Food and Agriculture Organization
of the United Nations

Urban food system assessments for nutrition and healthy diets

Technical guidance note

PUBLIC
HEALTH
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of INDIA

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ABSTRACT

An important part of FAO's work involves the development and uptake of assessment tools that can help improve understanding of the characteristics, dynamics and constraints of food systems. Recent efforts have focused on supporting national and subnational governments and food system stakeholders in urban settings. Numerous tools, methodologies and guiding principles are available in the broad technical areas of food supply chains, city-region food systems and value chains, to assess the contribution of food systems for the eradication of hunger. However, there is a dearth of resources that place primary focus on navigating food systems for outcomes related to nutrition – in particular, healthy diets. The technical guidance note addresses this gap, taking inspiration from existing resources on food security and nutrition to propose an integrated approach towards assessing food systems for healthy diets in the context of urban areas. The note begins by elaborating the need to operationalize conceptual frameworks on food systems in order to enable evidence-informed policy and programme design, and support a food systems transformation agenda focused on nutrition and healthy diets. The second, and main, part of the note presents the Urban Food System Assessments for Nutrition (UFSAN) Tool, providing an overview of its conceptual basis, key features and a step-wise guide to its implementation.

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ABBREVIATIONS AND ACRONYMS

FAO	Food and Agriculture Organization of the United Nations
FCS	food consumption score
GAIN	Global Alliance for Improved Nutrition
HDDS	household dietary diversity score
HLPE	High Level Panel of Experts
IDDS	individual dietary diversity score
INFORMAS	International Network for Food and Obesity/non-communicable diseases Research, Monitoring and Action Support
IYCF	infant and young child feeding
KII	key informant interview
MDD-C	minimum dietary diversity for children
MDD-W	minimum dietary diversity - women
NCD	non-communicable disease
NEMS-S	Nutrition Environment Measures Survey in Stores
SDG	Sustainable Development Goal
UFSAN	Urban Food System Assessments for Nutrition and Healthy Diets

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INTRODUCTION

Agriculture and food systems will play a key role in helping governments make tangible progress towards the attainment of the Sustainable Development Goals (SDGs), and in particular of SDG 2, related to ending hunger, achieving food security, improving nutrition and promoting sustainable agriculture. It is concerning that the world is off track in achieving SDG Target 2.1, to ensure access to safe, nutritious and sufficient food for all people at all times, and SDG Target 2.2, to eradicate all forms of malnutrition (FAO *et al.*, 2020). Progress towards achieving these targets has been hampered by conflicts, climate variability and extremes, and recently by the COVID-19 pandemic. The latest figures on food insecurity reveal that almost 690 million people (or 9 percent of the world population) suffer from hunger, and up to 750 million people (or one in ten) suffer from severe food insecurity (FAO *et al.*, 2020).

The burden of malnutrition in all its forms – undernutrition, micronutrient deficiencies and overweight and obesity – affects all countries around the world. It is estimated that approximately 144 million children under the age of five are stunted, 47 million are wasted and 38 million are overweight (FAO *et al.*, 2020). Obesity and non-communicable diseases (NCDs) are on an upward trend in most regions globally, and are not only a problem affecting high-income nations. Over 2 billion adults are overweight or obese, almost 422 million people suffer from diabetes and 1.1 billion have high blood pressure (Development Initiatives, 2018; NCD Risk Factor Collaboration, 2019). Moreover, the diets currently consumed by most of the world population are lacking, in terms of quantity, quality, diversity and safety. Today, healthy diets are unaffordable for many consumers, especially for the poor and vulnerable, around the globe. According to the latest estimates, more than 3 billion people cannot afford healthy diets (FAO *et al.*, 2020). The high burden of malnutrition, in all its forms, associated NCDs and poor-quality diets place a significant burden on health systems. It is estimated that malnutrition costs the global economy up to USD 3.5 trillion per year (Global Panel on Agriculture and Food Systems for Nutrition, 2016).

Agriculture and food systems play a critical role in the provision of food and ensuring better diets, especially in low- and middle-income countries (HLPE, 2017). Given the high burden of malnutrition and poor-quality diets, there is a serious need to develop and redesign, across food systems, integrated policies and programmes to promote healthy diets. A critical first step for the development of such policies and programmes involves assessing food systems in a given context. Proper assessments are crucial for promoting the level of investments in nutrition interventions, coordinated and synergistic actions, and policy coherence among different sectors that can contribute to better diets.

An important part of the work of the Food and Agriculture Organization of the United Nations (FAO) involves the development and uptake of assessment tools and methodologies that can help improve the understanding of food systems' characteristics, dynamics and constraints. Recent FAO efforts have been focused on supporting national and subnational governments and food system stakeholders in urban settings. An example is the NADHALI project, which ran from 2016 to 2018 (FAO, 2021a). These efforts are aimed at improving the capacities of these stakeholders in analysing challenges related to food insecurity and in better assessing the contribution of food systems to the eradication of hunger (FAO, 2019a).

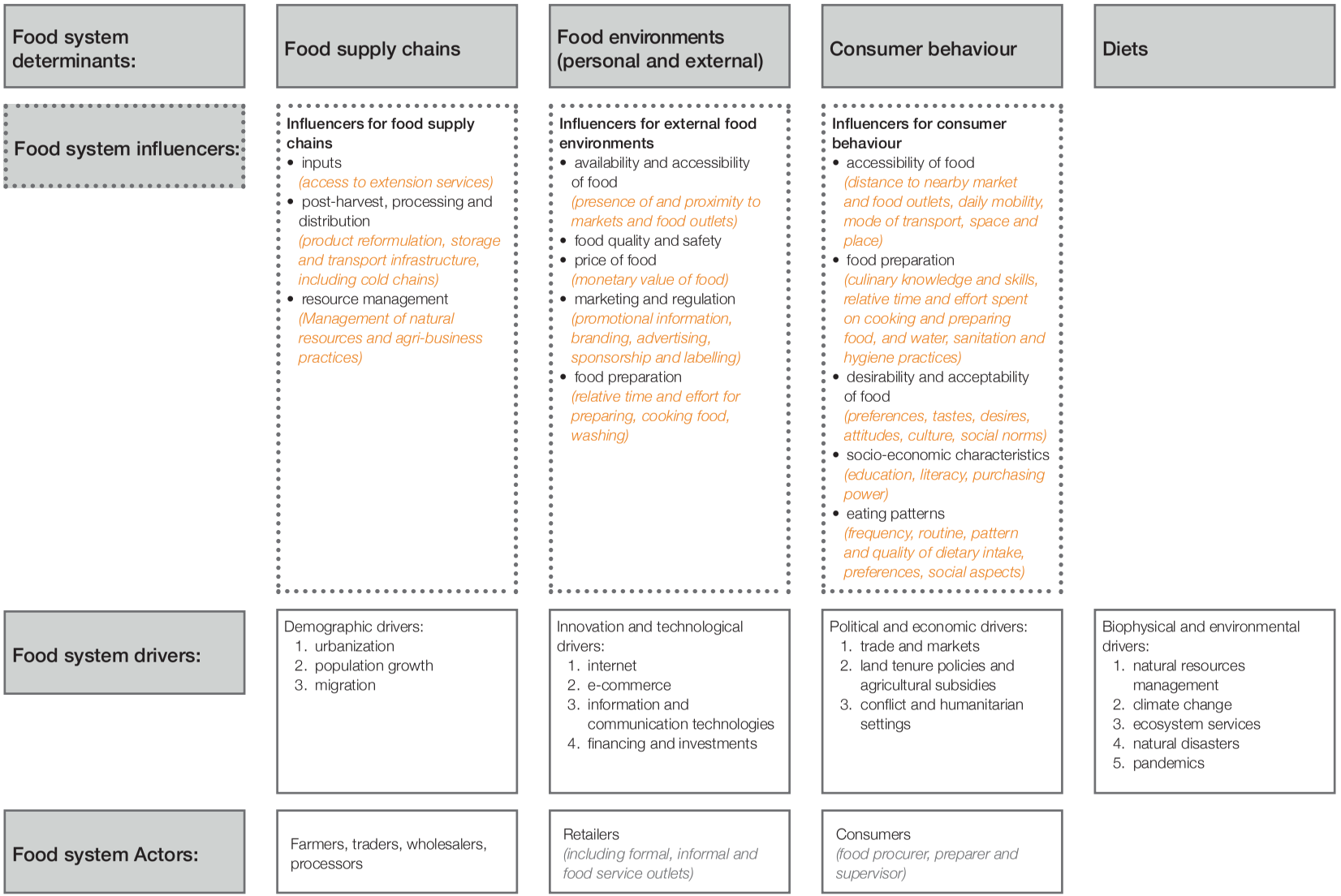
Although numerous tools, methodologies and guiding principles are available in the broad technical areas of food supply chains, city-region food systems and value chains to support governments and development practitioners in understanding food system dynamics (FAO, RUAF and Wilfrid Laurier University, 2018; FAO, 2021b; FAO, 2014a; FAO, 2012), there is a dearth of resources that place primary focus on navigating food systems for outcomes related to nutrition – in particular, healthy diets.

This document takes inspiration from existing resources on food security and nutrition to propose an integrated approach towards assessing food systems for nutrition and healthy diets, in the context of urban areas. It begins by elaborating the need to operationalize conceptual frameworks on food systems to enable evidence-informed policy and programme design, and to support a food systems transformation agenda which is focused on nutrition and healthy diets. The second, and main, part of the report presents the Urban Food System Assessments for Nutrition and Healthy Diets (UFSAN) Tool (hereafter, also Tool), providing an overview of its conceptual basis, key features and a step-wise guide to implementation.

The UFSAN Tool was designed with the aim to help governments, policymakers and development practitioners in identifying elements and activities within food systems that limit the attainment of healthy diets while providing either a snapshot or a periodical understanding of the nutrition and food systems situation in a given urban context. Another, crucial, aim was to guide policies, programmes and investments towards a range of potential food system actions that promote better nutrition and healthy diets. In the latter portion of the report, the experiences with applying the Tool in four large metropolitan urban settings – namely Pune and Ahmedabad, in India, and Kathmandu and Pokhara, in Nepal – are presented. In doing so, the document highlights critical factors which determine the successful implementation of the Tool and the main challenges, including during and after the COVID-19 pandemic, that must be negotiated to carry out the assessment successfully.

The Tool acknowledges that food system actors may come from a whole host of sectors, including agriculture, health, environment, social affairs, labour, water, sanitation and hygiene. Therefore, this Guidance Note is developed in such a way that it can be applied by experts from these sectors as well. While the Tool aims to be holistic, covering major food systems drivers, components, actors and influencers (see Figure 1), it needs to be supplemented with other comprehensive tools and methodologies, in-depth value chain studies and representative, population-based nutrition and public health surveys in order to provide a full picture of the situation, issues and opportunities that food systems afford for nutrition in an urban setting. That said, the Tool is envisaged as a flexible resource that can be applied rapidly and modified to meet the objectives of food system assessments.

Figure 1. Conceptual framework underpinning the Urban Food System Assessments for Nutrition and Healthy Diets Tool.



Source: Adapted from Raza, *et al.* (2020), HLPE (2017) and UNICEF and GAIN (2019).

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OPERATIONALIZING FOOD SYSTEMS FRAMEWORKS

Shaping food systems for healthy diets poses several challenges, not least due to the complexity of conceptualizing the system in its totality. Food systems are expansive by definition, covering various disciplines, fields and sectors. According to FAO, food systems encompass the entire range of activities involved in the production, processing, marketing, consumption and disposal of goods that originate from agriculture, forestry or fisheries, including the inputs needed and the outputs generated at each of these steps. Food systems also involve the people and institutions that initiate or inhibit change in the system, as well as the social, political, economic and technological environment in which these activities take place (FAO, 2013). The wide range of communities of practice engaged in the food systems debate have divergent understandings of the problems and, consequently, on the potential solutions which should be given priority (Béné *et al.*, 2019).

Definitions

- Drivers: underlying structural factors that impact the functioning of food systems. Examples: cultural traditions and beliefs, trade and markets, infrastructure and climate change.
- Determinants: processes and conditions within food systems necessary to improve diets. Examples: food supply chains, food environments and consumer behaviour.
- Influencers: immediate, individual-level entry points for each determinant that can be leveraged for healthy diets.

In recent times, influential reports and academic literature have enabled a better conceptual understanding of the linkages between food systems and nutrition (Lawrence *et al.*, 2015; HLPE, 2017; Turner *et al.*, 2018; UNICEF and GAIN, 2019; Raza *et al.*, 2020). These conceptual frameworks are useful towards developing a shared understanding, among food system stakeholders, of the influencers and pathways that link system determinants (food supply chains, food environments and consumer behaviour), drivers and feedback loops with dietary outcomes. Given the importance of food systems transformation for the attainment of the SDGs and Agenda 2030, there is a need to operationalize conceptual frameworks so that they can guide the assessment of healthy diets, identify bottlenecks in food systems and support the development of actions that have the potential to improve nutrition for vulnerable groups, especially children under five years of age and women of reproductive age (15–49 years).

