city is constrained by terrain and geography – rocky, with sparse vegetation. The majority of the urban population live within the official, city limits, with a handful of high density settlements existing to the north of the city.

**Key spatial indicators**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Kabul</th>
<th>Average, 7 cities ( excl. CXB)</th>
<th>Average, similar size LMIC cities in the region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population density, persons per km²</td>
<td>13,651</td>
<td>9,468</td>
<td>13,337</td>
</tr>
<tr>
<td>Slum population</td>
<td>86% *</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total built-up area in 2015, km²</td>
<td>108.7</td>
<td>471.0</td>
<td>82.1</td>
</tr>
<tr>
<td>Total resident population in 2015</td>
<td>4,381,842</td>
<td>11,002,460</td>
<td></td>
</tr>
<tr>
<td>Surface of the built-up area per person in 2015, m²</td>
<td>24.8</td>
<td>37.3</td>
<td>20.3</td>
</tr>
<tr>
<td>Proportion of total resident population potentially exposed to floods in 2015 (%)</td>
<td>10%</td>
<td>38%</td>
<td></td>
</tr>
<tr>
<td>Proportion of cultivated land in 50km radius</td>
<td>9.9%</td>
<td>33.3%</td>
<td></td>
</tr>
<tr>
<td>Cultivated land in 50km radius per 100,000 persons, km²</td>
<td>19.4</td>
<td>44.0</td>
<td></td>
</tr>
<tr>
<td>Number of supermarkets per 100,000 persons</td>
<td>0.5</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>GDP per capita</td>
<td>1,314.5</td>
<td>4,200.4</td>
<td></td>
</tr>
<tr>
<td>Growth rate</td>
<td>4</td>
<td>2.4</td>
<td>7.2</td>
</tr>
<tr>
<td>Proportion of population of the urban agglomeration living outside the formal boundaries of the city</td>
<td>24%</td>
<td>37%</td>
<td></td>
</tr>
</tbody>
</table>

*of the urban housing stock nationally

**Food supply chains**

The following table illustrates the location of the suppliers and customers of surveyed private sector entities, giving an indication of the proximity of food supply chains to the city.

**The proximity of food supply chains to the city**

<table>
<thead>
<tr>
<th></th>
<th>Markets/Customer locations</th>
<th>Supplier locations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Within the city</strong></td>
<td>57.60%</td>
<td>69.30%</td>
</tr>
<tr>
<td><strong>Surrounding region</strong></td>
<td>35.70%</td>
<td>20.00%</td>
</tr>
<tr>
<td><strong>Other regions of the country</strong></td>
<td>4.90%</td>
<td>5.30%</td>
</tr>
<tr>
<td><strong>Internationally</strong></td>
<td>1.80%</td>
<td>5.30%</td>
</tr>
</tbody>
</table>
Food environment

The local food system actors and the types of food available in the local market are shown in the below figure. The inner circle consists of the types of food businesses while the outer circle shows the types of food the system produces, processes or sells.

Food system actors & foods available in the local market

4. Outcomes & Pre-COVID-19 vulnerability

Nutritional status, dietary diversity and consumption of unhealthy foods

The following figures date from pre-COVID-19 and indicate vulnerabilities before the crisis, unless recent figures are available in which case a comparison between pre-COVID-19 and recent data is presented.

Children, 6-23 months

Foods consumed by breastfeeding children (6-23 months), Kabul

- Fruits and vegetables rich in Vitamin A: 31.2%
- Ther fruits and vegetables: 18.4%
- Meat, Fish, Poultry: 8.5%
- Eggs: 19.2%

Minimum acceptable diet, children (6-23 months), Kabul

18.9%

Changes in the food security levels of Kabul’s population before and during COVID-19 is presented based on the available data, using the Food Consumption Score (FCS) and the Livelihood Coping Strategy Index (LCSI). Recent data using the Food Insecurity Experience Scale (FIES) was not available.

Proportion of wasted and stunted children, Kabul Province

- Wasting: 7% (High Severity: 10%)
- Stunting: 30% (High Severity: 30%)

Change in the prevalence of emergency coping strategies (LCSI), Kabul province and Kabul city

- Pre-COVID 2019*: 9%
- During-COVID 2020*: 20%
- During COVID 2021**: 51%

*Kabul province  **Kabul city

Change in the prevalence of households with a poor food consumption score, Kabul division

- Pre-COVID 2019: 14%
- During-COVID 2020: 19%
- During COVID 2021: 29%

Produced by Dikoda. For more information contact Sophie@dikoda.com
5. COVID-19 impact & response

This section explores the effects of COVID-19 on Kabul’s food system, examining supply chains, food prices and responses.

Change in food prices since COVID-19

Change in food prices from January to December 2020 on four selected food items, AFN

- Cooking oil +72% - Wheat Flour +12% - Wheat +18%
- Pulses +21%

Extent of disruption of the COVID-19 pandemic on markets and supply chains

- Yes – Severely
- Yes – Moderately
- No

Access to customers/markets
- 25.3%
- 49.3%
- 25.3%

Supply chains
- 29.2%
- 51.3%
- 19.5%

Foods that were short in supply

- Fruits and vegetables
- Animal Source Foods
- Staple Grains
- Manufactured or processed foods
- Nuts and Seeds
- 22%
- 17%
- 18%
- 28%
- 14%

Effects of COVID-19 on company supply chains

- Suppliers closing down 10%
- Shortage of supplies 13%
- Reduce product lines and or ingredients 8%
- Production stoppage 12%
- Move production 3%
- Change of production focus 9%
- Transportation disruption 13%
- No impact 10%

Data Sources

- Livelihoods coping strategy index (LCSI) Seasonal Food Security Assessment (SfSA) 2019; Pre-Lean Season Assessment 2020; Pre-Lean Season Assessment 2021.
- Monthly food prices WFP VAM.

Foods consumed by breastfeeding children (6–23 months) Secondary analysis of the DHS 2015
- Minimum acceptable diet Secondary analysis of the DHS 2015
- Proportion of wasted and stunted children Afghanistan MICS 2013. Stunting prevalence is classified as high and wasting prevalence as medium by WHO standards.
- Food Consumption Score (FCS) Seasonal Food Security Assessment (SfSA) 2019; Pre-Lean Season Assessment 2020; Pre-Lean Season Assessment 2021.

Produced by Dikoda. For more information contact Sophie@dikoda.com
Responses and coping mechanisms

Impacts of COVID-19 on the food system are mitigated by responses by development partners and the government and by adaptations taken by food companies to changing conditions. This section illustrates some of these adaptations and responses, highlighting possible vulnerabilities and opportunities presented by the crisis.

Private sector’s methods to cope with lower income with breakdown of reduced costs

- Business loan 36.1%
- Sold Business Assets 4.8%
- Invested Personal Money 23.8%
- Lower Quality food 7.5%
- Reduced Suppliers 8.5%
- Cheaper Distribution 13.7%
- Cheaper Suppliers 10.5%
- Reduced Products 17%
- Reduced Sales hours or days 19%
- Downsize Staff 23.5%
- Reduced Costs 35.4%

Other methods of adaptation by companies during COVID-19

- New Food Products 26.9%
- New distribution methods 34.6%
- Sharing workforce with other companies 18.0%
- Diversification of products 20.5%

Response by Development Partners to food insecurity

- Cash transfer 15.7%
- Food vouchers 16.1%
- Other 1.6%
- Food aid 30.1%
- School meals 11.7%
- Urban agriculture 24.9%

Methods and data sources

The brief describes the city’s food system based on the Food Systems Framework presented in the report, with focus on available data and components that are likely to be impacted by COVID-19. All data is on city level unless indicated otherwise. Sources for the city brief include primary and secondary data and are listed after each figure or table. DHS data has been disaggregated to strata level to obtain figures specific to the city. Dikoda surveys took place in March 2021 and were carried out on governance, NGO and private sector stakeholders. The development of the typology and the full survey methodology is detailed in the report.

<table>
<thead>
<tr>
<th>Method</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultivated land in 50km radius per capita, km²</td>
<td>Copernicus as above</td>
</tr>
<tr>
<td>Number of markets/supermarkets per 100,000 persons</td>
<td>Calculated using GIS and OpenStreetMap data for each city</td>
</tr>
</tbody>
</table>

Produced by Dikoda. For more information contact Sophie@dikoda.com
**External drivers**

The landcover and urbanisation maps illustrate some key external drivers that shape the food system in Peshawar. These include the use of land and indications of where population density and growth are most intense, highlighting the relationship cities have with food production, and suggesting areas of higher vulnerability during crises that affect the food system.

**Landcover 2015**

- **Urban built-up**
- **Cultivated land**
- **Vegetated / bare**
- **Permanent water body / ocean**
- **City boundary**

**Urbanisation trends**

- **Neighbouring, high-density settlements, distinct from the city**
- **Very high density areas**
- **Areas of high density**
  - **1000 persons/km²**
  - **4000 persons/km²**
  - **20000 persons/km²**

**Urban Food System Analysis – COVID-19 City Food System Briefs**

Peshawar is the sixth largest city in Pakistan and capital of the Khyber Pakhtunkhwa province (formerly North West Province), around 50km from the border with Afghanistan. The city has grown broadly east-west along the Peshawar Valley, and several high-density suburbs have grown up including Hayatabad to the west of the city. Around 20% of the population of the urban agglomeration living outside the formal, Peshawar Municipal Corporation area. The neighbouring city of Charsadda lies around 15km away across the Kabul River, where a further 100,000+ persons live.

**Key spatial indicators**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Peshawar</th>
<th>Average, 7 cities (excl. CXB)</th>
<th>Average, similar size LMIC cities in the region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population density, persons per km²</td>
<td>7,533</td>
<td>9,468</td>
<td>9,107</td>
</tr>
<tr>
<td>Slum population</td>
<td>+ 250,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total built-up area in 2015, km²</td>
<td>812</td>
<td>471</td>
<td>76</td>
</tr>
<tr>
<td>Total resident population in 2015</td>
<td>2,764,734</td>
<td>11,002,460</td>
<td></td>
</tr>
<tr>
<td>Surface of the built-up area per person in 2015, m²</td>
<td>29.4</td>
<td>37.3</td>
<td>20.3</td>
</tr>
<tr>
<td>Proportion of total resident population potentially exposed to floods in 2015 (%)</td>
<td>7%</td>
<td>38%</td>
<td></td>
</tr>
<tr>
<td>Proportion of cultivated land in 50km radius</td>
<td>35.8%</td>
<td>33.3%</td>
<td></td>
</tr>
<tr>
<td>Cultivated land in 50km radius per 100,000 persons, km²</td>
<td>40.3</td>
<td>44.0</td>
<td></td>
</tr>
<tr>
<td>Number of supermarkets per 100,000 persons</td>
<td>0.7</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>GDP per capita</td>
<td>2,014.1</td>
<td>4,200.4</td>
<td></td>
</tr>
<tr>
<td>Growth rate</td>
<td>2.0</td>
<td>2.4</td>
<td>1.3</td>
</tr>
<tr>
<td>Proportion of population of the urban agglomeration living outside the formal boundaries of the city</td>
<td>19%</td>
<td>37%</td>
<td></td>
</tr>
</tbody>
</table>

**Food supply chains**

The following table illustrates the location of the suppliers and customers of surveyed private sector entities, giving an indication of the proximity of food supply chains to the city.

<table>
<thead>
<tr>
<th>Location</th>
<th>Markets/Customer locations</th>
<th>Supplier locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within the city</td>
<td>48.80%</td>
<td>34.40%</td>
</tr>
<tr>
<td>Surrounding region</td>
<td>41.30%</td>
<td>43.10%</td>
</tr>
<tr>
<td>Other regions of the country</td>
<td>9.40%</td>
<td>23.30%</td>
</tr>
<tr>
<td>Internationally</td>
<td>0.60%</td>
<td>1.30%</td>
</tr>
</tbody>
</table>

Produced by Dikoda. For more information contact Sophie@dikoda.com
Food environment

The local food system actors and the types of food available in the local market are shown in the below figure. The inner circle consists of the types of food businesses while the outer circle shows the types of food the system produces, processes or sells.

Food system actors & foods available in the local market

4. Outcomes & Pre-COVID-19 vulnerability

Nutritional status, dietary diversity and consumption of unhealthy foods

The following figures date from pre-COVID-19 and indicate vulnerabilities before the crisis, unless recent figures are available in which case a comparison between pre-COVID-19 and recent data is presented.

Children, 6-23 months

Foods consumed by breastfeeding children (6-23 months), Peshawar

- Fruits and vegetables rich in Vitamin A: 7.3%
- Other fruits and vegetables: 19.6%
- Meat, Fish, Poultry: 0.9%
- Eggs: 20.9%

Minimum diet diversity (6-23 months), Peshawar: 11.1%

Children under 5 years

Proportion of wasted and stunted children before and during COVID-19, Peshawar

- Wasting: Pre-Covid 6%, During: 14%
- Stunting: Pre-Covid 10%, During: 30%

Change in the prevalence of moderate or severe food insecurity (Food Insecurity Experience Scale)

- Pre-COVID, KP province 2018: 18%
- During COVID Peshawar 2020: 37%

Food security

Changes in the food security levels of Peshawar’s population before and during COVID-19 is presented based on the available data, using the Food Security Experience Scale (FIES). Recent data using the Food Consumption Score (FCS) or the Livelihood Coping Strategy Index (LCSI) were not available.
This section explores the effects of COVID-19 on Peshawar's food system, examining supply chains, food prices and responses.

### COVID-19 Type of effect on food system
- **Food Safety**: 15.1%
- **Food Affordability**: 24.5%
- **Food Access**: 35.2%
- **Food Supply chains**: 25.2%

### Extent of disruption of the COVID-19 pandemic on markets and supply chains
- **Yes – Severely**: 64.4%
- **Yes – Moderately**: 27.5%
- **No**: 8.1%
- **Access to customers/markets**: 64.4% 27.5% 10.0%
- **Supply chains**: 64.4% 25.6% 10.0%

### Foods that were short in supply
- **Fruits and vegetables**: 25%
- **Animal Source Foods**: 21%
- **Staple Grains**: 16%
- **Manufactured or processed foods**: 19%
- **Nuts and Seeds**: 19%

### Effects of COVID-19 on company supply chains
- **Production stoppage**: 19%
- **Reduce product lines and or ingredients**: 7%
- **Move to other locations**: 11%
- **Suppliers closing down**: 12%
- **More suppliers**: 4%
- **Shortage of supplies**: 18%
- **Shift**: 1%
- **Other**: 1%

### Proportion of surveyed businesses whose income decreased between 25% and 50%
- **22%**

### Data Sources
- **Food consumed by breastfeeding children (6–23 months)**: Secondary analysis of the DHS 2017-18
- **Minimum acceptable diet**: Secondary analysis of the DHS 2017-18
- **Proportion of wasted and stunted children**: Secondary analysis of the DHS 2017-18; FAO Rapid assessment 2020. Stunting prevalence is classified as high and wasting prevalence as medium by WHO standards.
- **Monthly food prices**: WFP VAM
- **Sections**: Food supply chains, Food environment, COVID-19 impact and response

Produced by Dikoda. For more information contact Sophie@dikoda.com
Responses and coping mechanisms

Impacts of COVID-19 on the food system are mitigated by responses by development partners and the government and by adaptations taken by food companies to changing conditions. This section illustrates some of these adaptations and responses, highlighting possible vulnerabilities and opportunities presented by the crisis.

Private sector’s methods to cope with lower income with breakdown of reduced costs

- Business loan 19%
- Sold Business Assets 26.2%
- Invested Personal Money 21.4%
- Reduced Costs 11.9%
- Cheaper Suppliers 20%
- Lower Quality Food 19%
- Reduced Suppliers 10%
- Cheaper Distribution 19%
- Reduced Sales hours or days 12%
- Downsized Staff 9%
- Reduced Products 8%

Other methods of adaptation by companies during COVID-19

- New Food Products 24.8%
- Sharing workforce with other companies 25.3%
- Diversification of products 21.1%
- Cash transfer 17.4%
- Urban agriculture 14.6%
- Food vouchers 21.1%
- Food aid 24.4%
- School meals 22.5%
- New distribution methods 28.2%

Methods and data sources

The brief describes the city’s food system based on the Food Systems Framework presented in the report, with focus on available data and components that are likely to be impacted by COVID-19. All data is on city level unless indicated otherwise. Sources for the city brief include primary and secondary data and are listed after each figure or table. DHS data has been disaggregated to strata level to obtain figures specific to the city. Dikoda surveys took place in March 2021 and were carried out on governance, NGO and private sector stakeholders. The development of the typology and the full survey methodology is detailed in the report.

Typology

The typology contains one core indicator for each dimension, giving an indication to the food system’s vulnerability and resilience in the face of COVID-19. No indicator was chosen for consumer behaviour.

Keypoints:
- Population density, persons per km²
- Slum population
- Cultivated land in 50km radius, km²
- Cultivated land in 50km radius per capita, km²
- Number of markets/supermarkets per 100,000 persons

The brief describes the city’s food system based on the Food Systems Framework presented in the report, with focus on available data and components that are likely to be impacted by COVID-19. All data is on city level unless indicated otherwise. Sources for the city brief include primary and secondary data and are listed after each figure or table. DHS data has been disaggregated to strata level to obtain figures specific to the city. Dikoda surveys took place in March 2021 and were carried out on governance, NGO and private sector stakeholders. The development of the typology and the full survey methodology is detailed in the report.
External drivers

The landcover and urbanisation maps illustrate some key external drivers that shape the food system in Phnom Penh. These include the use of land and indications of where population density and growth are most intense, highlighting the relationship cities have with food production, and suggesting areas of higher vulnerability during crises that affect the food system.