2.1. Conceptual basis

The UFSAN Tool takes inspiration from the Innocenti Framework for Children and Adolescents, developed by the United Nations Children's Fund (UNICEF) and the Global Alliance for Improved Nutrition (GAIN), and the framework proposed by the Committee on World Food Security's High Level Panel of Experts (HLPE) report, for several reasons (UNICEF and GAIN, 2019; HLPE, 2017). Firstly, frameworks such as that proposed by the HLPE are consensus-based and are widely used as a reference point for high-level advocacy, dialogue and policy formulation on nutrition and food systems by the agencies of the United Nations, international development organizations, research institutes and academia. Secondly, the framework has influenced FAO's programmatic work on nutrition and healthy diets. For example, the framework has been used to guide the forthcoming Strategy for FAO's Work in Nutrition, which provides overarching guidance for the agency's vision of healthy diets for all people at all times (FAO, 2020).

Lastly, these frameworks provide an opportunity to utilize the food systems approach to understand issues related to access, availability and affordability of healthy diets. A food systems approach has the potential to address the complexity and totality of the systems, and enables policymakers to facilitate multi-stakeholder collaboration and coordination at different levels to achieve transformational changes (FAO, 2018). The food systems approach places equal emphasis on both the supply and demand dimensions critical to ensuring healthier diets and better nutrition. On the supply side, this entails working along the food supply chain, whereas on the demand side, it involves shaping consumer behaviour.

Within the HLPE and UNICEF and GAIN conceptual frameworks, as well as other related frameworks, the influencers for each determinant of the food system – food supply chains, external food environments, personal food environments and consumer behaviour – are ready entry points for governments to shape more nutrition-focused food systems (Raza *et al.*, 2020). Therefore, the UFSAN largely converts these influencers into modules and questions that can be administered through a survey, to assess the performance of individual food systems as it relates to healthy diets.

2.2. Evidence synthesis on links between food system influencers and nutrition

To understand which specific modifiable influencers (see Figure 1) have been linked with nutritional outcomes in previous studies, we reviewed the Evidence and Gap Map developed by the Innovative Methods and Metrics for Agriculture and Nutrition Actions (IMMANA) (Sparling *et al.*, 2021) and other literature. To narrow the scope of the surveys – in the interests of ensuring that they could be implemented rapidly – questions for data available from other sources, such as Demographic and Health Surveys, were not included. For example, questions on infant and young child feeding (IYCF) practices were not included.

Some broad themes found in the literature on the pathways between consumer-level influencers and nutritional outcomes were the following.

- The first systematic review to evaluate the association between food environments and dietary intake among adults was conducted in 2012 and identified 38 studies, all in high-income countries (Caspi *et al.*, 2012). A comparable systematic review was conducted to evaluate similar studies among children in 2014, and identified 26 studies, again all in high-income countries except one, which was done in China (Engler-Stringer *et al.*, 2014). Most recently, a systematic review with a specific focus on low- and middle-income countries was conducted, identifying 28 studies that evaluated the association of food environments with dietary intake, nutritional status or health (Turner *et al.*, 2020). Across all of these reviews, a substantial heterogeneity in measures and assessment tools was observed, which made drawing direct comparisons across studies a major challenge; moreover, a majority of studies were cross-sectional. In general, the evidence from geographic information system studies of food accessibility (operationalized as the distance to various food retailers or the density of food outlets), which made up the majority of the studies identified in these reviews, does not support identification of a strong or consistent relationship with diet or body mass index. This may be because a reductionist approach that focuses on studying accessibility alone does not capture the complexity of food choice behavior, which is driven by other influencers, including affordability, convenience and acceptability.
- The time spent cooking food at home is associated with healthier diets in high-income countries (Mills *et al.*, 2017). Studies in low- and middle-income countries of cooking time have focused on variation with cooking fuel type; to date, there is very limited evidence on associations with diet quality.
- Frequent out-of-home food consumption, particularly fast food and street food, is associated with higher body mass indexes and an increased risk of overweight or obesity and nutrition-related chronic diseases in low- and middle-income countries; however, most evidence to date is cross-sectional (Joseph *et al.*, 2015; Kagaruki *et al.*, 2021; Li *et al.*, 2020).

- Dietary diversity is associated with improved nutritional status, a lower risk of low birth weight, and a lower risk of certain nutrition-related chronic diseases (Kheirouri and Alizadeh, 2021; Miller *et al.*, 2020; Mozaffari *et al.*, 2021).
- Food preferences are increasingly recognized as important drivers of dietary intake in low- and middle-income countries (Sánchez-García, Reyes-Morales and González-Unzaga, 2014; Thakwalakwa *et al.*, 2020).

Several tools already exist for measuring retailer-level influencers. However, due to inconsistencies in methods across studies, most systematic reviews have concluded that while there is evidence to suggest a link with dietary intake, it is not possible to draw firm conclusions in this respect (Gustafson, Hankins and Jilcott, 2012; Ni Mhurchu *et al.*, 2013). Metrics have included product availability (see box), price, quality, placement (in-store location) and promotion (displays, labelling, advertising), as well as hours of operation. The most commonly used tool (applied in 29 studies between 1990 and 2015 [Glanz *et al.*, 2016]) is the Nutrition Environment Measures Survey in Stores (NEMS-S). This survey assesses the availability, price and quality of 11 food categories (milk, fresh fruit, fresh vegetables, beef, hot dogs, frozen dinners, baked goods, beverages, bread, chips and cereal) (Glanz *et al.*, 2007). The NEMS-S survey has been adapted for use in urban Brazil (Martins *et al.*, 2013), Costa Rica – where it has been renamed IMANEA (Golfin *et al.*, 2017), and urban Mediterranean contexts (Martínez-García *et al.*, 2020). The GroPromo tool expands NEMS-S to measure placement and promotion of healthy versus unhealthy foods (Kerr *et al.*, 2012). Finally, the International Network for Food and Obesity/non-communicable diseases Research, Monitoring and Action Support (INFORMAS) is developing evidence-based standardized methods to assess retailer food environments. One of these methods – the cumulative linear shelf length of healthy versus unhealthy foods – was validated against the "gold standard" of total available healthy versus unhealthy foods in New Zealand supermarkets (Vandevijvere, Mackenzie and Ni Mhurchu, 2017), and recently implemented in urban Argentina (Elorriaga *et al.*, 2021). However, like the GroPromo, it has not yet been linked to individual dietary intake or nutritional outcomes. Given the lack of validation in other settings, especially low- and middle-income countries, and the difficulties encountered in conducting these measurements in a developing country context, where not all markets are formal, it was ultimately decided not to include shelf-related measurements of food availability in UFSAN.

Product availability metrics for retailer food environments

- ➔ presence
- ➔ linear shelf length
- ➔ proportion of shelf space
- ➔ shelf surface area
- ➔ number of displays
- ➔ variety

With regard to the wholesaler- and producer-level influencers, several themes emerged.

- While few studies have explored the impacts of **agricultural input subsidies** on nutritional outcomes in low- and middle-income countries – a recent systematic review identified only four such studies, conducted in the Gambia and Malawi – those that have been conducted to date suggest a positive impact (Walls *et al.*, 2018).
- **Participation in producer organizations** (also known as cooperatives) can help producers consolidate produce for transport and marketing and cultivate more nutrient-dense foods, such as fruits and vegetables. However, these organizations often exclude the poorest farmers and female farmers, as one study in Ethiopia found, although these farmers may still benefit from spillovers (Bernard and Spielman, 2009).
- Several studies suggest a correlation between **participation in modern food value chains** and improved food security among smallholder farmers; an example is the study of inclusive agribusiness conducted among mango farmers in Kenya (Wangu, Mangnus and van Westen, 2020). Most of these benefits appear to occur indirectly, in the form of off-farm employment opportunities in commercial farms and post-harvest businesses. Moreover, while benefits for food security may be observed, this does not necessarily translate to improved diet quality and nutritional status. The positive nutritional impacts of participation in higher-value chains may be greater if women can retain control of the revenues. Thus, training and empowering female producers would indirectly affect nutritional outcomes.
- Where **transportation infrastructure** is poor, transaction costs drive a large wedge between producer and consumer prices for many nutritious foods, compared to crops that can be stored. Technologies that can reduce the transaction costs associated with getting healthier foods from producer to consumer could potentially reduce consumer prices while actually increasing or maintaining the level of producer prices (Allen and De Brauw, 2018). The lack of post-harvest and distribution infrastructure (e.g. drying or cold storage) limits the ability of traditional food value chains to support healthy diets year-round. Direct provision of infrastructure can improve storage, logistics and communications, reducing food losses and business costs for agribusinesses.
- **Layers of wholesalers** increase price markups between farmgates and consumers. The targeted elimination of wholesalers distributing high-nutrition-value products can improve market access.

- While there is much interest in crop diversification as an approach to diversifying diets and improving nutritional outcomes, the evidence gained to date is weak and suggests that **market access** is more important for dietary quality than on-farm production diversity (Sibhatu and Qaim, 2018).
- Five pathways have been proposed between **sustainability certification** and food security: price premiums/market access, yields/income, land use change, land rights and empowerment of women (Schleifer and Sun, 2020). For example, sustainability standards in the coffee market have had positive impacts on food security and diet quality for smallholder farmers in Uganda (Chiputwa and Qaim, 2016). However, not all studies have found a positive impact on food security, and few have evaluated diet quality and nutritional outcomes.

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THE URBAN FOOD SYSTEM ASSESSMENTS FOR NUTRITION TOOL

3.1. Methodology

The UFSAN Tool aims to operationalize conceptual frameworks on food systems and enable policymakers, development practitioners, FAO staff in decentralized offices and researchers to ascertain the performance of food systems vis-à-vis healthy diets and promote data-informed actions. Thus, the Tool and this complementary Technical Guidance Note have been designed with the aforementioned stakeholders in mind, with high attention placed on ensuring that they can replicate the assessment as independently as possible.

In developing the Tool, the following two considerations formed its main components: (i) the importance of building on existing tools, methodologies and approaches related to nutrition, food supply chains and urban food systems; and (ii) the identification of nutrition-sensitive modules and questions, based on the scientific evidence and programmatic advice available.

Most of the tools, methodologies and approaches used as a basis for the UFSAN Tool were drawn from FAO's normative products and country-level engagement. These FAO resources included the following: the Toolkit for nutrition-sensitive agriculture and food systems, the Rapid Urban Food System Assessment Tool (RUFSAT), the City-Region Food Systems Toolkit, and the framework for developing sustainable food value chains (FAO, RUAF and Wilfrid Laurier University, 2018; FAO, 2021b; FAO, 2014a).

The UFSAN Tool should not be considered as an alternative to full-scale and in-depth analyses on topics related to nutrition, such as dietary intakes, food safety, nutrition education and malnutrition. It is meant to highlight food system bottlenecks in an urban setting in a rapid and resource-efficient manner, which can be used to better target existing schemes, plan and coordinate multi-sectoral responses for nutrition and provide the impetus for a deeper dive into certain topics.

3.2. Modules

As a result of the review of the evidence and programmatic guidance available on the impact of food systems actions on healthy diets, a list of modules and associated questions were identified that can enhance the nutrition-sensitivity of existing tools, methodologies and approaches. These nutrition-sensitive modules are presented in this section.

Tips!

➔ Depending on the availability of resources and the objectives of the assessment, different nutrition-sensitive modules can be prioritized.

3.2.1. Dietary intake

As the main objective of the Tool is to shape better diets, it is imperative that what people are consuming is captured. There are several non-quantitative indicators that can be administered at the population level to measure food group diversity and caloric availability for individuals and households. These include: the individual dietary diversity score (IDDS); the minimum dietary diversity - women (MDD-W) indicator; the minimum dietary diversity for children indicator (MDD-C), as part of IYCF practices for children aged 6–23 months; the household dietary diversity score (HDDS); and the Food Consumption Score (FCS), including the Food Consumption Score Nutritional Quality Analysis (FCS-N).

All of these indicators aim to measure dietary diversity and are complementary in many ways. For instance, the IDDS MDD-W, FCS and HDDS are complementary indicators and, when measured in the same context, can provide data for performing comparisons on food consumption and dietary diversity for specific nutritionally vulnerable groups and the overall household. However, these indicators differ in terms of units of analysis, objectives, recall periods, inclusion of numbers of food groups, individual food items and food consumed away from homes. Table 1 presents the complementarities of some of these indicators in more detail, to inform the selection of the most appropriate food group diversity indicators for food systems assessments depending on the relevant context, objectives and resources.

Table 1. Selection of food group diversity indicators currently in use or advocated for use at the population level

	Indicators			
	MDD-W	**MDD-C**	**HDDS**	**FCS/ FCS-N**
Population sampled/unit of analysis	Women aged 15–49 years (collected at the individual level and interpreted at the population level)	Infants and young children aged 6–23 months	Households	Households
Validated against	Micronutrient adequacy assessed by multiple 24-hour open recalls	Micronutrient density compared with desirable density for complementary foods, assessed by 24-hour recall or weighed food records	Kilocalorie availability as assessed in household-level consumption surveys	Caloric intake and HDDS FCS-N dimensions on protein, vitamin A and iron, validated against household nutrient adequacy
Objectives	Proxy for the probability of micronutrient adequacy of women's diets Reflects micronutrient adequacy, which is a critical dimension of diet quality	Proxy for the adequacy of the micronutrient density of infant and young child diets Reflects one of several favourable IYCF practices	Proxy for household-level access to kilocalories (dietary energy), which is one dimension of household food security Reflects economic access to a diet with higher kilocalories per capita	Household food security across time, as measured by food group consumption and main sources of each food group
Recall period	24 hours	24 hours	24 hours	7 days
Number of food groups	10	8 (including breastmilk)	12	FCS – 9 FCS-N – 15
Threshold for dichotomous indicator	5 or more of the 10 food groups	5 or more of the 8 food groups	Not a dichotomous indicator	Weighted scores have thresholds for poor, borderline and acceptable consumption, set according to context
Indicator tabulation includes fats/ oils, sweets and all beverages, including alcohol	No, but option to include in extended food group list	No	Yes	Yes (not alcohol)
Foods consumed outside the home	Included	Included	Not included	Not included.
Sources	FAO, 2021b	International Dietary Data Expansion Project (INDDEX Project), 2021	FAO, 2010	WFP, 2008; WFP, 2009; WFP, 2015

Ideally, the food system assessments should include a mix of dietary diversity indicators which enable an understanding of dietary intakes at both individual level – particularly for women of reproductive age, who also tend to make decisions on food purchasing – and household level. UFSAN includes the MDD-W, the IDDS and the FCS. The MDD-W indicator measures food diversity consumption and micronutrient adequacy for women of reproductive age (15–49 years old) while the IDDS measures dietary diversity for other age groups and gender using the same food groups. The food groups defined are: (1) grains, white roots and tubers, and plantains; (2) pulses (beans, peas and lentils); (3) nuts and seeds; (4) dairy; (5) meat, poultry and fish; (6) eggs; (7) dark green leafy vegetables; (8) other vitamin A-rich fruits and vegetables; (9) other vegetables; and (10) other fruits. For the data collection questionnaires, it is possible to collect information on other food groups consumed that may be of local relevance; however, these will not be part of the MDD-W/IDDS indicator calculation. It is also important to include unhealthy food groups, such as fried and salty snacks, sweet beverages and sweet foods, to achieve a better understanding of the double burden of malnutrition, overweight and obesity. Optional food categories include insects and other small proteins, red palm oil, and other oils and fats. The FCS, on the other hand, enables obtaining a picture of dietary intake at the household level in food-insecure settings. As the pilot was carried out in India and Nepal, settings where food insecurity levels are high, the FCS was also included in the assessment. Additionally, both the MDD-W/IDDS and the FCS, as well as the other indices included in Table 1, can be used for baseline and follow-up assessments to measure changes in diets over time, given that the same methodology is applied.

Tips!

- ➔ To ensure comparability of data and the possibility of aggregation for pooled analysis, the same methodology should be used in all countries covered by the project.
- ➔ The effects of seasonality should be considered when determining the timing of the survey.
- ➔ Days of fasting and feasting that deviate from the usual diet should be avoided.

The MDD-W/IDDS can be collected in two ways – through an open recall, or through a list-based questionnaire over a 24-hour period (FAO, 2021b). For the UFSAN pilot, the list-based method was employed, whereby the enumerator reads a list of foods and beverages out loud to the respondent. The enumerator informs respondents that they should respond "yes" for each food or beverage consumed during the previous day and night. The enumerator then continues by reading aloud a list of foods organized in groups, giving multiple examples for each food group. This method may resemble a 24-hour food frequency questionnaire. However, it does not attempt to capture frequency or usual consumption. Therefore, the list-based method is a closed-list 24-hour recall. Both the MDD-W/IDDS and the FCS are included in the UFSAN, as exhibited in Annex 1.

Tips!

- ➔ When collecting the MDD-W, it is worthwhile to try to exclude very small quantities and to include "large-enough quantities".
- ➔ Large-enough quantities are those consumed in amounts greater than or equal to 15 g (usually, one teaspoon, in terms of household measures of the food item).
- ➔ Food items consumed in quantities less than 15 g should be included in the "condiments and seasoning" food group, and will not count for MDD-W purposes.
- ➔ Detailed information on the collection and analysis of the MDD-W can be found in FAO, 2021b (available at www.fao.org/documents/card/en/c/cb3434en).

Tips!

- ➔ For households and individuals residing in low-income settings in urban areas, such as slums and structurally disadvantaged areas, the food insecurity experience scale (FIES) may also be administered.
- ➔ More information about FIES can be found via the FAO Voices of the Hungry Project (available at www.fao.org/in-action/voices-of-the-hungry/fies/en/). The survey questions can be found in Annex 1.

3.2.2. Food purchase and procurement

External food environments in modern urban settings are diverse and provide a range of options (supermarkets, informal vendors, etc.) for consumers to purchase and procure healthy foods. However, these options are not always physically accessible. Another issue might be a lack of diversity in markets and retail outlets that supply healthy and nutritious foods. Additionally, consumption of food and meals away from home at restaurants and food service outlets, as well as the use of food ordering apps, have increased in all regions of the world, and for all income groups. However, these restaurants and food service outlets are associated with the sale of highly processed foods. The UFSAN Tool attempts to capture the availability of healthier food options on restaurant and food service outlet menus.

The UFSAN Tool includes questions, such as those shown in Table 2, to enable better comprehension of the accessibility and availability (i.e. presence and proximity) of markets and food outlets.

Table 2. Food purchases from retail outlets

Question	Options	[Appropriate list of market outlets]
Do you shop for food in these places?	- Yes - No	
If yes, how often do you shop in each place?	- Every day - 2–6 times a week - 1 time a week - 2–3 times a month - 1 time a month or rarely - Never	
How far is it from your house?	- <1 km - 1–2 km - 3–5 km 5–10 km - >10 km	
What form of transportation do you use to get to each place?	- Walking - Bicycle - Motorbike - Car - Public transit - Other (specify)	

Source: Authors' own elaboration.

Tips!

➔ The list of market outlets may include:

- permanent wet market
- temporary wet market
- government ration shop
- small local shop
- specialty store (e.g. bakery, dairy)
- street vendor
- mobile door-to-door vendor
- grocery store
- restaurants
- Internet (delivery).

3.2.3. Food marketing

External food environments in low- and middle-income countries do not support consumers in making healthy food choices. Almost all retail outlets, including small informal food shops, mobile food stalls, supermarkets and restaurants, rely on some form of food marketing strategy to influence purchasing behaviours. Food marketing has been directly linked to consumers' food preferences and consumption patterns (Cairns *et al.*, 2013). The marketing strategies employed in low-and middle-income countries can include food promotion, branding and advertising.

The UFSAN Tool takes inspiration from INFORMAS, as well as other examples found in the literature – such as the GroPromo tool (Kerr *et al.*, 2012) – to propose a set of questions that can easily enable the collection of data related to food marketing in low- and middle-income countries. In these settings, retail outlets tend to be small in size, sometimes mobile and informal, and typically sell a wide range of food-related items and other products for household use. Therefore, methods developed in high-income countries, such as measuring shelf space to ascertain the relative proportion of healthy versus unhealthy foods, may not be fit for purpose in low-and middle-income countries.

The Tool makes use of the questions outlined in Table 3 to observe how food advertising and promotion strategies are used to display food items at key places – entrances, checkouts, ends of aisles, floors and ceilings – in order to promote the sale of unhealthy food items.

Table 3. Assessment of retail food environments

Directly observe the following	Options
Outdoor marketing	
Are there any food or non-alcoholic beverage advertisements on the door, windows, walls or elsewhere, such as on fences or in the parking lot, belonging to the retailer?	- Yes - No
If yes, what foods and beverages are advertised? *Check all that apply.*	List of food items
Are there any fresh fruit or vegetables outside, in front of the retailer (for example in produce bins)?	- Yes - No
Are there any food or non-alcoholic beverage advertisements on/near the:	
Entrance	- Yes - No
If yes, what foods and beverages are advertised? Note: this includes foods and beverages that are specifically placed/ promoted near the entrance. *Check all that apply.*	[Same list of food items]
Checkouts	- Yes - No
If yes, what foods and beverages are advertised? Note: this includes foods and beverages that are specifically placed/ promoted near the checkouts. *Check all that apply.*	[Same list of food items]
Ends of aisles	- Yes - No
If yes, what foods and beverages are advertised? Note: this includes foods and beverages that are specifically placed/ promoted at the end of aisles. *Check all that apply.*	[Same list of food items]
Floor	- Yes - No
If yes, what foods and beverages are advertised? *Check all that apply.*	[Same list of food items]
Ceiling	- Yes - No
If yes, what foods and beverages are advertised? *Check all that apply.*	[Same list of food items]

Source: Authors' own elaboration.

Tips!

➔ The list of food items may include:

- soft drinks
- crisps
- biscuits
- ice cream
- confectionery
- milk
- vegetable oil
- bottled water
- eggs
- other (specify).

Tips!

➔ For informal mobile food vendors and stalls, Table 3 can be modified such that only Questions 1–4 are administered.

➔ Based on the feedback to these questions, a subjective index can be generated to classify healthy versus unhealthy outlets.

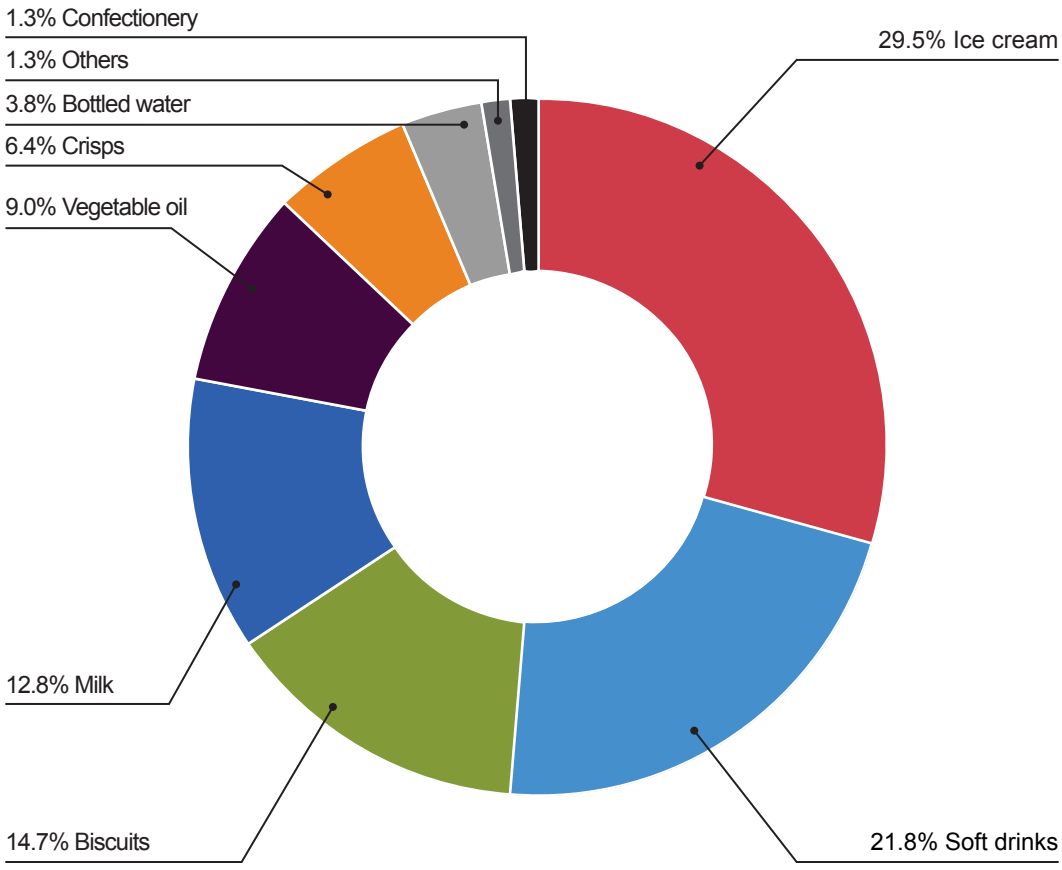
Box 1 provides an example of how information on food marketing in the retail environment can be collected in an urban setting.