Landcover 2015

Urbanisation trends

Key spatial indicators

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Phnom Penh</th>
<th>Average, similar size LMIC cities in the region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population density, persons per km²</td>
<td>6,905</td>
<td>9,468</td>
</tr>
<tr>
<td>Slum population</td>
<td>approx. 25%</td>
<td></td>
</tr>
<tr>
<td>Total built-up area in 2015, km²</td>
<td>77.4</td>
<td>471.0</td>
</tr>
<tr>
<td>Total resident population in 2015</td>
<td>1,816,032</td>
<td>11,002,460</td>
</tr>
<tr>
<td>Surface of the built-up area per person in 2015, m²</td>
<td>42.6</td>
<td>37.3</td>
</tr>
<tr>
<td>Proportion of total resident population potentially exposed to floods in 2015 (%)</td>
<td>90%</td>
<td>38%</td>
</tr>
<tr>
<td>Proportion of cultivated land in 50km radius</td>
<td>93.4%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Cultivated land in 50km radius per 100,000 persons, km²</td>
<td>193.5</td>
<td>44.0</td>
</tr>
<tr>
<td>Number of supermarkets per 100,000 persons</td>
<td>4.3</td>
<td>4.8</td>
</tr>
<tr>
<td>GDP per capita</td>
<td>2,643.7</td>
<td>4,200.4</td>
</tr>
<tr>
<td>Growth rate</td>
<td>3.0</td>
<td>2.4</td>
</tr>
<tr>
<td>Proportion of population of the urban agglomeration living outside the formal boundaries of the city</td>
<td>13%</td>
<td>37%</td>
</tr>
</tbody>
</table>

Food supply chains

The following table illustrates the location of the suppliers and customers of surveyed private sector entities, giving an indication of the proximity of food supply chains to the city.

<table>
<thead>
<tr>
<th>Markets/ Customer locations</th>
<th>Supplier locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within the city</td>
<td>92.3%</td>
</tr>
<tr>
<td>Surrounding region</td>
<td>7.7%</td>
</tr>
<tr>
<td>Other regions of the country</td>
<td>-</td>
</tr>
<tr>
<td>Internationally</td>
<td>-</td>
</tr>
</tbody>
</table>

Phnom Penh is the largest city and capital of Cambodia. It is built on the banks of the Tonlé Sap, Mekong, and Bassac Rivers in low-lying, fertile agricultural land. Around 90% of the city’s population is at risk from annual flooding. The city has expanded north-south along the river banks and also in a westerly direction, with the urban footprint growing at around 1.15% per annum. Population growth rates are c. 3% per annum.
4. Outcomes & Pre-COVID-19 vulnerability

Nutritional status, dietary diversity and consumption of unhealthy foods

The following figures date from pre-COVID-19 and indicate vulnerabilities before the crisis, unless recent figures are available in which case a comparison between pre-COVID-19 and recent data is presented.

Women

Average minimum dietary diversity score for women (MDD-W), Phnom Penh Province

Pre-COVID: 5,3/10

Children, 6-23 months

Foods consumed by breastfeeding children (6-23 months), Phnom Penh

- Fruits and vegetables rich in Vitamin A: 17.7%
- Ther fruits and vegetables: 15.7%
- Meat, Fish, Poultry: 15.4%
- Eggs: 14.1%

Minimum acceptable diet (6-23 months), urban Cambodia

- Children under 5 years
  - Wasting: 8%
  - Stunting: 19%

Food security

Changes in the food security levels of Phnom Penh's population before and during COVID-19 is presented based on the available data, using the Food Consumption Score (FCS) and the Livelihood Coping Strategy Index (LCSI). Data using the Food Insecurity Experience Scale (FIES) was not available.

- Pre-COVID: 52%
- During COVID: 30.3%
- Emergency Coping: 5.3%
- Crisis Coping: 30.3%
- Stress Coping: 35.5%
This section explores the effects of COVID-19 on Phnom Penh’s food system, examining supply chains, food prices and responses.

**Change in food prices since COVID-19**

Change in food prices from May 2020 to March 2021 on four selected food items

-23% Snakehead Fish
+5% Morning Glory
+18% Veg Oil
+9% Rice

**5. COVID-19 impact & response**

Effects of COVID-19 on company supply chains

- Shortage of supplies 42%
- Transportation disruption 45%
- More suppliers 2%
- Suppliers closing down 5%

**extent of disruption of the COVID-19 pandemic on markets and supply chains**

- Yes – Severely
- Yes – Moderately
- No

Access to customers/markets
0,5% 96,6% 2,9%

Supply chains
1% 96,2% 2,9%

**Foods that were short in supply**

- Fruits and vegetables 0%
- Animal Source Foods 4%
- Staple Grains 28%
- Manufactured or processed foods 68%
- Nuts and Seeds 76%

**Proportion of surveyed businesses whose income decreased between 25% and 50%**

4.8%

**Data Sources**

- MDH-W Socioeconomic impacts of COVID-19 on households in Cambodia, Round 3, 2020
- Secondary analysis of the DHS 2014
- Minimum acceptable diet Food systems dashboard, 2013-2018
- Proportion of wasted and stunted children Secondary analysis of the DHS 2014. Stunting prevalence is classified as low and wasting prevalence as medium by WHO standards.
- Food Consumption Score (FCS) CIES 2017; COVID19 Social Impact Study.
- Livelihoods coping strategy index (LCSI) Socioeconomic impacts of COVID-19 on households in Cambodia, October 2020
- Monthly food prices WFP VAM
- Sections Food supply chains, Food environment, COVID-19 impact and response Dikoda 2021

Produced by Dikoda. For more information contact Sophie@dikoda.com
The typology contains one core indicator for each dimension, giving an indication to the food system's vulnerability and resilience in the face of COVID-19. No indicator was chosen for consumer behaviour.

### Private sector’s methods to cope with lower income with breakdown of reduced costs

- Reduced Costs 61.5%
- Reduced Suppliers 12.3%
- Reduced Sales hours or days 9.4%
- Cheaper Suppliers 8.8%
- Invested Personal Money 24.6%
- Business loan 2.8%
- Other 10.6%

### Other methods of adaptation by companies during COVID-19

- Diversification of products 38.4%
- New Food Products 6.1%
- New distribution methods 55.6%
- Cheaper Suppliers 8.8%
- Reduced Suppliers 12.3%
- Reduced Costs 61.5%
- Reduced Sales hours or days 9.4%

### Response by Development Partners to food insecurity

- Urban agriculture 3.9%
- School meals 33.6%
- Food aid 44.5%
- Food vouchers 1.6%
- Cash transfer 15.6%
- Other 0.8%

### Methods and data sources

The brief describes the city’s food system based on the Food Systems Framework presented in the report, with focus on available data and components that are likely to be impacted by COVID-19. All data is on city level unless indicated otherwise. Sources for the city brief include primary and secondary data and are listed after each figure or table. The development of the typology and the full survey methodology is detailed in the report.

- Calculated from GHSL data: Florczyk, A et al. (2019): GHSL Urban Centres Database 2015, multitemporal and multidimensional attributes, EUCOMA European Commission Joint Research Centre (JRC) PID: https://data.europa.eu/89h/data/53473144-b88c-44bc-b4a3-4583ed1f547e
- Calculated using GIS and OpenStreetMap data for each city

### Additional information

- Urban Food System Analysis – COVID-19 City Food System Briefs
- Produced by Dikoda. For more information contact Sophie@dikoda.com
**External drivers**

The landcover and urbanisation maps illustrate some key external drivers that shape the food system in Cox’s Bazar refugee camp. These include the use of land and indications of where population density and growth are most intense, highlighting the relationship cities have with food production, and suggesting areas of higher vulnerability during crises that affect the food system.

**Landcover 2015**

The refugee camp has grown very rapidly from virtually nothing to a settlement with urbanised characteristics over around 5 years, from 2017 to present. Since this time around 900,000 people have settled in this camp, constructing housing, buildings, shops, market places and a network of roads and footpaths. An estimated 1500ha of land has been cleared, 20% of which to house the camp and 80% deforested.

**Urbanisation trends**

**Key spatial indicators**

Key indicators were not available for Cox’s Bazar from the GHSL database as for the other cities. Other indicators describing the external drivers have been used.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Cox’s Bazar</th>
<th>Average, 7 cities (excl. CXB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total refugee population in 2021</td>
<td>871,924</td>
<td>11,002,460</td>
</tr>
</tbody>
</table>

**Change in prevalence of households that are multi-dimensionally poor (Rohingya)**

<table>
<thead>
<tr>
<th>Period</th>
<th>Pre-Covid</th>
<th>During Covid</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>47%</td>
<td>60%</td>
</tr>
</tbody>
</table>

**Food supply chains**

The following table illustrates the location of the suppliers and customers of surveyed private sector entities, giving an indication of the proximity of food supply chains to the city.

<table>
<thead>
<tr>
<th>Location</th>
<th>Markets/Customer locations</th>
<th>Supplier locations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within the city</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td>Surrounding region</td>
<td>40%</td>
<td>20%</td>
</tr>
<tr>
<td>Other regions of the country</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Internationally</td>
<td>20%</td>
<td>20%</td>
</tr>
</tbody>
</table>

Produced by Dikoda. For more information contact Sophie@dikoda.com
### Food environment

The local food system actors and the types of food available in the local market are shown in the below figure. The inner circle consists of the types of food businesses while the outer circle shows the types of food the system produces, processes or sells.

#### Food system actors & foods available in the local market

- **Grains**: 26.3%
- **Nuts or seeds**: 5.3%
- **Dairy**: 15.8%
- **Eggs**: 10.5%
- **Processed/manufactured, high sugar/fat**: 15.8%
- **Processed/manufactured, low in sugar/fat**: 15.8%
- **Food Retail / Caterer**: 20%
- **Food Storage / suppliers**: 80%
- **Vegetables**: 5.3%
- **Fruit**: 24.5%
- **Cookies, chips, potatoes**: 29.7%
- **Sugar, soda, coffee**: 10.5%
- **Pasta, rice, noodles**: 10.5%
- **Soup, broth**: 10.5%
- **Frozen fish or meat**: 1.8%
- **Live fish, meat, poultry**: 2.9%
- **Processed fish or meat**: 4.7%
- **Processed fish or meat, high sugar/fat**: 4.7%
- **Processed fish or meat, low in sugar/fat**: 4.7%
- **Ready to eat meals**: 2.4%
- **Ready to eat meals, high sugar/fat**: 2.4%
- **Ready to eat meals, low in sugar/fat**: 2.4%
- **Other food**: 2.9%
- **Other food, high sugar/fat**: 2.9%
- **Other food, low in sugar/fat**: 2.9%
- **Meat, poultry, fish**: 14.8%
- **Processed meat, poultry, fish**: 14.8%
- **Seafood**: 14.8%
- **Fresh fish, poultry, meat**: 14.8%
- **Processed fish, poultry, meat**: 14.8%
- **Fish, poultry, meat**: 14.8%
- **Sausages, sausages, processed fish**: 14.8%
- **Couscous, bulgur, lentils**: 14.8%
- **Other grains, legumes, nuts, seeds**: 14.8%

### 4. Outcomes & Pre-COVID-19 vulnerability

**Nutritional status, dietary diversity and consumption of unhealthy foods**

The following figures date from pre-COVID-19 and indicate vulnerabilities before the crisis, unless recent figures are available in which case a comparison between pre-COVID-19 and recent data is presented.

#### Pre-COVID anemia and MUAC of women of reproductive age

<table>
<thead>
<tr>
<th>Category</th>
<th>Pre-COVID</th>
<th>During Covid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anemia (Reproductive age)</td>
<td>20.2%</td>
<td>29.5%</td>
</tr>
<tr>
<td>Low MUAC (Pregnant or Lactating)</td>
<td>5.0%</td>
<td>18%</td>
</tr>
<tr>
<td>Low MUAC (Reproductive age)</td>
<td>4.7%</td>
<td>2%</td>
</tr>
</tbody>
</table>

#### Children under 5 years

**Minimum acceptable diet**

<table>
<thead>
<tr>
<th>Category</th>
<th>Pre-COVID</th>
<th>During Covid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children, 6-23 months</td>
<td>7.3%</td>
<td>29.7%</td>
</tr>
<tr>
<td>Children under 5 years</td>
<td>8.8%</td>
<td></td>
</tr>
</tbody>
</table>

#### Change in the proportion of wasted (WHZ) and stunted (HAZ) children in Cox’s Bazar

<table>
<thead>
<tr>
<th>Location</th>
<th>Pre-COVID</th>
<th>During Covid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makeshift</td>
<td>10.9%</td>
<td>11.3%</td>
</tr>
<tr>
<td>Nayapara</td>
<td>13.3%</td>
<td>14.8%</td>
</tr>
<tr>
<td>Kutupalong</td>
<td>12.1%</td>
<td>11.9%</td>
</tr>
</tbody>
</table>

#### Change in poor to borderline food consumption score, mean of Rohingya and host community

<table>
<thead>
<tr>
<th>Category</th>
<th>Pre-COVID</th>
<th>During Covid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Makeshift</td>
<td>10.9%</td>
<td>11.3%</td>
</tr>
<tr>
<td>Nayapara</td>
<td>13.3%</td>
<td>14.8%</td>
</tr>
<tr>
<td>Kutupalong</td>
<td>12.1%</td>
<td>11.9%</td>
</tr>
</tbody>
</table>

*Only change which is statistically significant.

#### Food security

Changes in the food security levels of Cox’s Bazar’s population before and during COVID-19 is presented based on the available data, using the Food Consumption Score (FCS) and the Livelihood Coping Strategy Index (LCSI). Data using the Food Insecurity Experience Scale (FIES) was not available.
5. COVID-19 impact & response

This section explores the effects of COVID-19 on Cox’s Bazar’s food system, examining supply chains, food prices and responses.

### Change in food prices since COVID-19

Change in food prices from May 2020 to March 2021 on four selected food items, BDT

- **Wheat flour**: +3%
- **Cooking oil**: +7%
- **Lentil**: +29%
- **Fruits and vegetables**: +34%

### Extent of disruption of the COVID-19 pandemic on markets and supply chains

- **Food Access**: 34.2%
- **Food Safety**: 4.0%
- **Food Affordability**: 60.5%
- **Food Supply chains**: 1.0%

### Foods that were short in supply

- **Fruits and vegetables**: 42%
- **Animal Source Foods**: 36%
- **Staple Grains**: 10%
- **Manufactured or processed foods**: 4%
- **Nuts and Seeds**: 8%

### Effects of COVID-19 on company supply chains

- **More suppliers**: 20%
- **No impact**: 60%
- **Other**: 20%

### Proportion of surveyed businesses whose income decreased between 25% and 50%

- **0%**

Data Sources

- Total refugee population in 2021: Inter Sector Coordination Group ISCG: Cox’s Bazar Refugee Population as of 31 January 2021
- Households that are multi-dimensionally poor (MDI) REVA 4
- Women’s anemia and MUAC Action Against Hunger, Emergency nutrition and health assessment round 2, May 2018
- Food Consumption Score (FCS) Reva
- Livelihoods coping strategy index (LCSI) Reva 1 and Reva 4
- Monthly food prices: WFP VAM
- Assistance received in the past 30 days: Reva 4

Stunting and wasting prevalence are each classified as high by WHO standards.

Business income: there was no business whose income had decreased between 25% and 50 since the start of the pandemic; businesses had not experienced a change in income. Source: Dikoda 2021.
The typology contains one core indicator for each dimension, giving an indication to the food system’s vulnerability and resilience in the face of COVID-19. No indicator was chosen for consumer behaviour.

### Typology

- **External Drivers**
- **Food Supply Chains**
- **Diets**
- **Individual Factors**
- **Transformative capacity**
- **High resilience**
- **Low resilience**
- **Diversification of products 71,4%**
- **New distribution methods 28,6%**
- **Cash transfer 46,5%**
- **Urban agriculture 14%**
- **School meals 4,7%**
- **Food aid 7%**
- **Food vouchers 27,9%**
- **Transformative capacity**
- **Adaptive capacity**
- **Low resilience**
- **Medium resilience**
- **High resilience**

### Methods and data sources

The brief describes the city’s food system based on the Food Systems Framework presented in the report, with focus on available data and components that are likely to be impacted by COVID-19. All data is on city level unless indicated otherwise. Sources for the city brief include primary and secondary data and are listed after each figure or table. DHS data has been disaggregated to strata level to obtain figures specific to the city. Dikoda surveys took place in March 2021 and were carried out on governance, NGO and private sector stakeholders. The development of the typology and the full survey methodology is detailed in the report.