Box 1. Food marketing in Pune, India

In Pune, India, one of the sites of the pilot, 66 retailers and food service outlets were selected to participate in the assessment. Twenty-six of these were formal retailers, 17 were informal retailers and 23 were food service outlets. The assessment revealed that informal retailers and food service outlets advertised foods only at their doors, windows, walls, fences or parking lots. Formal retailers, on the other hand, advertised more widely, covering the entrance, checkouts, ends of aisles and floors of the outlet.

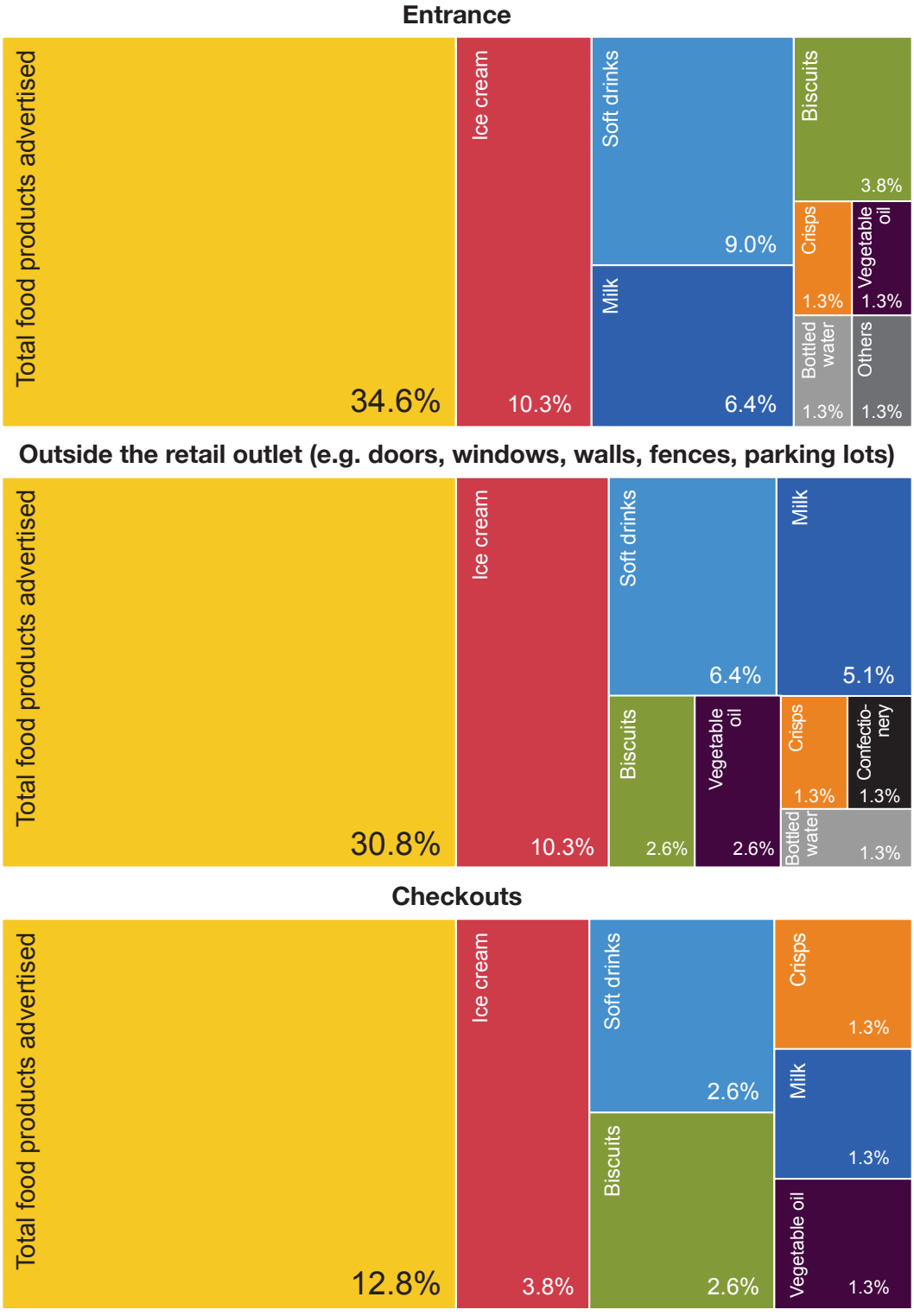
Among formal retailers, the most common food items advertised were ice cream (29.5 percent) and soft drinks (21.8 percent).

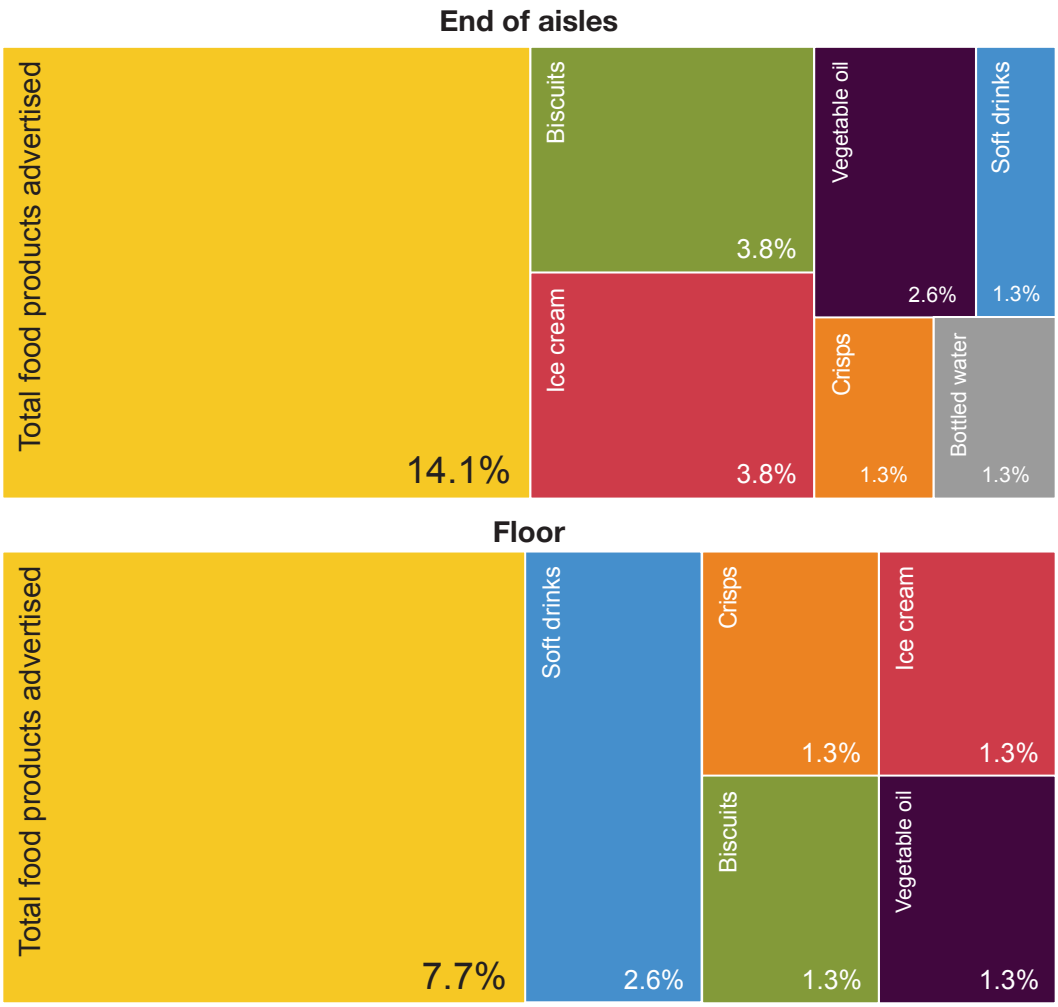
Percent distribution of common food items advertised by formal retailers (N=78 food products).



The most desired areas to place advertisements were found to be the entrance (34.6 percent) and outside the retail outlet (doors, windows, walls, fences or parking lots) (30.8 percent).

Percent distribution of the food and beverages advertised by formal retailers by place of advertisement (entrance, checkouts, etc.), N=78 food products:





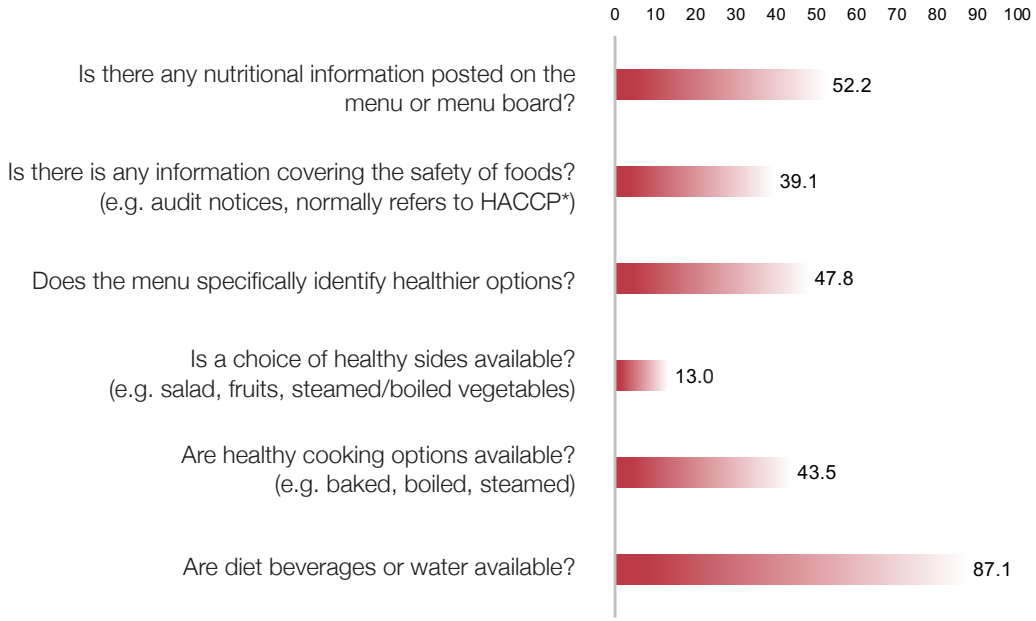
Among informal retailers, 8 retailers (47.1 percent), and 13 food service retailers (56.5 percent) advertised their food items at outside the retail outlet (doors, windows, walls, fences and parking lots).

Distribution of the food and beverages advertised – Informal retailers (N=17) and food service (N=23)

Food items	Informal retailers	Food service outlets
	Outside (e.g. doors, windows, walls, fences, parking lots)	
	Frequency (%)	Frequency (%)
Soft drinks	1 (5.9)	3 (13)
Crisps	1 (5.9)	-
Biscuits	1 (5.9)	-
Ice cream	1 (5.9)	2 (8.7)
Milk	1 (5.9)	2 (8.7)
Bottled water	1 (5.9)	1 (4.3)
Others	2 (11.8)	5 (21.7)
Total	8 (47.1)	13 (56.5)

The pilot also revealed that nutritional information was provided on menus by 12 retailers (52.2 percent). Healthier options in menus were present at 11 retailers (47.8 percent) and healthy cooking options were available at 10 retailers (43.5 percent).

Percent distribution of food marketing and advertisement at food service outlets (N=23)



**HACCP:* Hazard analysis and critical control points.

Source: **FAO.** 2022. *Urban food system and nutrition assessment in Pune, Maharashtra, India – Project report.* Rome.

3.2.4. Food quality, safety and price

Food quality, safety and price are important drivers of food choice. Low-quality and unsafe foods are often the leading causes of undernutrition and poor health in low-income and resource-poor settings. In addition, affordability of diverse and healthy food items is a growing concern around the world. Therefore, it is imperative that food systems assessments focused on healthy diets and nutrition include questions related to food quality, safety and price. Box 2 provides an example of how these considerations were included in the pilot for the UFSAN Tool in Kathmandu, Nepal.

As mentioned above, food safety is an emerging problem in urban areas, as supply chains become longer and people consume highly processed food away from home (IFPRI, 2018). Food safety concerns continue to trouble consumers, as a result of highly publicized food scares involving dangerous food additives, counterfeit products and the sale of expired food. Consumer knowledge and household practices related to food safety can be crucial to addressing food safety concerns. Annex 1 provides a brief list of questions that can assist in judging adherence to food safety standards at the consumer level.

Tips!