### Responses and coping mechanisms

Impacts of COVID-19 on the food system are mitigated by responses by development partners and the government and by adaptations taken by food companies to changing conditions. This section illustrates some of these adaptations and responses, highlighting possible vulnerabilities and opportunities presented by the crisis.
Section 5
Resilience
The typology based on selected key indicators suggests that food systems in the study cities did not show high levels of resilience (or transformative capacity) to respond effectively to the COVID-19 crisis. There are differences in indicators and across cities as to particularly strong or vulnerable parts of the food system (as displayed in the spider plots in the city briefs).

Individual factors, represented by reduced income, were particularly affected in most cities where the average household income declined significantly (by at least 40%) and remained at the absorptive level (i.e. lower level of resilience characterized by coping rather than adapting or transforming). Combined with even moderate rise in food prices, this loss of income raises concerns regarding the resilience of households with already low incomes and is eventually likely to reflect in diet and nutritional outcomes.

As shown in the city of Phnom Penh, greater proximity to cultivated land is likely to contribute to the resilience of an urban food system by reducing the length and complexity of food supply chains. This may also have a bearing on food prices and indeed Phnom Penh's food prices remained relatively stable during the pandemic. However, the population was still affected by loss of household income.

While the COVID-19 pandemic provides opportunities for positive transformation of food systems, of which our research has found evidence, such as retailers moving to new distribution methods, this is not reflected by the key indicators used in the typology. Yet these innovative transformations represent an area that could be strengthened on the supply side to increase the resilience of the economy and the livelihoods of those working in the food system by protecting income and the access of vulnerable individuals to the food system. We recommend that an innovative dimension is included in future food system evaluation to reflect a government or municipalities capacity to change, rethink, or innovate in times of crisis.
### TABLE 4. SCORING MATRIX FOR THE TYPOLORY OF URBAN FOOD SYSTEMS RESILIENCE

<table>
<thead>
<tr>
<th>Selected indicators</th>
<th>Data Sources</th>
<th>External drivers</th>
<th>Food supply chains</th>
<th>Food environments</th>
<th>Individual factors</th>
<th>Consumer Behavior</th>
<th>Diets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cultivated land within 50 km of city (km² per 100,000 persons)</td>
<td>Source: See Appendix 2</td>
<td>Adaptive (18.0)</td>
<td>Absorptive (46.5%)</td>
<td>Adaptive (5%)</td>
<td>Absorptive (75%)</td>
<td>N/A</td>
<td>Absorptive (25%)</td>
</tr>
<tr>
<td>Proportion of food sector businesses with most suppliers, located within the city (%)</td>
<td>Source: Dikoda / 2021</td>
<td>Adaptive (60.0%)</td>
<td>Adaptive (13%)</td>
<td>Adaptive (44%)</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>Average change in food prices during pandemic (%) *</td>
<td>Source: WFP / 2020-21</td>
<td>Adaptive (30%)</td>
<td>Absorptive (17%)</td>
<td>Adaptive (59%)</td>
<td>N/A</td>
<td>Adaptive (63.9%)</td>
<td></td>
</tr>
<tr>
<td>Reduction in average household income (%)</td>
<td>Various / 2020-21</td>
<td>Absorptive (6.0)</td>
<td>Absorptive (37.0%)</td>
<td>Absorptive (47%)</td>
<td>N/A</td>
<td>Absorptive (15.7%)</td>
<td></td>
</tr>
</tbody>
</table>

Cut-offs used to categorise the above values in relation to levels of resilience and capacity:

<table>
<thead>
<tr>
<th>Absorptive capacity</th>
<th>Adaptive capacity</th>
<th>Transformative capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;8.6 km²</td>
<td>0-49%</td>
<td>≥30%</td>
</tr>
<tr>
<td>8.6-25.3 km²</td>
<td>50-74%</td>
<td>5-29%</td>
</tr>
<tr>
<td>≥25.3 km²</td>
<td>75-100%</td>
<td>&lt;5%</td>
</tr>
</tbody>
</table>

* Four food items including a staple and vegetable oil and two other food items (according to availability an animal sourced food, a pulse, a vegetable, or another staple). Results for Cox’s Bazar are based on three food items.

**FIGURE 14. COMPARISON OF EIGHT CITY TYPOLORYES SHOWING LEVELS OF RESILIENCE (OR CAPACITY) TO RESPOND TO THE COVID-19 CRISIS.**
The spider plots in the city briefs illustrate our assessment of urban food system resilience using the selected indicators. This enables comparisons between cities to identify strong or vulnerable parts of the food system. In the two examples below, Dhaka shows better availability of data (hollow circles indicate lack of data) and a higher level of resilience overall compared to Jakarta. However, Dhaka shows vulnerability in relation to food supply chains (indicated by proximity to cultivated land) and individual factors (indicated by reduction in average household income during the pandemic).

**In summary, this analysis demonstrates:**
Level of resilience vary widely across cities, with Quezon City demonstrating the lowest level of resilience and Phnom Penh the highest. In terms of food system dimensions, there is less variability for the dimension external drivers and lower level for individual factors and diets. Below we present a summary of evidence per food system dimension.

- **External drivers:**
Proximity to cultivated land is an important driver in relation to food supplies during the COVID-19 pandemic. The availability of cultivated land in close proximity (within 50km) of select cities in the Asia-Pacific region varies significantly. Some of the largest cities in this study Jakarta, Quezon City have reasonably limited access to cultivated land. On the other hand, Phnom Penh, surrounded by a much greater area of cultivated land than the other cities, has a relatively short supply chains proved to be an asset during the pandemic and food supplies remained relatively stable. This might be due partially to the smaller size of the city but also hypothetically to policies protecting peri-urban agriculture. High prices of agricultural land on the fringe of the city or restrictive land-use policies designed to curb urban sprawl may be a deterrent to converting land to urban uses, resulting in more compact, denser cities surrounded by abundant farmland.

- **Food supply chains:**
Proportion of food sector businesses with most suppliers located within the city was selected as an indicator of the resilience of food supply chains during the pandemic. Urban food systems have been disproportionately affected by COVID-19 restrictions because they rely on food brought
into the city from rural areas, where most food production occurs. All cities except Phnom Penh are more dependent on more distant food supplies from more productive agricultural areas. In Jakarta and Dhaka, successful supply chain interventions by government involved a high level of coordination between government departments that facilitated permissions for the movement of goods across districts, where cross-district movement was otherwise restricted and exemption from quarantine requirements by lorry drivers transporting essential food items.

- **Food environments:**
Food prices increased during the pandemic in all eight cities, with considerable variations between cities and between food groups. The lowest average increase in food prices was in Phnom Penh, while the greatest average increase in food prices was in Quezon City. The reduced financial capacity due to the drop in purchasing power by poor dwellers mean that women and children faced higher risks of lower dietary diversity. This also had a ripple effect on street food and informal food actors. These stakeholders faced acute challenges associated with the drop in business due to their limited capital and financial resilience. Nutrition sensitive and urban specific safety net for both poor urban dwellers and SMEs / informal food actors are important in this context. As the COVID-19 pandemic unfolded, many existing social protection programmes were not fit for purpose to provide an adequate response, due to inaccurate targeting and lack of access for workers in the informal economy.

- **Individual factors:**
Household income changes during crisis indicates changes in food purchasing power for urban poor and they spent most of their income on food. Household income dropped significantly for all cities by more than 50% compared to pre-COVID-19 except Cox’s Bazaar and Phnom Penh where the drop was less. In Quezon City and Jakarta Consumer, behaviour showed that households dramatically altered the way they purchased food due to COVID-19 – including by reducing purchases of nutritious foods.

- **Diets:**
The proportion of women with a minimum diet diversity is a proxy for women’s quality of diet. It is a key indicator that reflects hardship experienced by women and their household during crisis. For 4 out of 8 cities, the proportion of women eating at least 5 different food groups in the previous day fluctuate a lot between Jakarta (64 percent), Chittagong (35 percent), Dhaka (30 percent) and Quezon City (16 percent). Jakarta is the only city with comparable pre-COVID19 data; the proportion of women in Jakarta who consumed at least five out of ten food groups, unhealthy foods, any meat source and SSBs were all higher before COVID-19. In Quezon City, women reduced their consumption of both nutritious and unhealthy foods, which increased the risk of micronutrient deficiencies.
Section 6

Conclusions and recommendations
This study provides a regional overview of the impacts of COVID-19 on urban food systems based on evidence from eight cities in the Asia and Pacific region. We examined urban food systems using the conceptual framework underpinning the Food Systems Dashboard, which enabled us to explore the influence of external drivers, and the impacts of the pandemic on components of food systems and diet outcomes. We highlighted areas of vulnerability and resilience using data and case studies from eight cities where WFP operates. We developed a typology of resilience using selected indicators to show how different parts of the food system may exhibit different levels of resilience and capacities for resilience. This helps to identify where interventions may be needed to strengthen resilience and generate transformational responses in urban food systems.

Broadly we found that COVID-19 has increased levels of vulnerability and food insecurity in cities through three main mechanisms, which varied between cities and throughout the pandemic:

• Disruptions to food supply chains
• Increased food prices
• Loss of income

We identified and showcased a range of interventions and responses that may help to mitigate the impacts of the pandemic and protect the urban poor. Based on our study findings, we present the following recommendations as potential entry points for governments and development actors to consider in the response to COVID-19 and to strengthen the resilience of urban food systems against inevitable future shocks.

The recommendations specific to WFP are highlighted in blue.

Program and policy recommendations:

Provide financial support through loans/grants and technical assistance to SMEs in the food sector to protect the integrity of food supply chains. Provide technical assistance directly or leverage partners’ expertise (e.g. SUN Business network) with the private sector and knowledge transfer with financial contributions, with particular focus on SMEs in the food sector such as manufacturers, suppliers, retailers, stands selling prepared meals, and street vendors. This would have multiple benefits throughout the food system: protecting the integrity of food supply chains in cities; protecting the livelihoods of small business owners and their employees; ensuring access to affordable food for the urban poor who may not have access to alternative ways of acquiring food (such as supermarkets or online services). Blended finance could support financing for technical loans and grants to invest in food storage, quicker food chains or improved food safety. Hardship grants could be made available for SMEs during crises to support their survival and continuous availability of nutritious foods.

Recommendation specific to WFP:

- Use WFP’s expertise in cash transfer to support e-voucher grants for SMEs to support a sustainable and resilient food systems. Business loans or grants to business with low or no interest (targeting could be done either based on location or products sold). Advertise existing support schemes more widely, especially those that are accessible to unregistered vendors.

- To increase street food vendors’ resilience, provide skills development to street food vendors to make transformative changes to their business that allows greater resilience, notably through online sales, delivery platforms and marketing in general, or support to diversify their business. Skills training could be provided together with financial support.
- Support vendors to use technology to move to online orders via collective channel (sales platform at low cost) or improve connections and communication with consumers. Support e-commerce that can reach poor urban-dwellers. Specifically for the case of Pasar Mitra Tani intervention in Jakarta, support targeted action to reach low-income residential areas and involve Jakarta’s poor population more actively.

**Support dynamic urban food supply chain.**
Disruptions caused by the pandemic require rethinking of business models and facilitation of movement of goods within and to the city through use of technology and dynamic distribution chains.

**Recommendation specific to WFP:**
- Supporting vendors to access wholesalers and pool resources to coordinate shared deliveries and negotiate better prices.
- Connect small urban vendors with small rural suppliers and bypassing the big operators
- Setup Covid19/pandemic safe logistics processes that put in place systems and safety to facilitate movement of goods while meeting safety requirements and tracking provenance
- Support the development of communication platforms reaching poor urban dwellers: These platforms could support information sharing targeting poor households on where food at most affordable price can be found in their community.
- Support government and municipalities initiatives during crisis such as the MoA led intervention in Dhaka to bring markets and foods closer to poor urban dwellers (refer to the deep dive case studies C2) and explore new approach such as mobile markets. For these interventions, advocate to increase the nutrition-sensitivity of the project by promoting nutritionally higher quality foods. WFP supply chain could work with programme and relevant government counterparts to explore more effective supply chain and logistical solutions (e.g., for transporting goods to overcome difficulties encountered when using public transportation systems, liaising with DAM about warehousing, cold chain, distribution mechanisms). This would however require broad-based consultation and intensive support from the different relevant stakeholders (including, ministries, departments and NGOs). Mobile markets can support access of fresh products in poor urban areas during lockdowns and physical restrictions.

**Social protection and safety net programs that are nutrition sensitive, adaptive and responsive to shocks and support those worst affected including the urban poor.** These include social assistance schemes - predictable and reliable transfers of cash, food or other goods, as well as subsidies and service fee waivers for vulnerable groups. While most countries have longstanding social protection programs, many were developed for rural populations that were previously considered the most vulnerable to low incomes and food insecurity. COVID-19 has exposed the vulnerability of urban populations, especially daily wage earners and informal sector workers, who were among the worst affected by loss of income. Social protection programs must have inclusive eligibility criteria and accessible registration systems so that people can apply for benefits quickly when circumstances change unexpectedly.

**Recommendation specific to WFP:**
- Demonstrate impact of cash transfer programme on food diversity for the current WFP led cash back intervention in Dhaka slums (refer to deep dive case studies C2) and promote the potential of cash incentives for Government and agencies to implement nutrition-sensitive social safety net programmes that have both food and nutrition security benefits for the target group.
- Increase the sustainability of cash programme by leveraging the potential of the programme to influence other components of the food system, including producers, retailers and consumers as part of a systemic approach to
food value chains. This can be achieved by ensuring that the cash is spent towards reinforcing the food supply chain (for example, via accredited street food vendors selling healthy foods).

- Promote the use of targeting and modalities that are urban and nutrition sensitive – recommend using Multi Dimensional Poverty Index (MDPI) for targeting, complement with SBCC tackling barriers of purchasing healthy foods, and include cash modality matching the cost of a healthy diet.

**Urban agriculture programs to enable city residents and communities to grow their own food and generate extra income.** Urban agriculture has the potential to strengthen the resilience (and sustainability) of urban food systems in several ways: shortening supply chains and reducing reliance on food transported into the city; improving food access, affordability and quality for the urban poor; physical and wellbeing benefits associated with being outside and growing food; greener neighborhoods and environmental benefits (such as urban greening and cooling). Training and resources should be tailored to local needs, including what grows best in the local climate and the amount of space people have for growing food. Advocating for policies that support local production by making or protecting land available for growing within or close to the city. Vertical and indoor growing solutions may also be considered.

**Recommendation specific to WFP:**
- Advocate for the inclusion of the urban poor and particularly families that are at risk of malnutrition (such as families with young children) into urban agriculture programmes (specifically in Quezon City where an urban agriculture programme is already operational – refer to the deep dive case study C2).

- Provide technical guidance on increasing nutrition-sensitivity of the urban agriculture programmes.
- Provide strategic guidance on what foods make sense to do as urban agriculture and where foods will not be competitive with rural suppliers. e.g. specialist foods that are highly nutritious and/or can be sold as specialist cash crops....
- Consider technical guidance on urban farming solutions (hydroponics, fertilizer) and provide specialist support lines and websites for problems solving and sale of cheap equipment. Create a city urban farming platform that links suppliers, transporters, equipment suppliers, consumers, technical experts, people providing loans/grants

- Demonstrate the impact of current urban agriculture programme on dietary diversity (Grow QC)

**Methodological recommendations:**

**Standardized indicators of resilience and vulnerability to facilitate comparisons between cities.** With support from WFP colleagues, we searched for and collated available data for eight cities on key food and nutrition outcomes and other indicators of vulnerability. However, we found that data were not complete or standardized across cities (or countries). This heterogeneity is illustrated in the city briefs (Section 4). The best data availability was for food prices and we developed a composite indicator for average change in food prices in 2020 (Table 4). Furthermore, standardized indicators are lacking for individual factors and consumer behaviour – two important components of (urban) food systems. There is an opportunity for international and multi-sectoral collaboration to improve the evidence base on food systems.

**Recommendation specific to WFP:** In future food system assessment in these 8 cities, the indicators included in the urban analysis should be considered and can be adjusted depending on the type of shock in question or depending on local priorities in order to compare how resilience levels have evolved over time. These include: Cultivated land within 50 km of city (km2 per 100,000 persons), proportion of food sector businesses with most suppliers located within the city, average change in food prices during a specific time frame based on 4 selected food items, reduction in average household income, Minimum Dietary Diversity for Women of Reproductive Age (MDD-W). For individual factors, child Food Insecurity Experience scale indicator (currently being tested) should be used to capture the level of food insecurity experienced by children and adolescents as research as shown that their experience is different to the household’s head.
More research should be undertaken to provide guidance on a standardized indicator relevant to consumer behavior.

Increase granularity and frequency of data collection to enable timely and targeted intervention as well as an appropriate monitoring over time. Data available typically do not feature the geographic disaggregation (rural vs urban) necessary to guide targeting of interventions to urban populations most in need and its frequency rarely allows for timely responses.  
Recommendation specific to WFP: Advocate that survey efforts include slum populations and that urban data are disaggregated per wealth quintile to reflect intercity inequalities. Promote urban specific surveys with municipalities.

Further development and application of the typology of urban food systems resilience. The typology we have developed is intended as an operational tool, which may be modified and adapted by future users. When selecting the indicators for the typology, we considered which indicators were most relevant to our analysis of resilience during the COVID-19 pandemic, and the indicators for which we had the best available/consistent data. It is likely that different indicators would be selected by future users. The reductionist approach of selecting one indicator for each dimension of the food system has obvious limitations. A typology cannot convey the complexity of urban food systems. It is a simplified classification system that may be used to identify broad patterns and make comparisons between urban food systems. We hope it will provide a starting point for the identification of priorities and opportunities to strengthen resilience.  
Recommendation specific to WFP: Support the formalization of the urban food system analysis.