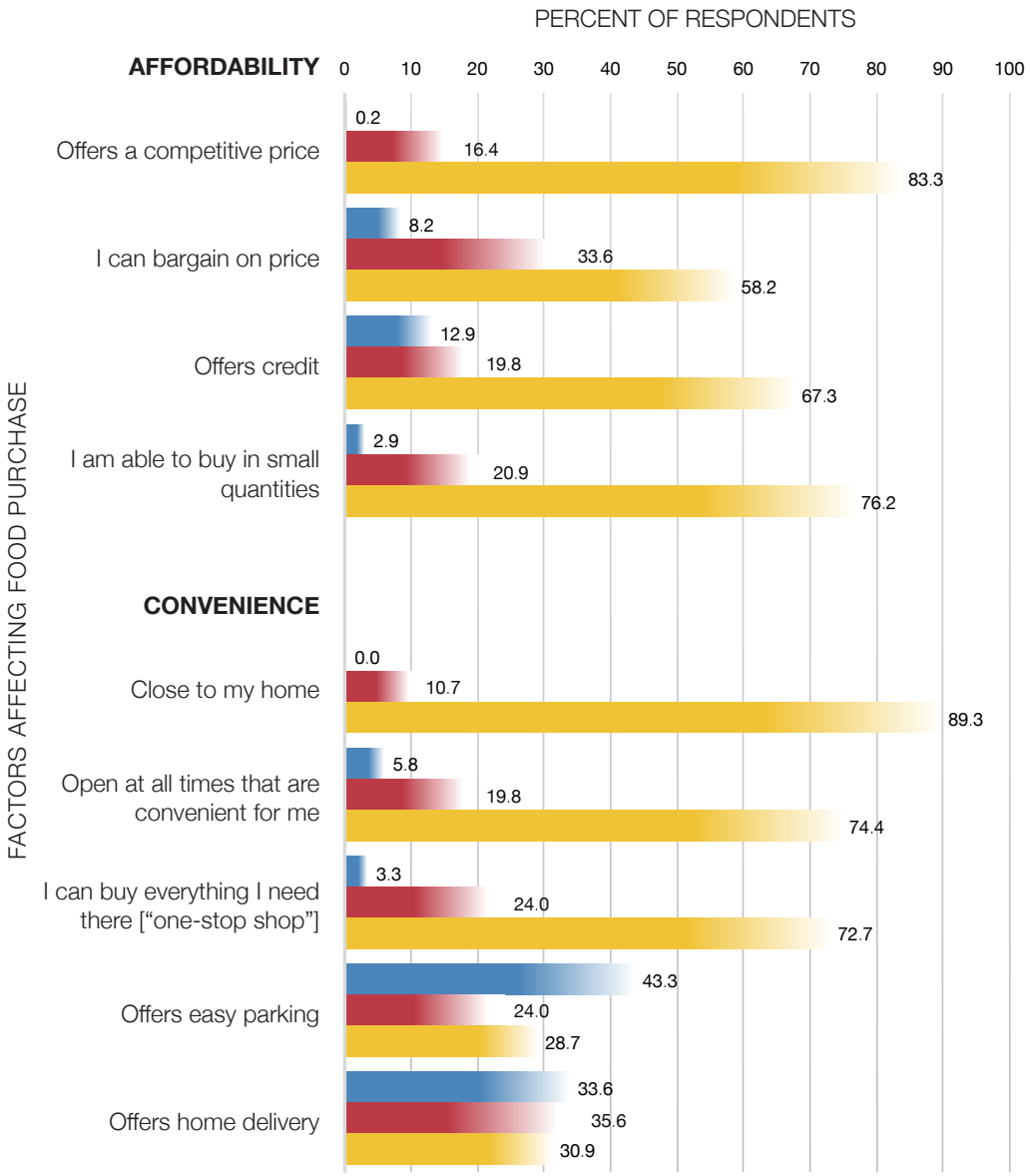
- ➔ For an overall assessment of national food control systems, the Food Control System Assessment Tool (available at www.fao.org/3/ca5334en/ca5334en.pdf) can be applied to identify priority areas of improvement and plan sequential and coordinated activities.
- ➔ This tool can be a useful baseline for monitoring the progress made in a given context.

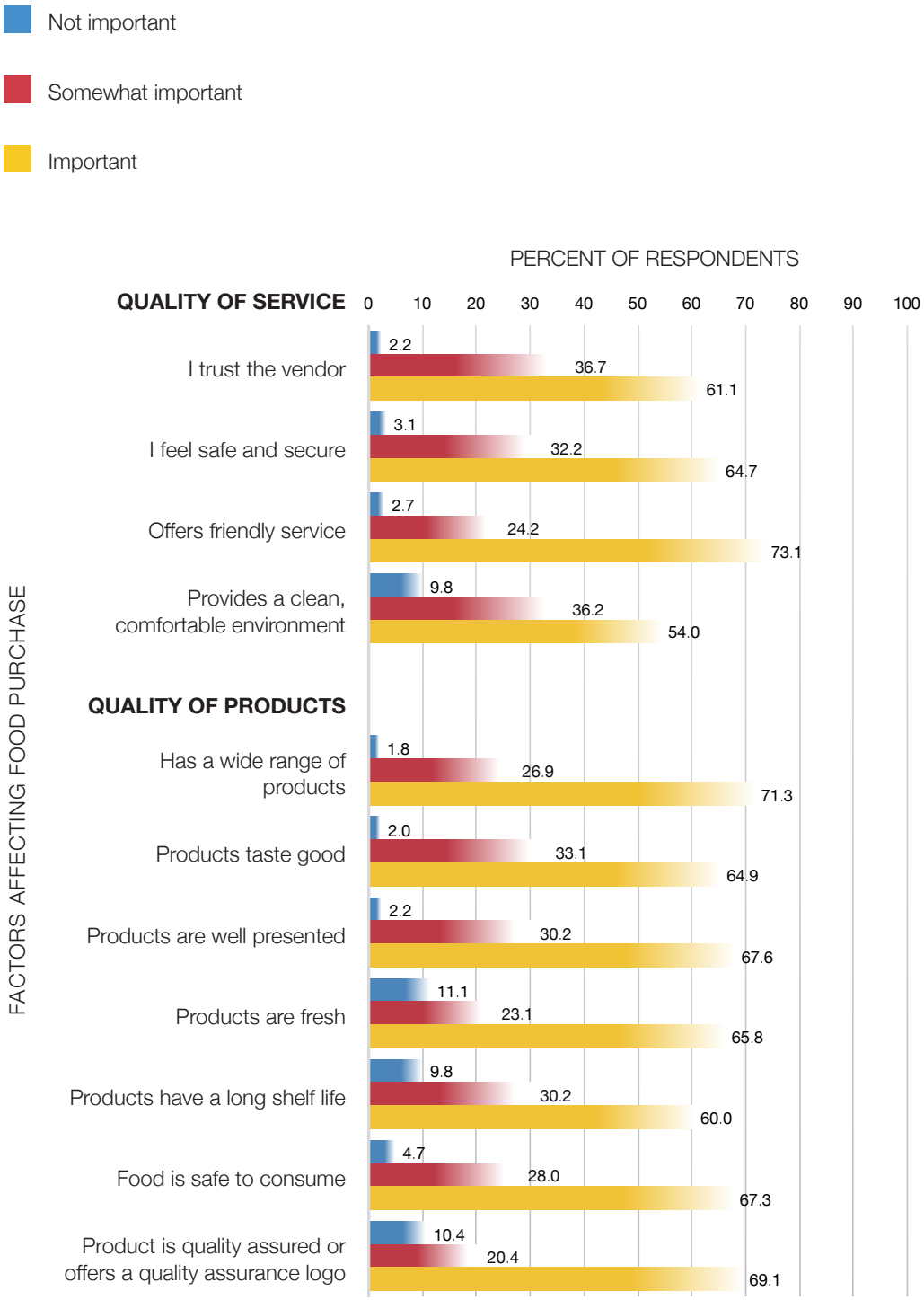
Box 2. Consumer preferences and perception of food marketing in Kathmandu, Nepal

In Kathmandu, Nepal, the food system assessment revealed that consumers considered competitive pricing and the possibility of buying small quantities of foods as key factors when making food purchases. Furthermore, consumers showed a preference for retail stores that are located close to their homes, open at convenient times, provide friendly service and sell safe food.

Across income groups, food affordability was an important factor for food purchasing. More than 80 percent of participants from all income groups considered affordability as an important factor, while more than 60 percent considered quality of service as a significant factor influencing food purchase.

Distribution of factors affecting food purchases among consumers (N=450)





Source: **Raza, A., Pandey, H., Lobo, A.S., Ganpule-Rao, A.** 2022. *Urban food system and nutrition assessment in Kathmandu, Nepal – Project report.* Rome, FAO.

3.2.5. Food loss and waste

Food loss and waste can lead to nutrient losses and thereby hamper progress towards the eradication of malnutrition (FAO, 2019b). Studies have shown that food loss and waste in highly perishable food supply chains, such as fruits, vegetables and animal-based products, lead to losses in essential micronutrients and reduce the overall supply of nutrients in the food systems (FAO, 2019b).

The UFSAN Tool includes questions for all food system actors, consumers, retailers, processors, wholesalers, traders and farmers related to food loss and waste (see Annexes 1 and 2). These questions attempt to ascertain the levels of food loss and waste, the reasons for the phenomena and the strategies used to cope with them.

Tips!

- ➔ Numerous protocols and methodologies are available for countries interested in performing comprehensive assessments of food losses and waste.
- ➔ Some examples are listed on the FAO Technical Platform on the Measurement and Reduction of Food Loss and Waste (available at www.fao.org/platform-food-loss-waste/food-loss/food-loss-measurement/en/).

Given that actions related to proper storage and distribution are critical to conserving micronutrients, questions on the availability of these facilities and services (as provided by municipal governments) have also been included.

3.2.6. Food preparation and social norms

Food preparation and social norms influence consumers' behaviours and personal food environments (Raza *et al.*, 2020). Cooking knowledge and practices, the presence of appropriate cooking equipment and space, and the availability of adequate time to prepare foods can all have an impact on the quality of diets. Therefore, the UFSAN Tool includes relevant questions on culinary knowledge and skills, the relative time and effort spent by household members on cooking and preparing food, and water, sanitation and hygiene practices to understand food preparation patterns. Recognizing that social norms and personal ambitions may also be responsible for food preparation behaviours and food choices, questions on the reasons – for example, religious, social or media-induced – for adopting certain diets are included (see Annex 1 for more details).

3.2.7. Nutrition education

Strategies aimed at improving food security and nutrition must go beyond ensuring physical and economic access to food, to making sure that all people have an understanding of what constitutes a healthy diet and how they can foster positive attitudes towards food (FAO, 2014b). For this reason, short questions related to nutrition education that can enable municipal governments to obtain a better sense of if and how consumers in an urban setting receive information about healthy diets and nutrition (including the means through which they do so, such as social media), and the steps they have taken as a result to change their diets in response to such information. Coupled with insights into consumers' dietary intake, information on nutrition education can be useful for better targeting existing nutrition education and consumer awareness schemes.

Tip!

➔ Resources permitting, thorough Knowledge, Attitudes and Practices (KAP) surveys such as those designed by FAO (available at www.fao.org/3/i3545e/i3545e00.htm) should be considered, to obtain an in-depth understanding of nutrition and health-related knowledge at the community level (FAO, 2014b).

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4

A STEP-WISE GUIDE TO THE URBAN FOOD SYSTEMS ASSESSMENT FOR NUTRITION AND HEALTHY DIETS

4.1. Formulate a "core team"

The success of the assessment depends on the creation of a "core team", which follows all steps from beginning to end. The core team should be small, ideally comprised of four to five people, and with an adequate mix of experts with diverse backgrounds. The team should have expertise in nutrition and food systems policies and programme design, implementation of large-scale public health and nutrition research studies, urban development and food supply chains. Other types of expertise that may be useful to the team include agricultural economics, environment, water, sanitation and hygiene, geo-mapping and consumer education and awareness.

Specific responsibilities of the core team members may include:

- directing the collection, and supporting the analysis, of secondary information related to food systems characteristics and the nutrition situation in select neighbourhoods within urban settings (see Section 4.2 for more information);
- determining the boundaries and parameters of the assessment (adapting the Tool accordingly; see Section 4.3 for more information);
- hiring local research teams and data enumerators;
- selecting local experts/individuals to conduct key informant interviews (KIIs) with policymakers and stakeholders engaged in food systems;
- supporting the process of submission of documents to, and obtaining approval from, the competent institutional ethics committee;
- supporting data analysis and preparation of final reports; and
- taking leadership in promoting the policy uptake of the outcomes of the assessment.

Steps for the operationalization of the food systems assessment for healthy diets

1. Identify a "core team"
2. Undertake secondary analysis
3. "Select" questions and modules to be included for the assessment
4. Collect primary data and conduct analysis
5. Conduct key informant interviews
6. Geo-mapping
7. Disseminate the findings of the assessment

4.2. Undertake secondary analysis of food systems characteristics and the nutrition situation

(administrative overview, socio-economic profile, food and nutrition analysis, and review of existing studies on food value chains)

Food systems assessment for healthy diets ought to be guided by a thorough secondary analysis of the administrative structure, the food systems characteristics and the nutrition situation in the targeted urban setting. Such analyses ensure that the proposed assessment does not replicate existing or ongoing efforts and, rather, builds on previous work in a meaningful way. In addition, these analyses can inform decisions about which neighbourhoods and localities should be included in the assessment.

The secondary analysis should include an administrative overview of municipal governance structures, as well as the legal and policy frameworks related to food security and nutrition in the setting where the assessment is to take place. The overview can be guided by the following questions.

- What local (or national) legislation, policies and programmes are in place to shape food systems towards better nutrition and healthy diets in the urban settings selected?
- Is the current set of policies and strategies sufficiently focused and well-designed to adequately address immediate and underlying causes of malnutrition, especially for specific socio-economic groups, geographic areas and administrative areas that are facing "stubborn" or more "pervasive" problems of malnutrition?

> *Tip!*
>
> ➔ Creating an institutional organigram can be a particularly useful tool for understanding the governance structures in an urban setting.

In this regard, a food and nutrition policy audit can be a useful resource (see Annex 3 for an example of an audit adapted from O'Brien and Denckla Cobb, 2012).

In the chosen urban settings where the assessment will be conducted, creating a socio-economic profile enables a closer understanding of how drivers shape the functioning of food systems in the selected context (see Figure 1 for a full list of drivers). The profile should include at least:

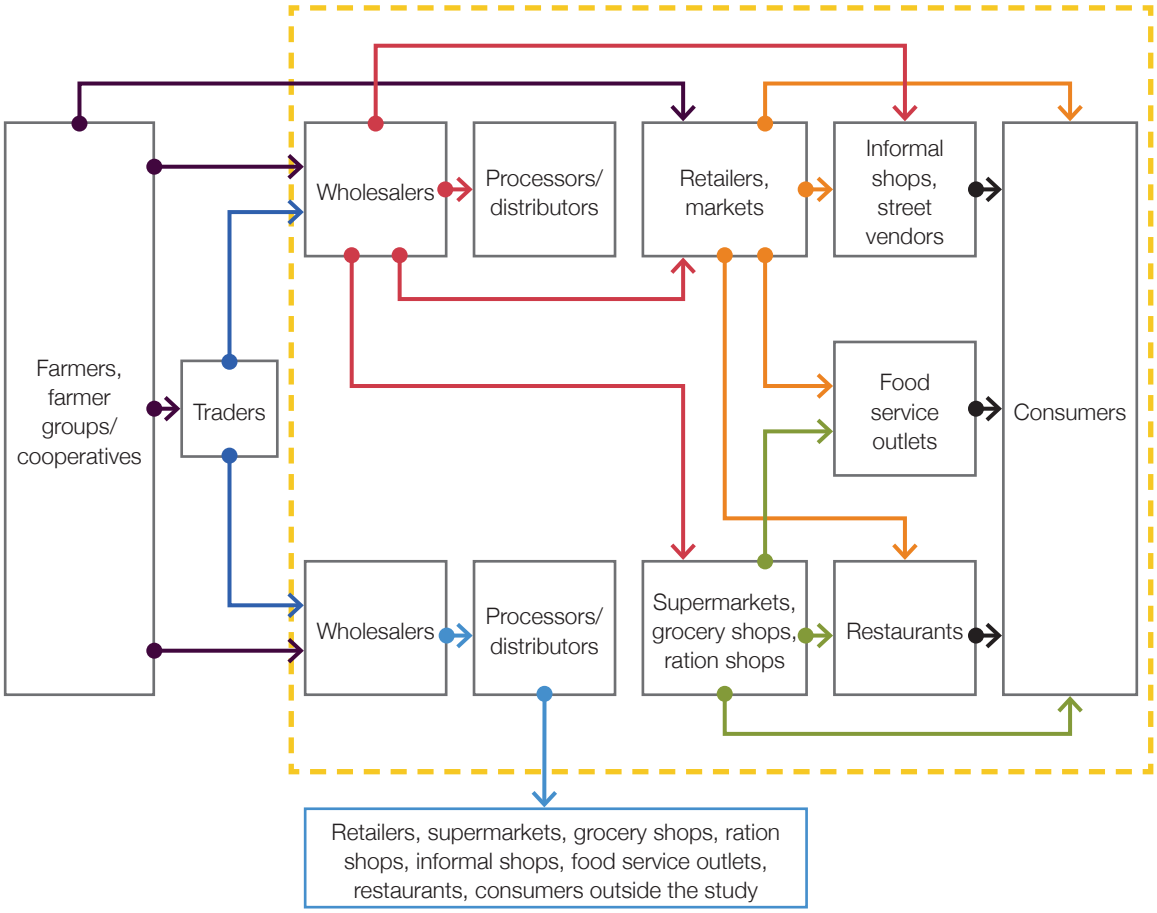
- trends in population growth;
- information on demography (such as data on gender, age and household structure of the population) that can be later used to compare the demographics of the studied neighbourhoods to the average for the whole city (to see whether certain problems are linked to certain demographic characteristics); and
- identification of socio-economic zones in an urban setting (wealthy areas, slums, etc.).

A food and nutrition situation analysis must also be undertaken during this step, to gather data on nutritional status (including micronutrient deficiencies, undernutrition, and overweight and obesity), the state of diets and NCDs and identify nutritionally vulnerable groups. The overview can be guided by the following questions.

- What are the trends, geographical and socio-economic patterns, and prospects for eradicating food insecurity, malnutrition and poverty in the select urban settings?
- What are the key drivers of food insecurity, malnutrition and poverty?
- What are the food consumption, purchasing and preparation patterns in the urban settings across socio-economics groups?
- What does a typical local food basket look like?

Based on the food and nutrition analysis, a review of existing studies on key food value chains can be effective in deciding the boundaries and features of the assessment. For select food value chains, pictorial representations such as the one given in Figure 2 can be a useful guide for primary data collection.

Figure 2. Broad representation of the fruits and vegetables value chain subsystem in Ahmedabad, India



Source: Authors' own elaboration.

4.3. Develop a "customized" food system assessment for nutrition and healthy diets

Following the completion of secondary analyses, the boundaries and parameters of the assessment can be decided using the conceptual framework in Figure 1 as a guide. Starting from left to right, begin by selecting the food system determinants (food supply chains, food environments and consumer behaviour).

For every determinant selected, choose the influencers of interest. For instance, selecting the food supply chains as the determinant of interest, influencers can be chosen from the list which includes inputs, post-harvest, processing and distribution, and resource management. The UFSAN Tool proposes questions for each of these influencers that can be administered as part of the final assessment. For a full list of questions linked to food system influencers for producers, see Annex 2.

Tip!

➔ At a minimum, food system assessment for healthy diets should cover Modules 3.1.1–3.1.8 and administer survey questionnaires to consumers, retailers, processors, wholesalers and farmers.

Similarly, should the determinant of interest be external food environments, then the following influencers may be selected: availability and accessibility of food; price of food; food quality and safety; market regulation; and food preparation. The questions associated with these influencers can be found in Annex 2. They are also explained in detail in Section 3, given their association with nutritional outcomes.

Finally, food system actors should be selected, to whom the set of survey questions should be administered. Significant actors in food systems include: consumers, food retailers (formal, informal and food service outlets), processors, wholesalers, traders, producers and government policymakers (see Annexes 1 and 2 for sample surveys for various food system actors).

Tip!

- ➔ Tracing the product to source (i.e. the farm) is expected to reveal a number of issues, such as resource constraints, transportation and logistics bottlenecks, inappropriate on-farm management and post-harvest handling practices, weaknesses in the flow of market information and constraints in the supply of inputs.
- ➔ For farmer and producer interviews, either face-to-face interviews or focus group discussions can be conducted.
- ➔ Wholesalers are one of the most accessible market intermediaries.
- ➔ The personal contacts and word-of-mouth efforts of wholesalers can be useful to gain access to other food systems actors (intermediaries, traders, etc.).

4.4. Collect primary data

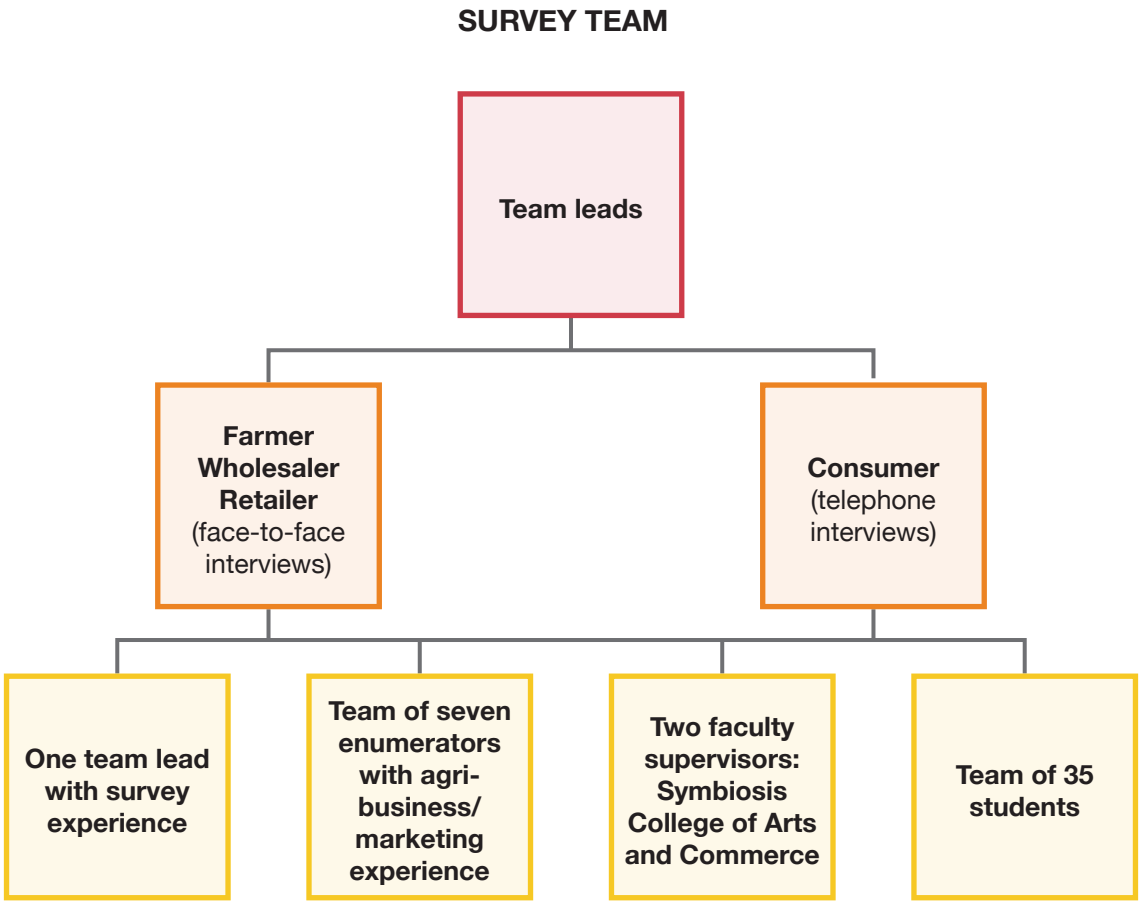
The collection of primary data needs to be planned by creating local survey teams. Figure 3 provides an overview of how the local survey teams were organized in Pune, India, as part of the piloting of the UFSAN Tool. The core team should train the local teams on:

- understanding the survey;
- developing an online application for data collection;
- pretesting the application and making necessary changes;
- installing and providing training on the application for the local teams;
- taking feedback from the local teams and adapting it to the local context;
- generating login credentials for each enumerator;
- running mock interviews with the enumerators;
- collecting data using the application on the field;
- performing weekly data quality checks and cleaning; and
- conducting final data correction, cleaning and analysis.

Tip!

- ➔ Different modes of data collection (face-to-face or telephonic) may be selected depending on the context.
- ➔ Data enumerators must be informed as to the confidentiality of the data to be collected.
- ➔ The local survey team must be trained on COVID-19 protection protocols and reminded from time to time to assure that all safety measures are followed.

Figure 3. Organization of local survey team in Pune, India, as part of the UFSAN Tool pilot



Source: Authors' own elaboration.

4.5. Key informant interviews

Holding KIIs with municipal and government representatives (including licensing authorities, inspection services and civil servants) and stakeholders (such as representatives from the chambers of commerce or from consumer, farmer, wholesaler, processor and retailer associations) can fill in gaps from the primary data collection activity and enable validation of the assessment's preliminary results. An example of the protocol for KIIs, as implemented during the pilot, is available in Annex 3.