Innovative approaches to defining urban areas and collecting city specific data. In general, there is a dearth of city-level data and, as mentioned above, a real lack of local/granular data on food and food systems related data at the city-level. Combining local surveys (household and enterprise surveys, key information interviews etc.) with spatial, remotely sensed data can bring unique insights, both in terms of how cities and their food systems function and the characteristics and location of populations that are more likely to be susceptible to food security shocks and stresses.  
Recommendation specific to WFP: Recognizing that it might not be feasible for WFP to collect detailed data frequently, approaches that support and improve government's existing assessment, monitoring and surveillance tools and systems are recommended.

Further information is provided in Appendix 3.
Appendix
## Appendix 1. Results of Dikoda surveys
### Private Sector Survey – Round 1

### Table 1. Which category best describes your business?

<table>
<thead>
<tr>
<th>Business Category</th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture / food producer</td>
<td>31.9%</td>
<td>21.0%</td>
<td>41.6%</td>
<td>12.4%</td>
<td>1.9%</td>
<td>18.1%</td>
<td>0%</td>
<td>7.4%</td>
<td>0%</td>
</tr>
<tr>
<td>Food manufacturer / processor</td>
<td>12.5%</td>
<td>18.9%</td>
<td>3.7%</td>
<td>20.8%</td>
<td>-</td>
<td>15.0%</td>
<td>0%</td>
<td>22.2%</td>
<td>0%</td>
</tr>
<tr>
<td>Food storage / supplier</td>
<td>50.0%</td>
<td>44.1%</td>
<td>9.3%</td>
<td>15.9%</td>
<td>12.6%</td>
<td>18.1%</td>
<td>3.4%</td>
<td>40.7%</td>
<td>80.0%</td>
</tr>
<tr>
<td>Food retail / caterer</td>
<td>5.6%</td>
<td>14.0%</td>
<td>40.4%</td>
<td>47.3%</td>
<td>20.4%</td>
<td>37.5%</td>
<td>96.2%</td>
<td>29.6%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>0%</td>
<td>2.1%</td>
<td>5.0%</td>
<td>3.5%</td>
<td>65.0%</td>
<td>11.3%</td>
<td>0.5%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

P<0.05 However, 8 cells (17.8%) have expected count less than 5. The minimum expected count is 0.45.

### Table 2. How many workers does your business currently employ?

<table>
<thead>
<tr>
<th>Worker Category</th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sole trader</td>
<td>10.6%</td>
<td>5.6%</td>
<td>6.2%</td>
<td>8.8%</td>
<td>40.8%</td>
<td>25.0%</td>
<td>8.2%</td>
<td>7.4%</td>
<td>0%</td>
</tr>
<tr>
<td>Fewer than 10</td>
<td>69.7%</td>
<td>62.5%</td>
<td>21.7%</td>
<td>65.0%</td>
<td>41.7%</td>
<td>51.3%</td>
<td>81.3%</td>
<td>40.7%</td>
<td>0%</td>
</tr>
<tr>
<td>Between 10 and 49</td>
<td>16.2%</td>
<td>27.1%</td>
<td>44.1%</td>
<td>21.7%</td>
<td>15.5%</td>
<td>21.9%</td>
<td>9.6%</td>
<td>33.3%</td>
<td>40.0%</td>
</tr>
<tr>
<td>Between 50 and 199</td>
<td>2.8%</td>
<td>3.5%</td>
<td>24.8%</td>
<td>4.0%</td>
<td>1.0%</td>
<td>1.9%</td>
<td>1.0%</td>
<td>14.8%</td>
<td>20.0%</td>
</tr>
<tr>
<td>More than 200</td>
<td>0.7%</td>
<td>1.4%</td>
<td>3.1%</td>
<td>0.4%</td>
<td>1.0%</td>
<td>-</td>
<td>-</td>
<td>3.7%</td>
<td>40.0%</td>
</tr>
</tbody>
</table>

P<0.05 However, 10 cells (25.0%) have expected count less than 5. The minimum expected count is .25.

### Table 3. Where are your suppliers mostly located?

<table>
<thead>
<tr>
<th>Supplier Location</th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within the city</td>
<td>46.5%</td>
<td>61.1%</td>
<td>46.6%</td>
<td>69.3%</td>
<td>53.4%</td>
<td>34.4%</td>
<td>91.8%</td>
<td>37.0%</td>
<td>60.0%</td>
</tr>
<tr>
<td>Region surrounding the city</td>
<td>26.8%</td>
<td>8.3%</td>
<td>36.0%</td>
<td>20.0%</td>
<td>19.4%</td>
<td>43.1%</td>
<td>8.2%</td>
<td>37.0%</td>
<td>20.0%</td>
</tr>
<tr>
<td>Other regions of the country</td>
<td>26.1%</td>
<td>27.1%</td>
<td>15.5%</td>
<td>5.3%</td>
<td>21.4%</td>
<td>21.3%</td>
<td>-</td>
<td>25.9%</td>
<td></td>
</tr>
<tr>
<td>Internationally</td>
<td>0.7%</td>
<td>3.5%</td>
<td>1.9%</td>
<td>5.3%</td>
<td>5.8%</td>
<td>1.3%</td>
<td>-</td>
<td>-</td>
<td>20.0%</td>
</tr>
<tr>
<td>More than 200</td>
<td>0.7%</td>
<td>1.4%</td>
<td>3.1%</td>
<td>0.4%</td>
<td>1.0%</td>
<td>-</td>
<td>-</td>
<td>3.7%</td>
<td>40.0%</td>
</tr>
</tbody>
</table>

P<0.05 However, 7 cells (21.9%) have expected count less than 5. The minimum expected count is .67.
### Table 4. Have your supply chains been disrupted by the COVID-19 pandemic?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes – severely</td>
<td>14.1%</td>
<td>15.2%</td>
<td>6.2%</td>
<td>29.2%</td>
<td>42.7%</td>
<td>64.4%</td>
<td>1.0%</td>
<td>51.9%</td>
<td></td>
</tr>
<tr>
<td>Yes – moderately</td>
<td>54.9%</td>
<td>68.3%</td>
<td>54.7%</td>
<td>51.3%</td>
<td>22.3%</td>
<td>25.6%</td>
<td>96.2%</td>
<td>22.2%</td>
<td>40.0%</td>
</tr>
<tr>
<td>No</td>
<td>31.0%</td>
<td>16.6%</td>
<td>39.1%</td>
<td>19.5%</td>
<td>35.0%</td>
<td>10.0%</td>
<td>2.9%</td>
<td>25.9%</td>
<td>60.0%</td>
</tr>
</tbody>
</table>

P<0.05 However, 7 cells (21.9%) have expected count less than 5. The minimum expected count is .67.

### Table 5. Where are your customers (or market) mostly located?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within the city</td>
<td>72.5%</td>
<td>92.4%</td>
<td>52.2%</td>
<td>57.6%</td>
<td>58.3%</td>
<td>48.8%</td>
<td>92.3%</td>
<td>25.9%</td>
<td>40.0%</td>
</tr>
<tr>
<td>Region surrounding the city</td>
<td>17.6%</td>
<td>2.1%</td>
<td>22.4%</td>
<td>35.7%</td>
<td>16.5%</td>
<td>41.3%</td>
<td>7.7%</td>
<td>59.3%</td>
<td>40.0%</td>
</tr>
<tr>
<td>Other regions of the country</td>
<td>8.5%</td>
<td>2.1%</td>
<td>23.6%</td>
<td>4.9%</td>
<td>19.4%</td>
<td>9.4%</td>
<td>-</td>
<td>14.8%</td>
<td></td>
</tr>
<tr>
<td>Internationally</td>
<td>1.4%</td>
<td>3.5%</td>
<td>1.9%</td>
<td>1.8%</td>
<td>5.8%</td>
<td>0.6%</td>
<td>-</td>
<td>-</td>
<td>20.0%</td>
</tr>
</tbody>
</table>

P<0.05 However, 9 cells (28.1%) have expected count less than 5. The minimum expected count is .49.

### Table 6. Has your access to customers (or markets) been disrupted by the COVID-19 pandemic?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes – severely</td>
<td>18.3%</td>
<td>11.0%</td>
<td>34.8%</td>
<td>25.3%</td>
<td>42.2%</td>
<td>64.4%</td>
<td>0.5%</td>
<td>55.6%</td>
<td></td>
</tr>
<tr>
<td>Yes – moderately</td>
<td>59.2%</td>
<td>66.2%</td>
<td>56.5%</td>
<td>49.3%</td>
<td>23.5%</td>
<td>27.5%</td>
<td>96.6%</td>
<td>11.1%</td>
<td>40.0%</td>
</tr>
<tr>
<td>No</td>
<td>22.5%</td>
<td>22.8%</td>
<td>8.7%</td>
<td>25.3%</td>
<td>34.3%</td>
<td>8.1%</td>
<td>2.9%</td>
<td>33.3%</td>
<td>60.0%</td>
</tr>
</tbody>
</table>

P<0.05 However, 1 cell (4.2%) has expected count less than 5. The minimum expected count is 4.59.

### Table 7. Has your business income increased or decreased during the COVID-19 pandemic?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased</td>
<td>3.5%</td>
<td>13.8%</td>
<td>-</td>
<td>8.4%</td>
<td>-</td>
<td>7.5%</td>
<td>-</td>
<td>22.2%</td>
<td></td>
</tr>
<tr>
<td>Decreased</td>
<td>72.5%</td>
<td>70.3%</td>
<td>90.1%</td>
<td>64.6%</td>
<td>59.2%</td>
<td>78.8%</td>
<td>86.5%</td>
<td>63.0%</td>
<td></td>
</tr>
<tr>
<td>No change</td>
<td>23.9%</td>
<td>15.9%</td>
<td>9.9%</td>
<td>27.0%</td>
<td>40.8%</td>
<td>13.8%</td>
<td>13.5%</td>
<td>14.8%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

P<0.05 However, 1 cell (4.2%) has expected count less than 5. The minimum expected count is 4.59.
Table 8. By what percentage has your business income increased?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 25%</td>
<td>60.0%</td>
<td>55.0%</td>
<td>-</td>
<td>77.8%</td>
<td>-</td>
<td>66.7%</td>
<td>-</td>
<td>33.3%</td>
<td></td>
</tr>
<tr>
<td>Between 25% and 50%</td>
<td>40.0%</td>
<td>45.0%</td>
<td>100.0%</td>
<td>22.2%</td>
<td>-</td>
<td>25.0%</td>
<td>-</td>
<td>16.7%</td>
<td></td>
</tr>
<tr>
<td>Between 50% and 75%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>8.3%</td>
<td>-</td>
<td>33.3%</td>
<td></td>
</tr>
<tr>
<td>More than 75%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>16.7%</td>
<td></td>
</tr>
</tbody>
</table>

P<0.05 However, 19 cells (79.2%) have expected count less than 5. The minimum expected count is .02.

Table 9. How did your business generate more income during the pandemic?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marketing</td>
<td>20.0%</td>
<td>20.0%</td>
<td>-</td>
<td>5.6%</td>
<td>-</td>
<td>8.3%</td>
<td>-</td>
<td>66.7%</td>
<td></td>
</tr>
<tr>
<td>Customer service</td>
<td>-</td>
<td>20.0%</td>
<td>-</td>
<td>72.2%</td>
<td>-</td>
<td>41.7%</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Online sales or discounts</td>
<td>60.0%</td>
<td>55.0%</td>
<td>-</td>
<td>11.1%</td>
<td>-</td>
<td>25.0%</td>
<td>-</td>
<td>16.7%</td>
<td></td>
</tr>
<tr>
<td>Diversified business model</td>
<td>20.0%</td>
<td>-</td>
<td>-</td>
<td>11.1%</td>
<td>-</td>
<td>25.0%</td>
<td>-</td>
<td>16.7%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>-</td>
<td>5.0%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

P<0.05 However, 21 cells (84.0%) have expected count less than 5. The minimum expected count is .08.

Table 10. By what percentage has your business income decreased?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 25%</td>
<td>34.0%</td>
<td>51.0%</td>
<td>38.4%</td>
<td>23.3%</td>
<td>3.3%</td>
<td>39.7%</td>
<td>94.4%</td>
<td>17.6%</td>
<td></td>
</tr>
<tr>
<td>Between 25% and 50%</td>
<td>51.5%</td>
<td>34.3%</td>
<td>49.3%</td>
<td>51.4%</td>
<td>36.7%</td>
<td>27.8%</td>
<td>5.6%</td>
<td>47.1%</td>
<td></td>
</tr>
<tr>
<td>Between 50% and 75%</td>
<td>11.7%</td>
<td>11.8%</td>
<td>11.6%</td>
<td>14.4%</td>
<td>40.0%</td>
<td>15.9%</td>
<td>-</td>
<td>35.3%</td>
<td></td>
</tr>
<tr>
<td>More than 75%</td>
<td>2.9%</td>
<td>2.9%</td>
<td>0.7%</td>
<td>11.0%</td>
<td>20.0%</td>
<td>16.7%</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>-</td>
<td>5.0%</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

P<0.05 However, 3 cells (9.4%) have expected count less than 5. The minimum expected count is 1.08.

Table 11. Have you received any financial support from the government? pandemic?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>-</td>
<td>1.0%</td>
<td>3.4%</td>
<td>-</td>
<td>6.7%</td>
<td>0.8%</td>
<td>0.6%</td>
<td>17.6%</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>100.0%</td>
<td>99.0%</td>
<td>96.6%</td>
<td>100.0%</td>
<td>93.3%</td>
<td>99.2%</td>
<td>99.4%</td>
<td>82.4%</td>
<td></td>
</tr>
</tbody>
</table>

P<0.05 However, 8 cells (50.0%) have expected count less than 5. The minimum expected count is .29.
Table 12. How did your business adapt to lower income during the pandemic?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka n=148</th>
<th>Jakarta n=161</th>
<th>Kabul n=228</th>
<th>Lucknow n=103</th>
<th>Peshawar n=160</th>
<th>Phnom Penh n=203</th>
<th>Quezon City n=54</th>
<th>Cox Bazaar refugee camp n=5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced costs</td>
<td>40.8%</td>
<td>53.9%</td>
<td>58.6%</td>
<td>35.4%</td>
<td>21.7%</td>
<td>11.9%</td>
<td>61.5%</td>
<td>64.7%</td>
<td></td>
</tr>
<tr>
<td>Sold business assets</td>
<td>19.4%</td>
<td>5.9%</td>
<td>0.7%</td>
<td>4.8%</td>
<td>20.0%</td>
<td>26.2%</td>
<td>0.6%</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Business loan</td>
<td>10.7%</td>
<td>2.0%</td>
<td>-</td>
<td>36.1%</td>
<td>11.7%</td>
<td>19.0%</td>
<td>2.8%</td>
<td>11.8%</td>
<td></td>
</tr>
<tr>
<td>Invested personal money</td>
<td>25.2%</td>
<td>34.3%</td>
<td>0.7%</td>
<td>23.8%</td>
<td>35.0%</td>
<td>21.4%</td>
<td>24.6%</td>
<td>17.6%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>3.9%</td>
<td>3.9%</td>
<td>40.0%</td>
<td>-</td>
<td>11.7%</td>
<td>21.4%</td>
<td>10.6%</td>
<td>5.9%</td>
<td></td>
</tr>
</tbody>
</table>

P<0.05 However, 2 cells (5.0%) have expected count less than 5. The minimum expected count is 2.97.
## Private Sector Survey – Round 2

### Table 1. Business Owner’s Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=146)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=225)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>5.2%</td>
<td>36.1%</td>
<td>2.9%</td>
<td>8.2%</td>
<td>6.8%</td>
<td>5.5%</td>
<td>4.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>53.5%</td>
<td>50.0%</td>
<td>27.8%</td>
<td>85.4%</td>
<td>78.7%</td>
<td>13.6%</td>
<td>8.8%</td>
<td>95.8%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Co-owned</td>
<td>46.5%</td>
<td>16.7%</td>
<td>36.1%</td>
<td>11.7%</td>
<td>13.1%</td>
<td>78.0%</td>
<td>64.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not applicable</td>
<td>28.1%</td>
<td>1.7%</td>
<td>20.9%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 2. Main food products produced or supported.

<table>
<thead>
<tr>
<th>Product Category</th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=146)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=225)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grains (rice, wheat, maize, etc.)</td>
<td>8.66%</td>
<td>4.26%</td>
<td>8.33%</td>
<td>11%</td>
<td>3.95%</td>
<td>11.66%</td>
<td>3.07%</td>
<td>18.97%</td>
<td>26.32%</td>
</tr>
<tr>
<td>Roots or tubers (potatoes, yam, cassava, etc.)</td>
<td>7.87%</td>
<td>4.26%</td>
<td>4.76%</td>
<td>7.33%</td>
<td>3.95%</td>
<td>1.02%</td>
<td>5.19%</td>
<td>0.86%</td>
<td>5.26%</td>
</tr>
<tr>
<td>Nuts or seeds</td>
<td>7.09%</td>
<td>3.83%</td>
<td>2.38%</td>
<td>7.09%</td>
<td>3.29%</td>
<td>6.54%</td>
<td>6.84%</td>
<td>0.86%</td>
<td>5.26%</td>
</tr>
<tr>
<td>Legumes (beans, lentils, peas)</td>
<td>6.3%</td>
<td>3.83%</td>
<td>2.38%</td>
<td>6.85%</td>
<td>2.63%</td>
<td>0.61%</td>
<td>7.55%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Fish</td>
<td>5.51%</td>
<td>6.38%</td>
<td>7.14%</td>
<td>2.44%</td>
<td>2.63%</td>
<td>12.07%</td>
<td>9.67%</td>
<td>3.45%</td>
<td>0%</td>
</tr>
<tr>
<td>Meat</td>
<td>12.6%</td>
<td>11.91%</td>
<td>17.86%</td>
<td>3.67%</td>
<td>11.18%</td>
<td>12.07%</td>
<td>9.2%</td>
<td>7.76%</td>
<td>0%</td>
</tr>
<tr>
<td>Dairy</td>
<td>14.96%</td>
<td>8.09%</td>
<td>5.95%</td>
<td>8.31%</td>
<td>13.16%</td>
<td>11.66%</td>
<td>9.91%</td>
<td>9.48%</td>
<td>15.79%</td>
</tr>
<tr>
<td>Eggs</td>
<td>5.51%</td>
<td>5.53%</td>
<td>7.14%</td>
<td>10.51%</td>
<td>9.87%</td>
<td>12.07%</td>
<td>14.15%</td>
<td>6.9%</td>
<td>10.53%</td>
</tr>
<tr>
<td>Vegetables</td>
<td>7.09%</td>
<td>10.64%</td>
<td>5.95%</td>
<td>4.4%</td>
<td>10.53%</td>
<td>12.07%</td>
<td>12.74%</td>
<td>4.31%</td>
<td>5.26%</td>
</tr>
<tr>
<td>Fruit</td>
<td>6.3%</td>
<td>11.91%</td>
<td>2.38%</td>
<td>4.4%</td>
<td>15.13%</td>
<td>11.86%</td>
<td>10.61%</td>
<td>1.72%</td>
<td>0%</td>
</tr>
<tr>
<td>Processed/manufactured foods low in sugar and/or fat</td>
<td>5.51%</td>
<td>3.40%</td>
<td>11.9%</td>
<td>11.74%</td>
<td>12.5%</td>
<td>4.29%</td>
<td>6.37%</td>
<td>0%</td>
<td>15.79%</td>
</tr>
<tr>
<td>Processed/manufactured with high sugar or high fat or content</td>
<td>10.24%</td>
<td>10.21%</td>
<td>19.05%</td>
<td>11.98%</td>
<td>10.53%</td>
<td>4.09%</td>
<td>3.77%</td>
<td>2.59%</td>
<td>15.79%</td>
</tr>
<tr>
<td>Not applicable</td>
<td>0.79%</td>
<td>0.43%</td>
<td>0%</td>
<td>1.22%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>5.17%</td>
<td>0%</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>1.57%</td>
<td>15.32%</td>
<td>4.76%</td>
<td>9.05%</td>
<td>0.66%</td>
<td>0%</td>
<td>0.94%</td>
<td>37.93%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Table 3. Target groups. Which of these groups are mostly your end consumers (e.g. the ones who consume the foods)?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=228)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Everyone across age groups and gender</td>
<td>100.00%</td>
<td>95.00%</td>
<td>97.20%</td>
<td>82.50%</td>
<td>100.00%</td>
<td>100.00%</td>
<td>96.70%</td>
<td>100.00%</td>
<td>100.00%</td>
</tr>
<tr>
<td>Babies only</td>
<td>1.00%</td>
<td>2.80%</td>
<td>1.90%</td>
<td>1.90%</td>
<td>1.90%</td>
<td>1.90%</td>
<td>1.90%</td>
<td>1.90%</td>
<td>1.90%</td>
</tr>
<tr>
<td>Women only</td>
<td>4.00%</td>
<td>15.50%</td>
<td>2.20%</td>
<td>2.20%</td>
<td>2.20%</td>
<td>2.20%</td>
<td>2.20%</td>
<td>2.20%</td>
<td>2.20%</td>
</tr>
</tbody>
</table>

Table 4. Which of the following effects of the coronavirus pandemic have impacted your company's supply chain in the last 12 months? Select all that apply.

<table>
<thead>
<tr>
<th>Effect</th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=228)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None of the above</td>
<td>17.65%</td>
<td>6.9%</td>
<td>2.56%</td>
<td>17.95%</td>
<td>7.41%</td>
<td>0%</td>
<td>0.57%</td>
<td>14.19%</td>
<td>60%</td>
</tr>
<tr>
<td>Shortage of supplies</td>
<td>35.29%</td>
<td>7.59%</td>
<td>12.31%</td>
<td>12.82%</td>
<td>24.07%</td>
<td>42.42%</td>
<td>18.13%</td>
<td>18.24%</td>
<td>0%</td>
</tr>
<tr>
<td>Suppliers closing down</td>
<td>10.29%</td>
<td>10.34%</td>
<td>3.08%</td>
<td>10.26%</td>
<td>16.67%</td>
<td>0.76%</td>
<td>20.68%</td>
<td>15.54%</td>
<td>0%</td>
</tr>
<tr>
<td>Production stoppage/suspension</td>
<td>2.94%</td>
<td>9.66%</td>
<td>6.15%</td>
<td>11.79%</td>
<td>11.11%</td>
<td>0.76%</td>
<td>19.26%</td>
<td>13.51%</td>
<td>0%</td>
</tr>
<tr>
<td>Change of production focus</td>
<td>5.88%</td>
<td>1.38%</td>
<td>1.03%</td>
<td>9.23%</td>
<td>10.19%</td>
<td>5.3%</td>
<td>18.13%</td>
<td>3.38%</td>
<td>0%</td>
</tr>
<tr>
<td>Transportation disruption</td>
<td>11.76%</td>
<td>39.31%</td>
<td>5.13%</td>
<td>12.82%</td>
<td>12.04%</td>
<td>44.7%</td>
<td>5.1%</td>
<td>21.62%</td>
<td>0%</td>
</tr>
<tr>
<td>Shift to a more localized supply chain</td>
<td>7.35%</td>
<td>0.69%</td>
<td>8.21%</td>
<td>2.56%</td>
<td>0.93%</td>
<td>4.55%</td>
<td>1.42%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Work with more suppliers</td>
<td>1.47%</td>
<td>2.76%</td>
<td>0.51%</td>
<td>10.77%</td>
<td>5.56%</td>
<td>1.52%</td>
<td>4.25%</td>
<td>3.38%</td>
<td>20%</td>
</tr>
<tr>
<td>Reduce product lines and/or ingredients</td>
<td>5.88%</td>
<td>1.38%</td>
<td>2.05%</td>
<td>8.21%</td>
<td>8.33%</td>
<td>0%</td>
<td>7.08%</td>
<td>7.43%</td>
<td>0%</td>
</tr>
<tr>
<td>Move operations to other location</td>
<td>0%</td>
<td>0.69%</td>
<td>0.51%</td>
<td>3.08%</td>
<td>3.7%</td>
<td>0%</td>
<td>5.38%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>1.47%</td>
<td>19.31%</td>
<td>0.51%</td>
<td>0.51%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>2.7%</td>
<td>20%</td>
</tr>
<tr>
<td>Processed/manufactured with high sugar or high fat content</td>
<td>10.24%</td>
<td>10.21%</td>
<td>19.05%</td>
<td>11.98%</td>
<td>10.53%</td>
<td>4.09%</td>
<td>3.77%</td>
<td>2.59%</td>
<td>15.79%</td>
</tr>
<tr>
<td>Not applicable</td>
<td>0.79%</td>
<td>0.43%</td>
<td>0%</td>
<td>1.22%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>5.17%</td>
<td>0%</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>1.57%</td>
<td>15.32%</td>
<td>4.76%</td>
<td>9.05%</td>
<td>0.66%</td>
<td>0%</td>
<td>0.94%</td>
<td>37.93%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Table 5. What actions has your company taken around the coronavirus pandemic to reduce cost of operations? Select all that apply.

<table>
<thead>
<tr>
<th>Action</th>
<th>Chittagong (n=142)</th>
<th>Dhaka n=145</th>
<th>Jakarta n=161</th>
<th>Kabul n=226</th>
<th>Lucknow n=103</th>
<th>Peshawar n=160</th>
<th>Phnom Penh n=208</th>
<th>Quezon City n=54</th>
<th>Cox Bazaar refugee camp n=5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced products</td>
<td>17.54%</td>
<td>3.97%</td>
<td>18.92%</td>
<td>16.99%</td>
<td>29.25%</td>
<td>9.32%</td>
<td>8.07%</td>
<td>7.69%</td>
<td>42.86%</td>
</tr>
<tr>
<td>Reduced sales hours or number of days</td>
<td>29.82%</td>
<td>3.17%</td>
<td>48.65%</td>
<td>18.95%</td>
<td>9.43%</td>
<td>0.85%</td>
<td>11.53%</td>
<td>12.82%</td>
<td>14.29%</td>
</tr>
<tr>
<td>Reduced suppliers</td>
<td>8.77%</td>
<td>6.35%</td>
<td>2.7%</td>
<td>8.5%</td>
<td>12.26%</td>
<td>27.12%</td>
<td>16.43%</td>
<td>19.23%</td>
<td>0%</td>
</tr>
<tr>
<td>Changed to cheaper suppliers</td>
<td>3.51%</td>
<td>9.52%</td>
<td>2.7%</td>
<td>10.46%</td>
<td>8.49%</td>
<td>3.39%</td>
<td>20.17%</td>
<td>5.13%</td>
<td>0%</td>
</tr>
<tr>
<td>Changed to lower quality food items</td>
<td>5.26%</td>
<td>0.79%</td>
<td>0%</td>
<td>7.19%</td>
<td>2.83%</td>
<td>3.39%</td>
<td>19.02%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Changed distribution methods to cheaper ones</td>
<td>8.77%</td>
<td>27.78%</td>
<td>2.7%</td>
<td>13.73%</td>
<td>15.09%</td>
<td>5.93%</td>
<td>16.14%</td>
<td>14.1%</td>
<td>0%</td>
</tr>
<tr>
<td>Downsized staff</td>
<td>26.32%</td>
<td>46.83%</td>
<td>18.92%</td>
<td>23.53%</td>
<td>22.64%</td>
<td>50%</td>
<td>8.65%</td>
<td>41.03%</td>
<td>42.86%</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>0%</td>
<td>1.59%</td>
<td>5.41%</td>
<td>0.65%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 6. Has your company done other adaptations during the pandemic?

<table>
<thead>
<tr>
<th>Adaptation</th>
<th>Chittagong (n=142)</th>
<th>Dhaka n=145</th>
<th>Jakarta n=161</th>
<th>Kabul n=226</th>
<th>Lucknow n=103</th>
<th>Peshawar n=160</th>
<th>Phnom Penh n=208</th>
<th>Quezon City n=54</th>
<th>Cox Bazaar refugee camp n=5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diversification of products</td>
<td>15.38%</td>
<td>13.73%</td>
<td>7.69%</td>
<td>20.51%</td>
<td>38.03%</td>
<td>38.38%</td>
<td>21.05%</td>
<td>13.33%</td>
<td>71.43%</td>
</tr>
<tr>
<td>New food products</td>
<td>50%</td>
<td>1.96%</td>
<td>61.54%</td>
<td>26.92%</td>
<td>26.76%</td>
<td>6.06%</td>
<td>24.81%</td>
<td>20%</td>
<td>0%</td>
</tr>
<tr>
<td>Sharing workforce with other companies</td>
<td>7.69%</td>
<td>3.92%</td>
<td>7.69%</td>
<td>17.95%</td>
<td>7.04%</td>
<td>0%</td>
<td>25.94%</td>
<td>20%</td>
<td>0%</td>
</tr>
<tr>
<td>New distribution methods</td>
<td>26.92%</td>
<td>80.39%</td>
<td>23.08%</td>
<td>34.62%</td>
<td>28.17%</td>
<td>55.56%</td>
<td>28.2%</td>
<td>46.67%</td>
<td>28.57%</td>
</tr>
<tr>
<td>Other (please specify)</td>
<td>0%</td>
<td>9.8%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>6.67%</td>
<td>0%</td>
</tr>
</tbody>
</table>
### Table 7. Which actions do you think would be the most effective to support you to cope with the effects of the pandemic?

<table>
<thead>
<tr>
<th>Action</th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=228)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support to ensure continuity of workforce</td>
<td>4.05%</td>
<td>14.22%</td>
<td>29.79%</td>
<td>11.03%</td>
<td>10%</td>
<td>18.84%</td>
<td>7.71%</td>
<td>11.11%</td>
<td>33.33%</td>
</tr>
<tr>
<td>Provide unemployment insurance or paycheck continuity support for employees</td>
<td>5.41%</td>
<td>1.9%</td>
<td>8.51%</td>
<td>1.78%</td>
<td>6.11%</td>
<td>19.52%</td>
<td>10.05%</td>
<td>1.75%</td>
<td>6.67%</td>
</tr>
<tr>
<td>Access to financial support</td>
<td>20.27%</td>
<td>11.37%</td>
<td>10.64%</td>
<td>16.37%</td>
<td>8.33%</td>
<td>16.1%</td>
<td>14.25%</td>
<td>19.88%</td>
<td>6.67%</td>
</tr>
<tr>
<td>Technical support to cope with the impact</td>
<td>5.41%</td>
<td>20.38%</td>
<td>2.13%</td>
<td>7.47%</td>
<td>7.78%</td>
<td>17.47%</td>
<td>15.19%</td>
<td>5.85%</td>
<td>6.67%</td>
</tr>
<tr>
<td>Provide incentives</td>
<td>1.35%</td>
<td>14.69%</td>
<td>6.38%</td>
<td>3.91%</td>
<td>5%</td>
<td>1.37%</td>
<td>12.38%</td>
<td>3.51%</td>
<td>0%</td>
</tr>
<tr>
<td>Increase and/or facilitate more procurement of my firm’s food products</td>
<td>6.76%</td>
<td>1.42%</td>
<td>0%</td>
<td>3.2%</td>
<td>6.67%</td>
<td>0%</td>
<td>13.08%</td>
<td>5.85%</td>
<td>0%</td>
</tr>
<tr>
<td>Re-open retail outlets</td>
<td>2.7%</td>
<td>0.47%</td>
<td>2.13%</td>
<td>5.34%</td>
<td>10.56%</td>
<td>0.34%</td>
<td>10.98%</td>
<td>4.09%</td>
<td>6.67%</td>
</tr>
<tr>
<td>Expand working or store-opening hours</td>
<td>1.35%</td>
<td>2.37%</td>
<td>17.02%</td>
<td>6.76%</td>
<td>6.67%</td>
<td>0%</td>
<td>7.71%</td>
<td>2.92%</td>
<td>13.33%</td>
</tr>
<tr>
<td>Facilitate domestic transport of goods</td>
<td>1.35%</td>
<td>9.95%</td>
<td>0%</td>
<td>9.25%</td>
<td>10.56%</td>
<td>2.05%</td>
<td>3.27%</td>
<td>6.43%</td>
<td>6.67%</td>
</tr>
<tr>
<td>Keep borders open</td>
<td>6.76%</td>
<td>3.79%</td>
<td>0%</td>
<td>12.1%</td>
<td>6.67%</td>
<td>19.18%</td>
<td>1.87%</td>
<td>7.6%</td>
<td>0%</td>
</tr>
<tr>
<td>Facilitate trade</td>
<td>27.03%</td>
<td>9%</td>
<td>0%</td>
<td>14.59%</td>
<td>18.33%</td>
<td>4.79%</td>
<td>1.64%</td>
<td>11.7%</td>
<td>20%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>17.57%</td>
<td>6.16%</td>
<td>23.4%</td>
<td>8.19%</td>
<td>3.33%</td>
<td>0.34%</td>
<td>1.87%</td>
<td>15.79%</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>4.27%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>3.51%</td>
<td>0%</td>
</tr>
</tbody>
</table>