4.6. Geo-mapping

The assessment can be complemented with a spatial overview of the food system in the urban settings by geographically referencing the locations of major retail outlets, wholesale markets, and processing and production zones. Such an overview can be a useful tool for discussions with policymakers at the municipal level. Box 3 presents an overview of geo-mapping from the city of Ahmedabad, India

Box 3. Geo-mapping of key food system actors and availability of key food groups in Ahmedabad, India

For the assessment in Ahmedabad, India, 46 farmers were approached in the villages near the outskirts of Ahmedabad. Additionally, a few interviews were conducted at the Agriculture Produce Market Committee, visited by several farmers. Two wards in the city – Paldi and Maninagar – were selected to conduct consumer (n=450) and retailer (n=55) interviews. For the interviews with wholesalers and traders (n=57), apart from Paldi and Maninagar, the following wards and locations were selected: Kalupur/ Maskati Market, Behrampura, Navrangpura, Ellisbridge, Vasana and Thaltej wards.

Distribution of farmers, traders/ wholesalers and retailers by survey type in Ahmedabad, India

- Farmers survey (46)
- Traders, Wholesalers and Processors Survey (N=57)
- Retailers and Food Service Deliveres Survey (N=55)

Distribution of farmers, traders/ wholesalers and retailers by food group in Ahmedabad, India

- Staples
- Fruits and Vegetables
- Dairy
- Bakery Products
- Indian Sweets
- Fried snacks
- Others

Source: **Raza, A., Pandey, H., Lobo, A.S. and Ganpule-Rao, A.** 2022. *Urban food system and nutrition assessment in Ahmedabad, Gujarat, India – Project report.* Rome, FAO.

4.7. Policy uptake and dissemination

Once the assessment is finalized, key stakeholders – from municipal governments, academia, the private sector, local communities, and consumer, producer and processor associations – should be invited to validate and discuss the findings in relation to the local context. The engagement should be facilitated through a Multi-Stakeholder Process (MSP).

Tip!

➔ The success of MSPs depends on high-quality facilitation and a structured approach.

➔ Widely accepted approaches and a core set of skills are needed for the success of these processes. Examples are provided in FAO's learning course on Facilitation of Capacity Development for multi-stakeholder processes (available at www.fao.org/capacity-development/resources/fao-learning-material/learning-courses/facilitation-of-capacity-development-for-multi-stakeholder-processes/en/).

The follow-up activities to the assessments could include the following:

- creation of multi-stakeholder and multisectoral task forces or groups within municipal governments to steward the agenda on nutrition and food systems;
- performance of further in-depth studies on bottlenecks identified during the assessment (food safety, food loss and waste, nutrition education, etc.) to enable a comprehensive understanding of food systems in the urban setting;
- building of local capacity and skills to promote the independent application of the UFSAN Tool by municipal governments, researchers and development organizations; and
- designing and implementing best practices and success stories that promote better nutrition and healthy diets across food systems.

Tip!

➔ Participatory methods that engage local communities and administrations are essential to ensure a sustainable impact on food security and nutrition in urban areas.

➔ The FAO guide on the Participatory Urban Food and Nutrition Security Assessment Process (available at www.fao.org/3/ae590e/ae590e.pdf) can be a useful resource in validating the assessment and brainstorming solutions with local communities.

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5

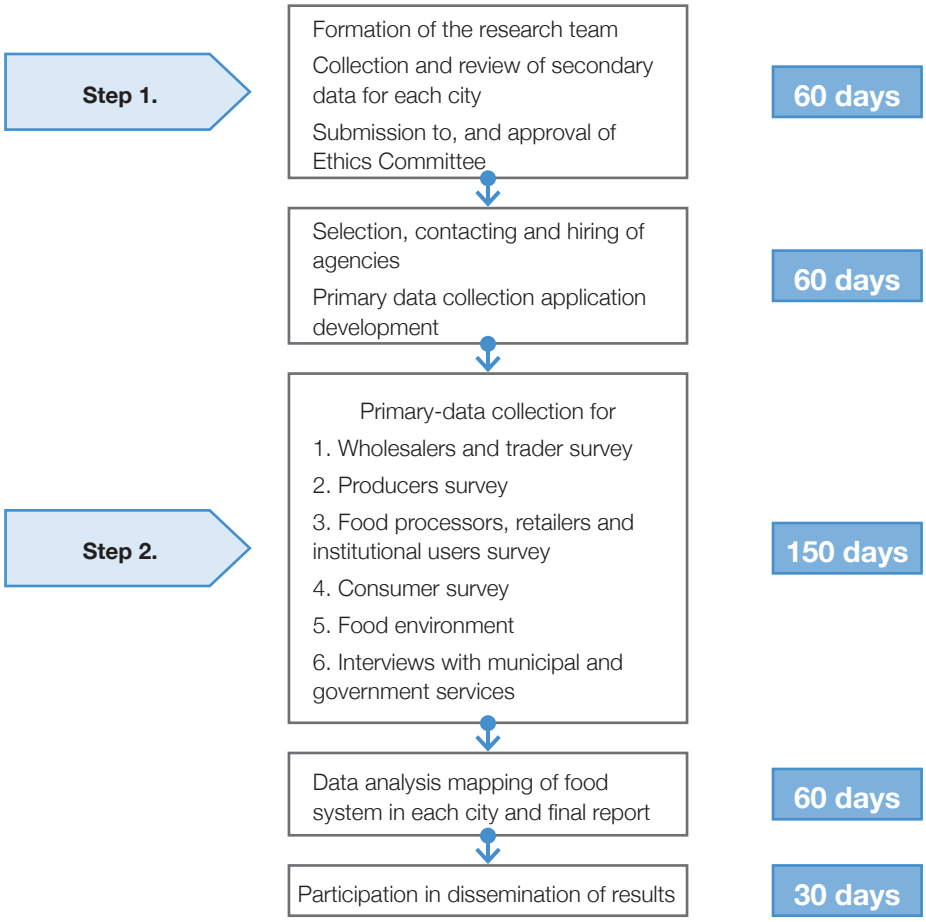
THE PILOT ON FOOD SYSTEMS ASSESSMENT FOR HEALTHY DIETS IN FOUR URBAN SETTINGS

The data collection for the pilot was completed from 12 October 2020 to 15 December 2020. The objectives of the pilot included:

- developing a holistic tool to assess nutrition and food systems in urban areas, with the aim to guide policies, programmes and investments towards a range of potential food system actions that promote better nutrition and healthy diets, especially for the nutritionally vulnerable residing in urban areas;
- piloting the UFSAN Tool in four urban settings: Ahmedabad (India), Pune (India), Pokhara (Nepal) and Kathmandu (Nepal); and
- disseminating the findings of the pilot among nutrition and food systems stakeholders in the aforementioned settings.

The participants included in the pilot were food traders, intermediaries, wholesalers and processors (n=217), peri-urban/urban farmers (n=181), retailers and food service outlets (n=242), consumers (n=1 801) and municipal and government representatives from each respective city. The total number of participants included in this study were 2 441. The important steps in the pilot are described schematically in Figure 4.

Figure 4. Schematic representation of the steps taken during the UFSAN pilot and approximate number of days needed for completion



Source: Authors' own elaboration.

The convenient sampling method was used in all surveys to recruit participants. The participants were interviewed through either telephonic or face-to-face interviews. Four questionnaires and a topic guide were developed for each survey; all translated to local languages. For consumer surveys, two representative wards that included consumers from all socio-economic strata were selected. For retailers and food service outlets, two representative wards were selected. The respondents were distributed and selected with respect to the retail shop they owned. For surveys for food traders, intermediaries, wholesalers and processors, the number of respondents was selected with respect to the food commodities. Wholesalers were contacted to provide the names of farmers from whom they buy their products. The farmers were recruited from the peripheral areas of the city. The farmers were distributed and selected with respect to the type of crop production. Table 4 presents an overview of the sampling size and techniques used during the pilot.

Table 4. Overview of the sampling size and techniques used to pilot the UFSAN Tool in four cities

Survey	Sample size	Sampling technique
Food trader, intermediary, wholesaler, processor survey	3 to 5 per food product category	Access to physical map of the metropolitan area Visit the wholesale markets Convenience sampling: researcher approaches the wholesaler
Peri-urban/urban farmer survey	45 farmers	Snowball sampling Producers provide contact details for collector agents and traders to whom they sell
Consumer survey	450 consumers	Proportion of population in each socio-economic classification is calculated Total sample divided by the number of strata and weighted by the proportion of the population within each stratum
Retailer and food service outlets	60–80 retailers	Mapping of supply chain for the whole city Mapping of food outlets in the two selected wards in each city

Source: Authors' own elaboration.

Detailed results of the pilot can be accessed through the city reports on Pune (FAO, 2022), Ahmedabad (Raza, A., Pandey, H., Lobo, A.S. and Ganpule-Rao, A., 2022a), Kathmandu (Raza, A., Pandey, H., Lobo, A.S. and Ganpule-Rao, A., 2022b) and Pokhara (Raza, A., Pandey, H., Lobo, A.S. and Ganpule-Rao, A., 2022c).

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ANNEXES

ANNEX 1. EXAMPLE OF A CONSUMER SURVEY QUESTIONNAIRE

Accessibility of food *(e.g. distance to nearby market and food outlets, daily mobility, mode of transport, space and place)*

Food purchased from a retailer:

Questions	Options	Select list of retailers
Do you shop for food in these places?	1 = Yes 0 = No	
If yes, how often do you shop in each place?	1 = Every day 2 = 2–6 times a week 3 = 1 time a week 4 = 2–3 times a month 5 = 1 time a month or rarely	
How far is it from your house?	metres	
What form of transportation do you use to get to each place?	1 = Walking 2 = Bicycle 3 = Motorbike 4 = Car 5 = Public transit 6 = Other (specify)	

Tips!

➔ The list of retailers may include:

1 = Permanent wet markets

2 = Temporary wet markets

3 = Government ration shop

4 = Small local shop

5 = Speciality store (bakery, dairy, etc.)

6 = Street vendor

7 = Mobile door-to-door vendor

8 = Grocery store

9 = Internet (delivery)

10 = Other (specify)

Questions	Options	Select list of food items
Where do you get each of the following foods? *Check all that apply.*	1 = Do not consume 2 = Purchase from a retailer (includes government ration shops) 3 = Purchase from restaurants/ food service outlets 4 = Grow/produce at home 5 = Receive as gift from family or friends 6 = Receive from NGO/food aid 7 = Other (specify)	
If you "purchase from a retailer", from which type of retailer do you most often purchase this food?	1 = Permanent wet market 2 = Temporary wet market 3 = Government ration shop 4 = Small local shop 5 = Speciality store (bakery, dairy) 6 = Street vendor 7 = Mobile door-to-door vendor 8 = Grocery store 9 = Internet (delivery)	
Which do you buy most often?	*Check all that apply.*	1 = Mutton 2 = Chicken 3 = Other (specify)
How much money do you spend on each occasion that you buy it?	*Indicate amount in local currency.*	
How much do you reject or throw away?	0 = None 1 = 25% 2 = 50% 3 = 75% 4 = All	
For what reasons do you reject or throw it away?	Specify	
What do you do with what you reject or throw away?	1 = Put in household waste 2 = Compost 3 = Feed to animals 4 = Give to someone else 5 = Other (specify)	

Tips!

➔ The list of food items may include:

1 = Meat or poultry (mutton, chicken, etc.)

2 = Dairy (milk, butter, paneer, etc.)

3 = Eggs

4 = Rice or flour

5 = Fresh fruits or vegetables

6 = Soft drinks (soda, energy drinks, etc.)