### Table 8. Has your business needed money to cope with the impact of the coronavirus pandemic in the last 6 months?

<table>
<thead>
<tr>
<th>Action</th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=228)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>60%</td>
<td>12.9%</td>
<td>56.82%</td>
<td>19.37%</td>
<td>22.73%</td>
<td>7.34%</td>
<td>54.95%</td>
<td>80%</td>
<td></td>
</tr>
<tr>
<td>Yes, for paying salaries</td>
<td>6%</td>
<td>29.03%</td>
<td>15.91%</td>
<td>19.82%</td>
<td>12.73%</td>
<td>25.43%</td>
<td>22.73%</td>
<td>10.99%</td>
<td></td>
</tr>
<tr>
<td>Yes, for paying suppliers</td>
<td>6%</td>
<td>10.75%</td>
<td>9.09%</td>
<td>14.86%</td>
<td>11.82%</td>
<td>24.57%</td>
<td>22.73%</td>
<td>5.49%</td>
<td></td>
</tr>
<tr>
<td>Yes, for inventory purchase</td>
<td>4%</td>
<td>11.83%</td>
<td>0%</td>
<td>6.76%</td>
<td>10%</td>
<td>2.59%</td>
<td>18.53%</td>
<td>5.49%</td>
<td></td>
</tr>
<tr>
<td>Yes, for working capital</td>
<td>14%</td>
<td>2.15%</td>
<td>2.27%</td>
<td>8.56%</td>
<td>8.18%</td>
<td>3.45%</td>
<td>10.84%</td>
<td>16.48%</td>
<td></td>
</tr>
<tr>
<td>Yes, for equipment financing</td>
<td>0%</td>
<td>10.75%</td>
<td>2.27%</td>
<td>7.21%</td>
<td>9.09%</td>
<td>1.29%</td>
<td>3.85%</td>
<td>2.2%</td>
<td></td>
</tr>
<tr>
<td>Yes, for capital intensive asset purchase</td>
<td>4%</td>
<td>4.84%</td>
<td>4.55%</td>
<td>5.86%</td>
<td>8.18%</td>
<td>4.31%</td>
<td>5.24%</td>
<td>3.3%</td>
<td>20%</td>
</tr>
<tr>
<td>Yes, for service existing loans / debt repayment</td>
<td>4%</td>
<td>1.61%</td>
<td>4.55%</td>
<td>9.91%</td>
<td>10%</td>
<td>25%</td>
<td>5.94%</td>
<td>1.1%</td>
<td></td>
</tr>
<tr>
<td>Yes, for refinancing</td>
<td>2%</td>
<td>16.13%</td>
<td>4.55%</td>
<td>7.66%</td>
<td>7.27%</td>
<td>13.36%</td>
<td>2.8%</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Keep borders open</td>
<td>6.76%</td>
<td>3.79%</td>
<td>0%</td>
<td>12.1%</td>
<td>6.67%</td>
<td>19.18%</td>
<td>1.87%</td>
<td>7.6%</td>
<td></td>
</tr>
<tr>
<td>Facilitate trade</td>
<td>27.03%</td>
<td>9%</td>
<td>0%</td>
<td>14.59%</td>
<td>18.33%</td>
<td>4.79%</td>
<td>1.64%</td>
<td>11.7%</td>
<td>20%</td>
</tr>
<tr>
<td>Don’t know</td>
<td>17.57%</td>
<td>6.16%</td>
<td>23.4%</td>
<td>8.19%</td>
<td>3.33%</td>
<td>0.34%</td>
<td>1.87%</td>
<td>15.79%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>4.27%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>3.51%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Table 9. Were you able to borrow money or get financial support?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No, because no money lender</td>
<td>4.62%</td>
<td>8.51%</td>
<td>0%</td>
<td>31.82%</td>
<td>60%</td>
<td>46.73%</td>
<td>16.29%</td>
<td>14.29%</td>
<td>0%</td>
</tr>
<tr>
<td>No, because rate too high</td>
<td>80%</td>
<td>0%</td>
<td>18.18%</td>
<td>13.64%</td>
<td>11.11%</td>
<td>0%</td>
<td>30.9%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>No, because already too much debt</td>
<td>3.08%</td>
<td>38.3%</td>
<td>0%</td>
<td>0%</td>
<td>8.89%</td>
<td>45.79%</td>
<td>28.65%</td>
<td>47.62%</td>
<td>0%</td>
</tr>
<tr>
<td>No, because no grant available</td>
<td>3.08%</td>
<td>34.04%</td>
<td>27.27%</td>
<td>30.3%</td>
<td>11.11%</td>
<td>0%</td>
<td>20.22%</td>
<td>9.52%</td>
<td>0%</td>
</tr>
<tr>
<td>Yes</td>
<td>9.23%</td>
<td>19.15%</td>
<td>54.55%</td>
<td>24.24%</td>
<td>8.89%</td>
<td>7.48%</td>
<td>3.93%</td>
<td>28.57%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 10. What did you need in the last 6 months? (in USD)

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than US$5000</td>
<td>45.50%</td>
<td>26.90%</td>
<td>54.50%</td>
<td>20.30%</td>
<td>69.40%</td>
<td>4.30%</td>
<td>52.60%</td>
<td>100.00%</td>
<td></td>
</tr>
<tr>
<td>US$5000 - US$10000</td>
<td>45.50%</td>
<td>37.20%</td>
<td>27.10%</td>
<td>27.80%</td>
<td>1.70%</td>
<td>24.30%</td>
<td>47.40%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greater than US$10000</td>
<td>9.10%</td>
<td>30.80%</td>
<td>18.20%</td>
<td>52.50%</td>
<td>91.50%</td>
<td>64.30%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don't know</td>
<td>5.10%</td>
<td>27.30%</td>
<td>2.80%</td>
<td>6.80%</td>
<td>7.10%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 11. Do you need technical assistance to cope with the impact of the coronavirus pandemic?

<table>
<thead>
<tr>
<th>Service Provided</th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes, for Business resilience planning</td>
<td>4.76%</td>
<td>15.52%</td>
<td>1.69%</td>
<td>4.06%</td>
<td>22.86%</td>
<td>15.43%</td>
<td>7.39%</td>
<td>1.04%</td>
<td>33.33%</td>
</tr>
<tr>
<td>Yes, for Advice on measures to keep staff in the workplace</td>
<td>3.17%</td>
<td>0.72%</td>
<td>1.69%</td>
<td>4.43%</td>
<td>8.57%</td>
<td>10.37%</td>
<td>14.37%</td>
<td>1.04%</td>
<td>0%</td>
</tr>
<tr>
<td>Yes, for Advice on input sourcing</td>
<td>1.59%</td>
<td>6.14%</td>
<td>0%</td>
<td>4.8%</td>
<td>6.43%</td>
<td>2.66%</td>
<td>14.77%</td>
<td>2.08%</td>
<td>0%</td>
</tr>
<tr>
<td>Yes, for Advice on sales/distribution</td>
<td>6.35%</td>
<td>9.03%</td>
<td>0%</td>
<td>9.59%</td>
<td>4.29%</td>
<td>6.91%</td>
<td>12.77%</td>
<td>5.21%</td>
<td>0%</td>
</tr>
<tr>
<td>Yes, for Advice on price information</td>
<td>3.17%</td>
<td>2.89%</td>
<td>3.39%</td>
<td>7.38%</td>
<td>1.43%</td>
<td>10.9%</td>
<td>7.39%</td>
<td>3.13%</td>
<td>0%</td>
</tr>
<tr>
<td>Yes, for Advice on fortification</td>
<td>1.59%</td>
<td>6.86%</td>
<td>0%</td>
<td>2.95%</td>
<td>4.29%</td>
<td>0.53%</td>
<td>0.4%</td>
<td>1.04%</td>
<td>0%</td>
</tr>
<tr>
<td>Yes, for Advice on product reformulation</td>
<td>1.59%</td>
<td>0.36%</td>
<td>0%</td>
<td>3.69%</td>
<td>1.43%</td>
<td>3.72%</td>
<td>1.6%</td>
<td>2.08%</td>
<td>0%</td>
</tr>
<tr>
<td>Yes, for Advice on food safety</td>
<td>1.59%</td>
<td>1.44%</td>
<td>6.78%</td>
<td>5.54%</td>
<td>1.43%</td>
<td>1.86%</td>
<td>3.19%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Yes, for Advice on nutrition labelling</td>
<td>3.17%</td>
<td>1.08%</td>
<td>0%</td>
<td>7.01%</td>
<td>1.43%</td>
<td>0.8%</td>
<td>4.79%</td>
<td>1.04%</td>
<td>0%</td>
</tr>
<tr>
<td>Yes, for Advice on reducing costs/making products more affordable</td>
<td>4.76%</td>
<td>0.36%</td>
<td>1.69%</td>
<td>3.69%</td>
<td>2.14%</td>
<td>8.51%</td>
<td>5.19%</td>
<td>2.08%</td>
<td>11.11%</td>
</tr>
<tr>
<td>Yes, for Marketing advice</td>
<td>6.35%</td>
<td>12.27%</td>
<td>28.81%</td>
<td>7.38%</td>
<td>7.86%</td>
<td>11.44%</td>
<td>6.99%</td>
<td>6.25%</td>
<td>11.11%</td>
</tr>
<tr>
<td>Yes, for Quality Assurance and Quality Control advice</td>
<td>6.35%</td>
<td>0.36%</td>
<td>1.69%</td>
<td>2.95%</td>
<td>3.57%</td>
<td>1.33%</td>
<td>7.19%</td>
<td>0%</td>
<td>11.11%</td>
</tr>
<tr>
<td>Yes, for Links to distribution or logistics channels</td>
<td>1.59%</td>
<td>4.33%</td>
<td>0%</td>
<td>5.54%</td>
<td>3.57%</td>
<td>1.86%</td>
<td>5.19%</td>
<td>1.04%</td>
<td>11.11%</td>
</tr>
<tr>
<td>Yes, for Update business plan</td>
<td>6.35%</td>
<td>15.16%</td>
<td>8.47%</td>
<td>6.27%</td>
<td>5%</td>
<td>9.84%</td>
<td>2.99%</td>
<td>6.25%</td>
<td>0%</td>
</tr>
<tr>
<td>Yes, for Development of online platforms for business operations</td>
<td>3.17%</td>
<td>9.03%</td>
<td>20.34%</td>
<td>4.06%</td>
<td>7.14%</td>
<td>12.77%</td>
<td>4.19%</td>
<td>3.13%</td>
<td>0%</td>
</tr>
<tr>
<td>Yes, for Support to improve staff health/ nutrition</td>
<td>1.59%</td>
<td>12.64%</td>
<td>1.69%</td>
<td>5.9%</td>
<td>8.57%</td>
<td>1.06</td>
<td>1.6%</td>
<td>2.08%</td>
<td>0%</td>
</tr>
<tr>
<td>No</td>
<td>42.86%</td>
<td>1.81%</td>
<td>23.73%</td>
<td>14.76%</td>
<td>10%</td>
<td>0%</td>
<td>62.5%</td>
<td>22.22%</td>
<td>0%</td>
</tr>
</tbody>
</table>
### UN/NGOs Survey – Round 1

**Table 1. Prior to the start of the COVID-19 pandemic, did your organisation have a focus on urban populations?**

<table>
<thead>
<tr>
<th></th>
<th>Dhaka n=208</th>
<th>Jakarta n=145</th>
<th>Quezon City n=54</th>
<th>Yangon n=208</th>
<th>Kabul n=226</th>
<th>Chittagong n=160</th>
<th>Phnom Penh n=208</th>
<th>Peshawar n=208</th>
<th>Lucknow</th>
<th>Cox Bazaar refugee camp n=5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>96.6%</td>
<td>49.2%</td>
<td>61.0%</td>
<td>77.0%</td>
<td>100.0%</td>
<td>96.7%</td>
<td>95.7%</td>
<td>57.1%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>3.4%</td>
<td>50.8%</td>
<td>39.0%</td>
<td>23.0%</td>
<td>3.3%</td>
<td>4.3%</td>
<td>42.9%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 2. Since the start of the COVID-19 pandemic, has your organisation increased its focus on urban populations?**

<table>
<thead>
<tr>
<th></th>
<th>Dhaka n=208</th>
<th>Jakarta n=145</th>
<th>Quezon City n=54</th>
<th>Yangon n=208</th>
<th>Kabul n=226</th>
<th>Chittagong n=160</th>
<th>Phnom Penh n=208</th>
<th>Peshawar n=208</th>
<th>Lucknow</th>
<th>Cox Bazaar refugee camp n=5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>100.0%</td>
<td>53.8%</td>
<td>53.7%</td>
<td>74.7%</td>
<td>100.0%</td>
<td>24.4%</td>
<td>37.1%</td>
<td>83.9%</td>
<td>89.7%</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>46.2%</td>
<td>46.3%</td>
<td>100.0%</td>
<td>25.3%</td>
<td>75.6%</td>
<td>62.9%</td>
<td>16.1%</td>
<td>10.3%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 3. What is the primary focus of your organisation in urban areas? Its focus on urban populations?**

<table>
<thead>
<tr>
<th></th>
<th>Dhaka n=208</th>
<th>Jakarta n=145</th>
<th>Quezon City n=54</th>
<th>Yangon n=208</th>
<th>Kabul n=226</th>
<th>Chittagong n=160</th>
<th>Phnom Penh n=208</th>
<th>Peshawar n=208</th>
<th>Lucknow</th>
<th>Cox Bazaar refugee camp n=5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>16.07%</td>
<td>4.62%</td>
<td>13.95%</td>
<td>0%</td>
<td>11.44%</td>
<td>16.28%</td>
<td>9.86%</td>
<td>13.59%</td>
<td>7.83%</td>
<td>28.57%</td>
</tr>
<tr>
<td>Food security and nutrition</td>
<td>14.29%</td>
<td>3.08%</td>
<td>20.93%</td>
<td>0%</td>
<td>12.53%</td>
<td>13.95%</td>
<td>3.06%</td>
<td>12.62%</td>
<td>8.7%</td>
<td>22.86%</td>
</tr>
<tr>
<td>Gender</td>
<td>5.36%</td>
<td>7.69%</td>
<td>13.95%</td>
<td>0%</td>
<td>17.71%</td>
<td>4.65%</td>
<td>28.57%</td>
<td>22.33%</td>
<td>11.3%</td>
<td>14.29%</td>
</tr>
<tr>
<td>Health</td>
<td>21.43%</td>
<td>6.15%</td>
<td>20.93%</td>
<td>50%</td>
<td>21.8%</td>
<td>16.28%</td>
<td>28.23%</td>
<td>28.16%</td>
<td>15.65%</td>
<td>7.14%</td>
</tr>
<tr>
<td>WASH</td>
<td>7.14%</td>
<td>0%</td>
<td>3.49%</td>
<td>50%</td>
<td>10.63%</td>
<td>2.33%</td>
<td>1.36%</td>
<td>16.99%</td>
<td>5.22%</td>
<td>10%</td>
</tr>
<tr>
<td>Shelter/protection</td>
<td>14.29%</td>
<td>6.15%</td>
<td>22.09%</td>
<td>0%</td>
<td>20.44%</td>
<td>11.63%</td>
<td>13.95%</td>
<td>6.31%</td>
<td>12.17%</td>
<td>17.14%</td>
</tr>
<tr>
<td>Other</td>
<td>21.43%</td>
<td>72.31%</td>
<td>4.65%</td>
<td>0%</td>
<td>5.45%</td>
<td>34.88%</td>
<td>14.97%</td>
<td>0%</td>
<td>39.13%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Table 4. Which components of urban food systems have been disrupted by COVID-19?urban populations?focus on urban populations?

<table>
<thead>
<tr>
<th></th>
<th>Dhaka n=208</th>
<th>Jakarta n=145</th>
<th>Quezon City n=54</th>
<th>Yangon n=208</th>
<th>Kabul n=226</th>
<th>Chittagong n=160</th>
<th>Phnom Penh n=208</th>
<th>Peshawar n=208</th>
<th>Lucknow</th>
<th>Cox Bazaar refugee camp n=5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food supply chains</td>
<td>30.16%</td>
<td>34.43%</td>
<td>16.22%</td>
<td>25%</td>
<td>26.85%</td>
<td>32.43%</td>
<td>0.99%</td>
<td>25.16%</td>
<td>36.73%</td>
<td>46.67%</td>
</tr>
<tr>
<td>Food access</td>
<td>23.81%</td>
<td>47.54%</td>
<td>32.43%</td>
<td>25%</td>
<td>26.85%</td>
<td>51.35%</td>
<td>34.16%</td>
<td>35.22%</td>
<td>22.45%</td>
<td>26.67%</td>
</tr>
<tr>
<td>Food affordability</td>
<td>12.7%</td>
<td>14.75%</td>
<td>27.03%</td>
<td>25%</td>
<td>28.02%</td>
<td>8.11%</td>
<td>60.89%</td>
<td>24.53%</td>
<td>31.63%</td>
<td>17.78%</td>
</tr>
<tr>
<td>Food safety</td>
<td>33.33%</td>
<td>3.28%</td>
<td>24.32%</td>
<td>25%</td>
<td>18.29%</td>
<td>8.11%</td>
<td>3.96%</td>
<td>15.09%</td>
<td>9.18%</td>
<td>8.89%</td>
</tr>
<tr>
<td>WASH</td>
<td>7.14%</td>
<td>0%</td>
<td>3.49%</td>
<td>50%</td>
<td>10.63%</td>
<td>2.33%</td>
<td>1.36%</td>
<td>16.99%</td>
<td>5.22%</td>
<td>10%</td>
</tr>
<tr>
<td>Shelter/protection</td>
<td>14.29%</td>
<td>6.15%</td>
<td>22.09%</td>
<td>0%</td>
<td>20.44%</td>
<td>11.63%</td>
<td>13.95%</td>
<td>6.31%</td>
<td>12.17%</td>
<td>17.14%</td>
</tr>
<tr>
<td>Other</td>
<td>21.43%</td>
<td>72.31%</td>
<td>4.65%</td>
<td>0%</td>
<td>5.45%</td>
<td>34.88%</td>
<td>14.97%</td>
<td>0%</td>
<td>39.13%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 5. Which vulnerable groups in urban areas have been most affected by the COVID-19 pandemic, including social and economic impacts?

<table>
<thead>
<tr>
<th></th>
<th>Dhaka n=208</th>
<th>Jakarta n=145</th>
<th>Quezon City n=54</th>
<th>Yangon n=208</th>
<th>Kabul n=226</th>
<th>Chittagong n=160</th>
<th>Phnom Penh n=208</th>
<th>Peshawar n=208</th>
<th>Lucknow</th>
<th>Cox Bazaar refugee camp n=5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women</td>
<td>7.84%</td>
<td>3.23%</td>
<td>13.39%</td>
<td>2.44%</td>
<td>20.08%</td>
<td>3.45%</td>
<td>0.81%</td>
<td>18.61%</td>
<td>17.46%</td>
<td>0%</td>
</tr>
<tr>
<td>Children</td>
<td>15.69%</td>
<td>12.9%</td>
<td>20.54%</td>
<td>2.44%</td>
<td>7.34%</td>
<td>3.45%</td>
<td>0%</td>
<td>24.24%</td>
<td>18.25%</td>
<td>0%</td>
</tr>
<tr>
<td>Adolescents</td>
<td>0%</td>
<td>0%</td>
<td>13.39%</td>
<td>2.44%</td>
<td>12.74%</td>
<td>0%</td>
<td>2.02%</td>
<td>8.23%</td>
<td>11.11%</td>
<td>0%</td>
</tr>
<tr>
<td>Elderly</td>
<td>56.86%</td>
<td>12.9%</td>
<td>19.64%</td>
<td>2.44%</td>
<td>32.82%</td>
<td>79.31%</td>
<td>48.18%</td>
<td>15.15%</td>
<td>11.11%</td>
<td>65%</td>
</tr>
<tr>
<td>People in slums / in-formal settlements</td>
<td>19.61%</td>
<td>50%</td>
<td>20.54%</td>
<td>2.44%</td>
<td>21.24%</td>
<td>13.79%</td>
<td>48.99%</td>
<td>17.32%</td>
<td>42.06%</td>
<td>35%</td>
</tr>
<tr>
<td>Other marginalized groups</td>
<td>0%</td>
<td>20.97%</td>
<td>12.5%</td>
<td>87.8%</td>
<td>5.79%</td>
<td>0%</td>
<td>16.45%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>21.43%</td>
<td>72.31%</td>
<td>4.65%</td>
<td>0%</td>
<td>5.45%</td>
<td>34.88%</td>
<td>14.97%</td>
<td>0%</td>
<td>39.13%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 6. Which foods were in short supply compared to normal times?COVID-19 pandemic, including social and economic impacts?VID-19?urban populations? focus on urban populations?

<table>
<thead>
<tr>
<th></th>
<th>Dhaka n=208</th>
<th>Jakarta n=145</th>
<th>Quezon City n=54</th>
<th>Yangon n=208</th>
<th>Kabul n=226</th>
<th>Chittagong n=160</th>
<th>Phnom Penh n=208</th>
<th>Peshawar n=208</th>
<th>Lucknow</th>
<th>Cox Bazaar refugee camp n=5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruits and vegetables</td>
<td>55.32%</td>
<td>31.75%</td>
<td>0%</td>
<td>77.78%</td>
<td>22.33%</td>
<td>16.54%</td>
<td>0%</td>
<td>24.77%</td>
<td>36.13%</td>
<td>41.67%</td>
</tr>
<tr>
<td>Animal source foods</td>
<td>27.66%</td>
<td>15.87%</td>
<td>47.92%</td>
<td>11.11%</td>
<td>17.15%</td>
<td>5.26%</td>
<td>3.89%</td>
<td>20.72%</td>
<td>17.65%</td>
<td>35.42%</td>
</tr>
<tr>
<td>Staple grains</td>
<td>2.13%</td>
<td>52.38%</td>
<td>18.75%</td>
<td>11.11%</td>
<td>17.8%</td>
<td>0%</td>
<td>28.33%</td>
<td>15.77%</td>
<td>9.24%</td>
<td>10.42%</td>
</tr>
<tr>
<td>Nuts and seeds</td>
<td>2.13%</td>
<td>0%</td>
<td>2.08%</td>
<td>0%</td>
<td>14.24%</td>
<td>75.94%</td>
<td>0%</td>
<td>19.37%</td>
<td>10.08%</td>
<td>8.33%</td>
</tr>
<tr>
<td>Manufactured, packaged or processed foods</td>
<td>10.64%</td>
<td>0%</td>
<td>18.75%</td>
<td>0%</td>
<td>27.83%</td>
<td>2.26%</td>
<td>67.78%</td>
<td>18.92%</td>
<td>17.65%</td>
<td>4.17%</td>
</tr>
<tr>
<td>Other</td>
<td>2.13%</td>
<td>0%</td>
<td>12.5%</td>
<td>0%</td>
<td>0.65%</td>
<td>0%</td>
<td>0%</td>
<td>0.45%</td>
<td>9.24%</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>21.43%</td>
<td>72.31%</td>
<td>4.65%</td>
<td>0%</td>
<td>5.45%</td>
<td>34.88%</td>
<td>14.97%</td>
<td>0%</td>
<td>39.13%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Table 7. Has your organisation implemented or supported any of these measures to alleviate food insecurity in urban areas during the COVID-19 pandemic?

<table>
<thead>
<tr>
<th></th>
<th>Dhaka n=208</th>
<th>Jakarta n=145</th>
<th>Quezon City n=54</th>
<th>Yangon n=208</th>
<th>Kabul n=226</th>
<th>Chittagong n=160</th>
<th>Phnom Penh n=208</th>
<th>Peshawar n=208</th>
<th>Lucknow</th>
<th>Cox Bazaar refugee camp n=5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash transfers</td>
<td>39.53%</td>
<td>76.6%</td>
<td>9.84%</td>
<td>50%</td>
<td>15.66%</td>
<td>50%</td>
<td>15.63%</td>
<td>17.37%</td>
<td>2.2%</td>
<td>46.51%</td>
</tr>
<tr>
<td>Food vouchers</td>
<td>6.98%</td>
<td>2.13%</td>
<td>18.03%</td>
<td>0%</td>
<td>16.06%</td>
<td>10%</td>
<td>1.56%</td>
<td>21.13%</td>
<td>5.49%</td>
<td>27.91%</td>
</tr>
<tr>
<td>Food aid</td>
<td>11.63%</td>
<td>14.89%</td>
<td>44.26%</td>
<td>50%</td>
<td>30.12%</td>
<td>3.33%</td>
<td>44.53%</td>
<td>24.41%</td>
<td>46.15%</td>
<td>6.98%</td>
</tr>
<tr>
<td>School meals</td>
<td>2.33%</td>
<td>4.26%</td>
<td>1.64%</td>
<td>0%</td>
<td>11.65%</td>
<td>6.67%</td>
<td>33.59%</td>
<td>22.54%</td>
<td>14.29%</td>
<td>4.65%</td>
</tr>
<tr>
<td>Urban agriculture</td>
<td>18.6%</td>
<td>2.13%</td>
<td>3.28%</td>
<td>0%</td>
<td>24.9%</td>
<td>26.67%</td>
<td>3.91%</td>
<td>14.55%</td>
<td>2.2%</td>
<td>13.95%</td>
</tr>
<tr>
<td>Other</td>
<td>20.93v</td>
<td>0%</td>
<td>22.95%</td>
<td>0%</td>
<td>1.61%</td>
<td>3.33%</td>
<td>0.78%</td>
<td>0%</td>
<td>29.67%</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>21.43%</td>
<td>72.31%</td>
<td>4.65%</td>
<td>0%</td>
<td>5.45%</td>
<td>34.88%</td>
<td>14.97%</td>
<td>0%</td>
<td>39.13%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 8. Has your organisation monitored the impact of the COVID-19 pandemic on food security or nutrition outcomes in urban areas? to alleviate food insecurity in urban areas during the COVID-19 pandemic?

<table>
<thead>
<tr>
<th></th>
<th>Dhaka n=208</th>
<th>Jakarta n=145</th>
<th>Quezon City n=54</th>
<th>Yangon n=208</th>
<th>Kabul n=226</th>
<th>Chittagong n=160</th>
<th>Phnom Penh n=208</th>
<th>Peshawar n=208</th>
<th>Lucknow</th>
<th>Cox Bazaar refugee camp n=5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>72.4%</td>
<td>58.3%</td>
<td>68.3%</td>
<td>74.5%</td>
<td>65.2%</td>
<td>56.1%</td>
<td>24.3%</td>
<td>33.9%</td>
<td>44.8%</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>27.6%</td>
<td>41.7%</td>
<td>31.7%</td>
<td>100.0%</td>
<td>25.5%</td>
<td>34.8%</td>
<td>43.9%</td>
<td>75.7%</td>
<td>66.1%</td>
<td>55.2%</td>
</tr>
</tbody>
</table>

Table 9. Which of these outcomes did your organisation monitor during the pandemic? food security or nutrition outcomes in urban areas? to alleviate food insecurity in urban areas during the COVID-19 pandemic?

<table>
<thead>
<tr>
<th></th>
<th>Dhaka n=208</th>
<th>Jakarta n=145</th>
<th>Quezon City n=54</th>
<th>Yangon n=208</th>
<th>Kabul n=226</th>
<th>Chittagong n=160</th>
<th>Phnom Penh n=208</th>
<th>Peshawar n=208</th>
<th>Lucknow</th>
<th>Cox Bazaar refugee camp n=5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food prices / affordability</td>
<td>23.53%</td>
<td>64.52%</td>
<td>21.74%</td>
<td>32%</td>
<td>16%</td>
<td>44.81%</td>
<td>14%</td>
<td>26.92%</td>
<td>4.55%</td>
<td>46.51%</td>
</tr>
<tr>
<td>Food insecurity</td>
<td>11.76%</td>
<td>16.13%</td>
<td>26.09%</td>
<td>23.5%</td>
<td>4%</td>
<td>20.78%</td>
<td>24%</td>
<td>19.23%</td>
<td>9.09%</td>
<td>27.91%</td>
</tr>
<tr>
<td>Food purchasing patterns</td>
<td>2.94%</td>
<td>12.9%</td>
<td>8.7%</td>
<td>24%</td>
<td>12%</td>
<td>1.3%</td>
<td>20%</td>
<td>25%</td>
<td>9.09%</td>
<td>6.98%</td>
</tr>
<tr>
<td>Diet diversity / diet quality</td>
<td>23.53%</td>
<td>0%</td>
<td>8.7%</td>
<td>10.5%</td>
<td>20%</td>
<td>32.47%</td>
<td>18%</td>
<td>13.46%</td>
<td>45.45%</td>
<td>4.65%</td>
</tr>
<tr>
<td>Nutritional status</td>
<td>32.35%</td>
<td>6.45%</td>
<td>34.78%</td>
<td>10%</td>
<td>32%</td>
<td>0.65v</td>
<td>24%</td>
<td>13.46%</td>
<td>31.82%</td>
<td>13.95%</td>
</tr>
<tr>
<td>Other</td>
<td>5.88%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>16%</td>
<td>0%</td>
<td>0%</td>
<td>1.92%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
## Governance Survey – Round 1

Table 1. What is the focus of your role in local government?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>0%</td>
<td>4.17%</td>
<td>17.78%</td>
<td>8.7%</td>
<td>8.33%</td>
<td>31.34%</td>
<td>6.82%</td>
<td>7.87%</td>
<td>42.86%</td>
</tr>
<tr>
<td>Food security and nutrition</td>
<td>0%</td>
<td>4.17%</td>
<td>33.33%</td>
<td>4.35%</td>
<td>12.5%</td>
<td>11.94%</td>
<td>15.91%</td>
<td>12.36%</td>
<td>14.29%</td>
</tr>
<tr>
<td>Health and social care</td>
<td>100%</td>
<td>14.58%</td>
<td>31.11%</td>
<td>17.39%</td>
<td>16.67%</td>
<td>29.85%</td>
<td>27.27%</td>
<td>22.47%</td>
<td>0%</td>
</tr>
<tr>
<td>Urban planning</td>
<td>0%</td>
<td>29.17%</td>
<td>13.33%</td>
<td>34.78%</td>
<td>12.5%</td>
<td>23.88%</td>
<td>28.41%</td>
<td>6.74%</td>
<td>0%</td>
</tr>
<tr>
<td>Food markets</td>
<td>0%</td>
<td>2.08%</td>
<td>4.44%</td>
<td>10.87%</td>
<td>12.5%</td>
<td>2.99%</td>
<td>15.91%</td>
<td>1.12%</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>0%</td>
<td>45.83%</td>
<td>0%</td>
<td>23.91%</td>
<td>37.5%</td>
<td>0%</td>
<td>5.68%</td>
<td>49.44%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 2. Where does food come from to feed the city (in normal times)?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within the city</td>
<td>50%</td>
<td>46.94%</td>
<td>1.49%</td>
<td>31.34%</td>
<td>70.59%</td>
<td>59.49%</td>
<td>24.72%</td>
<td>32.2%</td>
<td>42.86%</td>
</tr>
<tr>
<td>Region surrounding the city</td>
<td>0%</td>
<td>48.98%</td>
<td>14.93%</td>
<td>14.93%</td>
<td>17.65%</td>
<td>32.91%</td>
<td>47.19%</td>
<td>39.83%</td>
<td>14.29%</td>
</tr>
<tr>
<td>Other regions of the country</td>
<td>50%</td>
<td>2.04%</td>
<td>16.42%</td>
<td>25.37%</td>
<td>11.76%</td>
<td>1.27%</td>
<td>10.11%</td>
<td>27.97%</td>
<td>0%</td>
</tr>
<tr>
<td>Internationally</td>
<td>0%</td>
<td>2.04%</td>
<td>1.49%</td>
<td>28.36%</td>
<td>0%</td>
<td>6.33%</td>
<td>17.98%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Food markets</td>
<td>0%</td>
<td>2.08%</td>
<td>4.44%</td>
<td>10.87%</td>
<td>12.5%</td>
<td>2.99%</td>
<td>15.91%</td>
<td>1.12%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 3. Were food supplies into the city disrupted by the COVID-19 pandemic?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes – severely disrupted</td>
<td>100%</td>
<td>6.38%</td>
<td>89.47%</td>
<td>30.77%</td>
<td>6.67%</td>
<td>0%</td>
<td>17.54%</td>
<td>10.91%</td>
<td>42.86%</td>
</tr>
<tr>
<td>Yes – moderately disrupted</td>
<td>0%</td>
<td>53.19%</td>
<td>10.53%</td>
<td>61.54%</td>
<td>26.67%</td>
<td>91.8%</td>
<td>38.6%</td>
<td>29.09%</td>
<td>14.29%</td>
</tr>
<tr>
<td>Not disrupted</td>
<td>0%</td>
<td>40.43%</td>
<td>0%</td>
<td>7.69%</td>
<td>66.67%</td>
<td>8.2%</td>
<td>43.86%</td>
<td>60%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Table 4. Which foods were in short supply compared to normal times?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka n=145</th>
<th>Jakarta n=161</th>
<th>Kabul n=228</th>
<th>Lucknow n=103</th>
<th>Peshawar n=160</th>
<th>Phnom Penh n=208</th>
<th>Quezon City n=54</th>
<th>Cox Bazaar refugee camp n=5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruits and vegetables</td>
<td>0%</td>
<td>32.61%</td>
<td>16.67%</td>
<td>21.54%</td>
<td>50%</td>
<td>0%</td>
<td>23.08%</td>
<td>28.21%</td>
<td>42.86%</td>
</tr>
<tr>
<td>Animal source foods</td>
<td>0%</td>
<td>17.39%</td>
<td>40.48%</td>
<td>12.31%</td>
<td>12.5%</td>
<td>2%</td>
<td>13.85%</td>
<td>20.51%</td>
<td>14.29%</td>
</tr>
<tr>
<td>Staple grains</td>
<td>0%</td>
<td>45.65%</td>
<td>16.67%</td>
<td>29.23%</td>
<td>0%</td>
<td>22%</td>
<td>15.38%</td>
<td>14.1%</td>
<td>0%</td>
</tr>
<tr>
<td>Nuts and seeds</td>
<td>0%</td>
<td>2.17%</td>
<td>4.76%</td>
<td>13.85%</td>
<td>0%</td>
<td>30%</td>
<td>16.92%</td>
<td>15.38%</td>
<td>0%</td>
</tr>
<tr>
<td>Manufactured, packaged or processed foods</td>
<td>100%</td>
<td>2.17%</td>
<td>21.43%</td>
<td>23.08%</td>
<td>37.5%</td>
<td>46%</td>
<td>30.77%</td>
<td>21.79%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 5. Were city food prices affected by the COVID-19 pandemic?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka n=145</th>
<th>Jakarta n=161</th>
<th>Kabul n=228</th>
<th>Lucknow n=103</th>
<th>Peshawar n=160</th>
<th>Phnom Penh n=208</th>
<th>Quezon City n=54</th>
<th>Cox Bazaar refugee camp n=5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes – generally increased</td>
<td>33.3%</td>
<td>100.0%</td>
<td>46.2%</td>
<td>46.7%</td>
<td>21.3%</td>
<td>1.8%</td>
<td>42.86%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes – generally decreased</td>
<td>2.2%</td>
<td>6.8%</td>
<td>4.3%</td>
<td>1.8%</td>
<td>14.29%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes – fluctuated</td>
<td>64.4%</td>
<td>53.8%</td>
<td>13.3%</td>
<td>1.7%</td>
<td>48.9%</td>
<td>21.8%</td>
<td>0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not affected</td>
<td>100.0%</td>
<td>40.0%</td>
<td>91.5%</td>
<td>25.5%</td>
<td>74.5%</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6. Did local government provide additional financial support (or food aid) to low-income or vulnerable groups in urban areas during the pandemic?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka n=145</th>
<th>Jakarta n=161</th>
<th>Kabul n=228</th>
<th>Lucknow n=103</th>
<th>Peshawar n=160</th>
<th>Phnom Penh n=208</th>
<th>Quezon City n=54</th>
<th>Cox Bazaar refugee camp n=5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>97.8%</td>
<td>100.0%</td>
<td>92.3%</td>
<td>26.7%</td>
<td>40.4%</td>
<td>96.4%</td>
<td>42.86%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>100.0%</td>
<td>2.2%</td>
<td>7.7%</td>
<td>73.3%</td>
<td>100.0%</td>
<td>59.6%</td>
<td>3.6%</td>
<td>14.29%</td>
<td></td>
</tr>
</tbody>
</table>

Table 7. For how long was additional financial support (or food aid) provided to low-income or vulnerable groups in urban areas?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka n=145</th>
<th>Jakarta n=161</th>
<th>Kabul n=228</th>
<th>Lucknow n=103</th>
<th>Peshawar n=160</th>
<th>Phnom Penh n=208</th>
<th>Quezon City n=54</th>
<th>Cox Bazaar refugee camp n=5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 month</td>
<td>5.3%</td>
<td>4.2%</td>
<td>75.0%</td>
<td>52.6%</td>
<td>96.4%</td>
<td>42.86%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between 1 and 3 months</td>
<td>42.1%</td>
<td>50.0%</td>
<td>25.0%</td>
<td>36.8%</td>
<td>9.4%</td>
<td>3.6%</td>
<td>14.29%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between 3 and 6 months</td>
<td>27.3%</td>
<td>42.1%</td>
<td>29.2%</td>
<td>100.0%</td>
<td>5.3%</td>
<td>32.1%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 6 months</td>
<td>72.7%</td>
<td>10.5%</td>
<td>16.7%</td>
<td>5.3%</td>
<td>58.5%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 8. Did local government provide additional financial support to food businesses during the pandemic?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>13.3%</td>
<td>100.0%</td>
<td>23.1%</td>
<td>4.3%</td>
<td>40.0%</td>
<td>42.86%</td>
<td>40.0%</td>
<td>60.0%</td>
<td>42.86%</td>
</tr>
<tr>
<td>No</td>
<td>100.0%</td>
<td>86.7%</td>
<td>76.9%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>95.7%</td>
<td>100.0%</td>
<td>60.0%</td>
<td>14.29%</td>
</tr>
</tbody>
</table>

Table 9. For how long was additional financial support provided to food businesses?

<table>
<thead>
<tr>
<th></th>
<th>Chittagong (n=142)</th>
<th>Dhaka (n=145)</th>
<th>Jakarta (n=161)</th>
<th>Kabul (n=226)</th>
<th>Lucknow (n=103)</th>
<th>Peshawar (n=160)</th>
<th>Phnom Penh (n=208)</th>
<th>Quezon City (n=54)</th>
<th>Cox Bazaar refugee camp (n=5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 month</td>
<td>10.5%</td>
<td>16.7%</td>
<td>100.0%</td>
<td>50.0%</td>
<td>4.3%</td>
<td>40.0%</td>
<td>42.86%</td>
<td>40.0%</td>
<td>42.86%</td>
</tr>
<tr>
<td>Between 1 and 3 months</td>
<td>68.4%</td>
<td>16.7%</td>
<td>50.0%</td>
<td>22.7%</td>
<td>95.7%</td>
<td>60.0%</td>
<td>14.29%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between 3 and 6 months</td>
<td>42.9%</td>
<td>15.8%</td>
<td>16.7%</td>
<td>31.8%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 6 months</td>
<td>57.1%</td>
<td>5.3%</td>
<td>50.0%</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

111
Appendix 2. Cultivated land per 100,000 persons

Analysis of a regional data set which summarises the amount of cultivated land per 100,000 persons within 50km of each of the cities in the GHSL dataset for Asia.

Hypothesis: food systems resilience/food security is underpinned (to a greater or lesser extent) by the availability of cultivated land within 50km or one-hours’ drive of each city (centre).

The availability of land within 50km varies between cities according to geography and according to the variation in the sizes/size classes of cities efficiency in land-use/amount of sprawl etc, land prices/ land market functions etc, availability and quality of road infrastructure. We are using this as an indicator of the ability of a city to feed itself/ contribute to food security for its citizens.

Sample size:

<table>
<thead>
<tr>
<th>National UN Income classification</th>
<th>N (sample size)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIC</td>
<td>158</td>
</tr>
<tr>
<td>LMIC</td>
<td>3940</td>
</tr>
<tr>
<td>UMIC</td>
<td>1690</td>
</tr>
<tr>
<td>HIC</td>
<td>171</td>
</tr>
</tbody>
</table>

FIGURE 1: BOX PLOT SHOWING THE RANGE OF VALUES FOR KM2 OF CULTIVATED LAND PER 100,000 PERSONS (WITHIN 50KM OF A CITY). BY UN INCOME CLASS OF COUNTRY.
We can clearly see that with the exception of cities in Higher Income Countries (HIC) – the amount of cultivated land per 100,000 persons tends to rise with GDP – in an almost co-linear fashion for UMICs. So perhaps as cities grow and expand outward, more land is cleared for agriculture to feed its citizens/used productively for agriculture, output rises until a larger share of non-farm output contributes to the city economy. Cities in HIC for example have greater share of manufacturing/services (greater value-added) and as such the amount of agricultural land close to the city is not what is driving increase in GDP. This graph likely confirms the contribution agriculture continues to make to city economies in LMICs, UMICs regardless of city-size. What this doesn’t tell us is how big a contribution this cultivated land makes to feeding its own citizens. Afghanistan, Nepal and North Korea are the only LICs in Asia.

**Approach to defining ‘cut-offs’**

If we assume that better access to agricultural land close to the city means both better economic growth prospects and potential to feed the city (with directly through the agricultural production and/or overall increases in wealth). In order to define cut-offs at which we feel the capacity of the city changes from absorptive to adaptive to transformative we could take somewhat arbitrary values that we see in the distribution of values from our 7,000-city sample. All of the focal cities are in LICs or LMICs – therefore one could take the lower bounds, interquartile range, and upper bounds of the distribution of values from the sample of to define cut-offs:

- Absorptive capacity $<$ 8.6 km$^2$
- Adaptive capacity 8.6-25.3 km$^2$
- Transformative capacity $\geq$ 25.3 km$^2$
Appendix 3
methodological approaches to defining urban areas

Below a number of methodological approaches are presented to defining urban areas, beyond administrative boundaries. Cities typically grow in population and area through a combination of three factors – endogenous growth (in-situ population growth), migration of those living outside of cities, re-definition of administrative boundaries. Very often the functional area of a city extends well beyond the formal city, administrative boundaries – which remain fixed, or change through a process of political settlement over longer-time periods. The result is an increasing number of people occupying land outside of municipal jurisdictions who contribute to the city economy, in mainly through the provision of labour, and yet do not benefit from municipal services or other government support. As land on the urban fringe is converted from rural/agricultural land to urban, infrastructure provision rarely keeps pace often resulting in the growth of settlements with lower standards/provision of basic services (WASH, roads/drainage, electricity etc.) and poorer housing conditions. These settlements may also house the urban poor, some of the more vulnerable groups in society, in marginal locations.

It is therefore important to have a broader appreciation of the urbanisation process taking place and shaping the growth of the city in order to identify early warning signs of unsustainable growth and the location of vulnerable groups. Further, urban food systems transcend administrative boundaries therefore it may be appropriate to think beyond these boundaries for programming i.e. targeting vulnerable groups. The availability of open, satellite data and opensource Geographic Information System software open possibilities for understanding cities and their food systems. Importantly, advances in cloud-based computing over the last decade now means much of the ‘heavy-lifting’ in terms of acquiring and processing spatial and temporal datasets has been done making regional and even global studies accessible to anyone with a modern web browser and a little knowledge of common coding languages.

These types of analysis can highlight the implications for a number of policy related issues i.e. land-use, infrastructure investment, public and environmental health, and of course food security. For example, we may highlight issues regarding the efficient use of land both within existing urban areas and on the fringes, particularly thinking about the loss of productive agricultural land and the impact this may have on food supply.

A number of methods for rapidly assessing patterns of urban growth are discussed below with relative costs and benefits summarised in a table below along with suggested sources of data.

**Landcover classification**
Several global datasets exist that provide spatial classification of landcover at different scales and temporal frequencies. With very little additional processing it is possible to access and analyse these datasets to provide an expanded view of patterns of urbanisation and development of cities overtime. Essentially, the urban ‘footprint’ for global settlements have been classified through a number of open data products, that provide timeseries data on the form of urbanisation across the globe. These datasets allow one to define the built footprint of each city – which often goes well beyond, formal administrative boundaries, as a basis for generating time-series data on the form and pace of growth of urban settlements and the surrounding landcover.
For example, in this study the Global Land Cover Layers (Copernicus) were used to generate data on the amount of cultivated land and other types of landcover available within 50k of each of the study cities. The nature of this landcover can then be mapped, visualised and summary statistics produced to provide regional comparative analysis between cities. Also due to the high-resolution of this data product (10m) it is suitable for undertaking intra-urban analyses. For example, monitoring loss of agricultural or forest land over time within and on the fringes of urban areas.

**FIGURE 1: EXAMPLE LANDCOVER CLASSIFICATION MAP. SOURCE: GLOBAL LAND COVER LAYERS: CGLS-LC100 COLLECTION (COPERNICUS EU) MAPPING: DIKODA**

Landcover classification can help
- visually explore the extent of the city, trends and dynamics relating to urban expansion
- monitoring the loss/gain of particular types of landcover – cultivated, forest etc. and relationships between the loss of some classes and growth of others
- identify priority locations where those in greatest need may have settled
- provide evidence to underpin policy development to better manage urban areas

**TABLE 1: SAMPLE DATASETS AND SOURCES. ALL OF THE FOLLOWING ARE AVAILABLE FREELY UNDER CREATIVE COMMONS LICENCE.**

<table>
<thead>
<tr>
<th>Data source</th>
<th>Description</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Human Settlement Layer (EC Joint Research Centre)</td>
<td>Global scale, time-series dataset the spatial extent of featuring c. 13,000 global, urban settlements as defined using supervised classification of satellite imagery and a number of spatial covariates. Data is available for four epochs, 1975, 1990, 2000, and 2015 with around 30+ spatial indicators available for each city.</td>
<td>30m, global</td>
</tr>
<tr>
<td>Global Land Cover Layers: CGLS-LC100 collection (Copernicus EU)</td>
<td>High resolution, global landcover classification that identifies 20+ landcover classes (urban/built, shrubs, forest etc) annually (2015 – 2019 currently available)</td>
<td>10m, global</td>
</tr>
<tr>
<td>MODIS Land Cover Type Yearly Global 500m (NASA)</td>
<td>Global landcover classification that identifies 20+ landcover classes (urban/built, shrubs, forest etc) annually (2000 – 2019 currently available)</td>
<td>500m, global</td>
</tr>
</tbody>
</table>
Gridded population data
The use of high-resolution satellite imagery combined with recent census data and machine learning techniques as yielded a number of global, databases that allow for the visualisation and exploration of the location and density of residents within and proximate to cities. Going further and combining population datasets with other spatial information, natural hazards, infrastructure development, landcover can assist in identifying populations at risk or vulnerable to natural and man-made hazards. Gridded population datasets are available as time-series data with estimates made using the most recent census data, with inter-census years being modelled, to provide time-series data over two decades or more.

FIGURE 2: EXAMPLE GRIDDED POPULATION DATA MAP OF YANGON, MYANMAR COMBINED WITH GLOBAL 100-YEAR FLOOD ESTIMATES TO IDENTIFY AND COUNT AT RISK POPULATIONS. SOURCE: WORLDPOP POPULATION ESTIMATES FOR MYANMAR AND FLOOD HAZARD MAP OF THE WORLD - 100-YEAR RETURN PERIOD. MAPPING: DIKODA

TABLE 2: SAMPLE DATASETS AND SOURCES. ALL OF THE FOLLOWING ARE AVAILABLE FREELY UNDER CREATIVE COMMONS LICENCE.

<table>
<thead>
<tr>
<th>Data source</th>
<th>Description</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>WorldPop</td>
<td>Various gridded population data products available at for most countries over the period 2000-2020. In addition to population counts, other demographic and socio-economic datasets are available that have been developed using a combination of spatial data and census including UN adjusted population totals, population density, age and sex structure, births etc.</td>
<td>c.100m – 1km resolution</td>
</tr>
<tr>
<td>Gridded Population of the World (GPW), v4</td>
<td>Similar to WorldPop, GPW products have been available since 1995 and produce population estimates for the years 2000, 2005, 2010, 2015, and 2020 with global coverage. Population counts and densities have also been adjusted to adjusted to national level, historic and future, population predictions from the United Nation’s World Population Prospects.</td>
<td>c.1 km resolution</td>
</tr>
<tr>
<td>Facebook High Resolution Population Density Maps + Demographic Estimates</td>
<td>Almost global coverage, providing population estimates at 30m resolution building on the approach used for the GPW dataset above. Data is available in GeoTiff (GIS) and Comma Separated Value (CSV) format with estimates of population, sex and age structure.</td>
<td>30m resolution</td>
</tr>
</tbody>
</table>
Night light emissions data
Satellites have been capturing night lights emissions imagery for decades which allows a unique opportunity to observe human activity from space. Mapping urban areas and human populations and economic activity has been a common use of this data and in recent years much has been written about the relevance, effectiveness and limitations of this kind of data for these applications. Very often gridded population estimates described above use night lights emission data to help map settled areas. These datasets complement those on landcover described above and provide additional opportunity for capturing data during cloud-free periods.

Originally developed to detect clouds at night an unanticipated benefit of the DMSP satellite program was the ability to detect visible and near-infrared emissions, the detection of city lights, gas, flares and fires. Annual and monthly composites available for the globe for the period 1992 to 2013. Similar to the DMSP data above, VIIRS has come onstream in 2012. Imagery is acquired and processed on a daily basis providing potential for fine-grained time-series analysis. Annual composites are available and is at a higher resolution than DMSP data. Note: due to the way the VIIRS sensor operates the data between the two sensors (DMSP and VIIRS) is not particularly compatible, making it difficult to produce a composite product that spans a longer time period.

Almost global coverage, providing population estimates at 30m resolution building on the approach used for the GPW dataset above. Data is available in GeoTiff (GIS) and Comma Separated Value (CSV) format with estimates of population, sex and age structure.

<table>
<thead>
<tr>
<th>Data source</th>
<th>Description</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DMSP</strong></td>
<td>Originally developed to detect clouds at night an unanticipated benefit of the DMSP satellite program was the ability to detect visible and near-infrared emissions, the detection of city lights, gas, flares and fires. Annual and monthly composites available for the globe for the period 1992 to 2013.</td>
<td>1 km</td>
</tr>
<tr>
<td><strong>Visible Infrared Imaging (VIIRS) Radiometer Suite (VIIRS)</strong></td>
<td>Similar to the DMSP data above, VIIRS has come onstream in 2012. Imagery is acquired and processed on a daily basis providing potential for fine-grained time-series analysis. Annual composites are available and is at a higher resolution than DMSP data. Note: due to the way the VIIRS sensor operates the data between the two sensors (DMSP and VIIRS) is not particularly compatible, making it difficult to produce a composite product that spans a longer time period.</td>
<td>500m</td>
</tr>
<tr>
<td><strong>Facebook High Resolution Population Density Maps + Demographic Estimates</strong></td>
<td>Almost global coverage, providing population estimates at 30m resolution building on the approach used for the GPW dataset above. Data is available in GeoTiff (GIS) and Comma Separated Value (CSV) format with estimates of population, sex and age structure.</td>
<td>(30m forthcoming)</td>
</tr>
</tbody>
</table>
OpenStreetMap

OpenStreetMap (OSM) is a global mapping service which is built upon the contribution of a community of mappers providing data on roads, buildings, infrastructure, places and other features. It operates it self-moderated, meaning anyone can upload data and/or challenge or improve the accuracy of data in their town or city for example. Many development partners and agencies undertake wide scale mapping and then upload features to OpenStreetMap. The data is freely available under a Creative Commons licence. Aside from accessing the data direct from OSM, a number of third parties maintain repositories of OSM data in various formats to enable greater accessibility.

In the case of food systems, it is possible to query the OSM database to return for example, location data relating to food outlets, restaurants, convenience stores, supermarkets etc. Although this data should be used with some caution – given the community-based nature of its acquisition – it can often be useful as a starting point to provide some basic context to the study of towns, cities or rural areas. When combined with other datasets such as population, it is also possible to investigate more broadly, accessibility to specific facilities or features, and using GIS to highlight the presence or absence of specific facilities in relation to where people live.