7 = Crisps

8 = Sweet biscuits or confectionery

9 = Other (specify)

Food preparation *(e.g. culinary knowledge and skills, relative time and effort spent on cooking and preparing food, WASH practices)*

Question	Options	Response
Within the last 12 months, have you or has anyone else in your household received any information about food safety?	1 = Yes 0 = No	
Who provided that information? *Check all that apply.*	1 = Government 2 = NGO 3 = Other (specify)	
What actions did you take/what things have you changed?	Specify	
Within your home, from where do you source the water that you use for cooking?	Specify	
Within your home, from where do you source the water that you use for drinking?	Specify	
Do you treat the water in any way before you use it?	1 = Yes 0 = No	
If yes, how do you treat the water?	Specify	
How often do you wash fruits and vegetables with clean water?	1 = Never 2 = Sometimes 3 = Always	
How difficult is it for you to wash fruits and vegetables with clean water?	1 = Not difficult 2 = Somewhat difficult 3 = Very difficult	
Who does most of the food shopping in your household? *Choose one.*	1 = Myself 2 = My spouse 3 = Parent-in-law 4 = Other family member (including children) 5 = Domestic help 6 = Myself and my spouse share responsibility 7 = Myself and parent-in-law share responsibility 8 = Myself and other family member (including children) share responsibility 9 = Myself and domestic help share responsibility 10 = Other (specify)	

Question	Options	Response
Who does most of the food preparation (cooking) in your household? *Choose one.*	1 = Myself 2 = My spouse 3 = Parent-in-law 4 = Other family member (including children) 5 = Domestic help 6 = Myself and spouse share responsibility 7 = Myself and parent-in-law share responsibility 8 = Myself and other family member (including children) share responsibility 9 = Myself and domestic help share responsibility 10 = Other (specify)	
How much time is spent in a typical weekday preparing food (cooking) in your household? *For all meals throughout the day combined, and time spent by all people who cook combined.*	Minutes	
How much time is spent in a typical weekend day preparing food (cooking) in your household? *For all meals throughout the day combined, and time spent by all people who cook combined.*	Minutes	

***Socio-economic** characteristics (e.g. education and literacy)*

Questions	Options	Response
Gender of respondent	1 = Female 2 = Male	
Age of respondent	Years	
Marital status	1 = Single/never married 2 = Married 3 = Widowed/divorced/separated	
What is the highest level of education you have completed?	1 = Illiterate 2 = Literate, no formal education 3 = Primary school (up to Standard 5) 4 = Middle school (Standard 5–8) 5 = High school (Standard 10) 6 = Higher secondary school (+2) 7 = Graduate (BA/BSc/BCom/Diploma) 8 = Professional degree/postgraduate	

Question	Options	Response
How many people are in your household?	Number	
Number of children < 5 years old	Number	
Number of children 6–12 years old	Number	
Number of children 13–17 years old	Number	
Number of adults (18 years or older)	Number	
Do you own a refrigerator?	1 = Yes	
	0 = No	
Do you own a freezer?	1 = Yes	
	0 = No	
Do you own a microwave?	1 = Yes	
	0 = No	
What is your total household income?	Local currency	
Units	1 = Per week	
	2 = Per month	
	3 = Per year	
	4 = Other (specify)	
How much money does your household spend on food purchased from retailers?	Local currency	
Units	1 = Per week	
	2 = Per month	
	3 = Per year	
	4 = Other (specify)	

Desirability and acceptability of food *(e.g. preferences, tastes, desires, attitudes, culture, social norms)*

How important are each of the following factors when deciding where to purchase your food? [READ ALL]	Not important	Somewhat Important	Important
Affordability			
Offers a competitive price			
I can bargain on price			
Offers credit			
I am able to buy in small quantities			
Convenience			
Close to my home			
Open at a time that is convenient for me			
I can buy everything I need there ("one-stop shop")			
Offers easy parking			
Offers home delivery			
Quality of service			
I trust the vendor			
I feel safe and secure			
Offers friendly service			
It provides a clean, comfortable environment			
Quality of products			
Has a wide range of products			
Products taste good			
Products are well presented			
Products are fresh			
Products have a long shelf life			
Food is safe to consume			
Product is quality-assured or offers a quality assurance logo			

No.	Questions	Options	Response
Thinking about the food that is consumed in your household, are any members of the household who are: [READ ALL]			
	Completely vegetarian [do not eat meat or fish]	Number of members of household *Enter "0" if none*	
	Mainly vegetarian [eat fish but not meat]	Number of members of household *Enter "0" if none*	
	Vegan [do not eat products derived from animals]	Number of members of household *Enter "0" if none*	
	Trying to lose weight	Number of members of household *Enter "0" if none*	
	On a special diet for medical reasons	Number of members of household *Enter "0" if none*	
	On a special diet for religious reasons	Number of members of household *Enter "0" if none*	

Eating patterns *(e.g. frequency, routine, pattern and quality of dietary intake, preferences, social aspects)*

For EVERY member of the family present in the household, in a typical week, how many meals are eaten at home and how many meals are eaten away from home:

Family member	Breakfast					Lunch					Dinner				
(relation to respondent, sex, age)	At home	At school or work	At a full-service restaurant	At a fast food restaurant	At a street vendor	At home	At school or work	At a full-service restaurant	At a fast food restaurant	At a street vendor	At home	At school or work	At a full-service restaurant	At a fast food restaurant	At a street vendor

Example of integrated data collection of MDD-W and FCS/ FCS-N

	Food items	MDD-W for women aged 15–49/IDDS for other age groups and gender	FCS – for households	
		In the last 24 hours (from this time yesterday to now), did your household consume food from any of these food groups? (Yes/No)	Over the last 7 days, on how many days did your household consume the following foods? (0–7)	What was the main source of the food in the past 7 days? (1–9)
1	**Cereals, grains, roots and tubers:** rice, pasta, buckwheat, bread, millet, potato, oatmeal			
2	**Legumes/nuts:** beans, peas, lentils, soy, walnuts and/or other nuts			
3	**Milk and other dairy products:** fresh milk/sour, yogurt, cottage cheese, cheese, other dairy products (exclude margarine/butter or small amounts of milk for tea/coffee)			
4	**Meat, fish:** goat, beef, chicken, pork, rabbit, blood, eggs, fish including canned tuna, and/or other seafood			
	If No, skip to Question 5			
4.1	**Flesh meat:** beef, pork, lamb, goat, rabbit, chicken, duck, other birds			
4.2	**Organ meat:** liver, kidney, heart and other organ meats			
4.3	**Fish:** fish, including canned tuna, and/or other seafood (fish in large quantities and not as a condiment)			
4.4	**Eggs**			
5	**Vegetables, leaves:** salad leaves, onion, beetroot, tomatoes, cucumbers, cabbage, carrots, peppers, zucchini, green beans, etc.			
	If No, skip to Question 6			
5.1	**Orange vegetables (vegetables rich in vitamin A):** carrot, red pepper, pumpkin			
5.2	**Green leafy vegetables:** spinach, broccoli and/or other dark green leaves			
6	**Fruits and berries:** apple, pear, apricot, peach, plum, cherry, banana, lemon, watermelon, melon, raspberry, strawberry, currant and/or other berries			
	If No, skip to Question 7			
6.1	**Orange fruits (fruits rich in vitamin A):** apricot, peach			
7	**Oil/butter/fat:** sunflower oil, olive oil, margarine, butter, pork fat, other fats/oil			

	Food items	MDD-W for women aged 15–49/IDDS for other age groups and gender	FCS – for households	
		In the last 24 hours (from this time yesterday to now), did your household consume food from any of these food groups? (Yes/No)	Over the last 7 days, on how many days did your household consume the following foods? (0–7)	What was the main source of the food in the past 7 days? (1–9)
8	**Sugar, or sweets:** sugar, honey, jam, cakes, candy, cookies, pastries and other sweets (sugary drinks)			
9	**Condiments/spices:** tea, coffee/cocoa, salt, garlic, spices, yeast/baking powder, tomato/sauce, meat or fish as a condiment, condiments including small amounts of milk for tea/coffee			

FOOD SOURCE CODES		
1 = Own production (crops, animal)	4 = Market (purchase on cash and credit)	7 = Hunting
2 = Exchange of food for labour	5 = Borrowing	8 = Fishing
3 = Gifts from neighbours/relatives	6 = Food assistance	9 = Gathering

During the last 12 months, was there a time when	Options	Response
You or others in your immediate household were worried you would run out of food because of the lack of money or other resources	1 = Yes 0 = No	
You or others in your immediate household were unable to eat healthy and nutritious food because of the lack of money or other resources	1 = Yes 0 = No	
You or others in your immediate household ate only a few kinds of food because of a lack of money or other resources	1 = Yes 0 = No	
You or others in your immediate household had to skip a meal because there was not enough money or other resources to get food	1 = Yes 0 = No	
You or others in your immediate household ate less than you thought you should because of a lack of money or other resources	1 = Yes 0 = No	
Your immediate household ran out of food because of the lack of money or other resources	1 = Yes 0 = No	
You or others in your household were hungry but did not eat because there was not enough money or other resources for food	1 = Yes 0 = No	
You or others in your household went without eating for a whole day because of a lack of money or other resources	1 = Yes 0 = No	

Food safety practices

No.	Questions	Options	Response
Food safety			
	Do you wash fruits, vegetables, meat and fish in clean water prior to cooking or storing?	1 = Yes 0 = No	
	Do you use clean and fresh utensils during cooking?	1 = Yes 0 = No	
	Do you keep meat and fish separate from fruits and vegetables including in the refrigerator?	1 = Yes 0 = No	
	Do you keep raw and cooked food separately?	1 = Yes 0 = No	
	Are you aware of the need to completely cook the food and not leave any part raw?	1 = Yes 0 = No	

Nutrition education

No.	Questions	Options	Response
Nutrition education			
	Within the last 12 months, have you or has anyone else in your household received any information about healthy, nutritious diets?	1 = Yes 0 = No	
	Who provided that information? *Check all that apply.*	1 = Government 2 = NGO 3 = Other (specify)	
	What actions did you take/what things have you changed?	Specify	

ANNEX 2. EXAMPLE OF RETAILER, PROCESSOR, WHOLESALER, TRADER AND FARMER SURVEY QUESTIONNAIRE

Availability and accessibility of food *(e.g. presence of and proximity to markets and food outlets)*

The following set of questions can be administered for all food system actors, namely retailers, processors, wholesalers, traders and farmers.

Questions	Options	List of food items
Which of the following product categories do you currently sell?	1 = Yes 0 = No	
How frequently do you repurchase the product?	1 = Every day 2 = 2–6 times a week 3 = 1 time a week 4 = 2–3 times a month 5 = 1 time a month or less	
From whom do you buy the product?	1 = Direct from farmers 2 = Farmer groups/cooperatives 3 = Traders 4 = Wholesalers 5 = Supermarkets 6 = Other retailers 7 = Distributors 8 = Other (specify)	
In a typical week, what quantity of the product do you purchase?	kg	
Is the quantity that you buy consistent all year round?	1 = Yes 0 = No	
When is the supply most constrained?	MM – MM	
When is the supply most abundant?	MM – MM	
In a typical week, what is the purchased value of the product?	Local currency	
Do you collect the product or does the supplier deliver?	1 = Collect 2 = Delivered 3 = Other (specify)	
How far is the supplier from your premises?	km	

Questions	Options	List of food items
How is the product transported to your premises?	1 = Open vehicle 2 = Closed vehicle 3 = Pushcart 4 = Rickshaw 5 = Head load 6 = Other (specify)	
Does the vehicle that transports the product to your premises have cold storage?	1 = Yes 0 = No	
The list of food items may include: Meat or poultry, Dairy, Eggs, Rice or flour, Fresh fruits or vegetables, Soft drinks, Crisps, and Sweet biscuits or confectionery		

The following set of questions can be administered for the following food system actors: retailers, processors, wholesalers and traders.

Questions	Options	List of food items
For the food items that you have purchased, to whom do you sell? *Check all that apply.*	1 = Consumers, direct 2 = Other food retailers 3 = Food service 4 = Wholesalers 5 = Distributors 6 = Other (specify)	
In a typical week, what quantity of this product do you sell? *Hint: all purchasers combined.*	kg	
In a typical week, what is the value of sales for the product? *Hint: all purchasers combined.*	Local currency	
At what times of the year is the demand most subdued?	MM – MM	
When are the peak periods of demand?	MM – MM	
Around this time next year, would you expect your sales to have increased, decreased or stayed about the same?	1 = Increased 2 = Decreased 3 = Stayed about the same	
Why?	Text	
The list of food items may include: Meat or poultry, Dairy, Eggs, Rice or flour, Fresh fruits or vegetables, Soft drinks, Crisps, and Sweet biscuits or confectionery		

Overall response (not by commodity):

Food quality and safety & price of food *(e.g. monetary value of food)*

The following set of questions can be administered for the following food system actors: retailers, processors, wholesalers and traders.

How important are each of the following factors when choosing a potential supplier? [READ ALL]	**Not important**	**Somewhat Important**	**Important**
Affordability			
Offers a competitive price			
Supplier is willing to offer credit			
Convenience			
Close location/easy access			
I can contact the supplier at any time			
Supplier delivers to my business			
Quality of service			
I trust the supplier			
Supplier advises me in advance of supply problems			
Supplier is willing to share risk			
Supplier does things in a timely fashion			
Quality of food			
Supplier has a large quantity and variety of products			
Products are consistently good quality			

Marketing and regulation *(e.g. promotional information, branding, advertising, sponsorship and labelling)*

The following set of responses should be recorded for informal retailers (street food stalls, mobile vendors, etc.).

No.	Directly observe the following:	Options	Response
Outdoor marketing			
	Are there any food or non-alcoholic beverage advertisements on the door, windows, walls or elsewhere, such as on fences or in the parking lot belonging to the retailer?	1 = Yes 0 = No	
	If yes, what foods and beverages are advertised? *Check all that apply.*	1 = Soft drinks 2 = Crisps 3 = Biscuits 4 = Ice cream 5 = Confectionery 6 = Milk 7 = Vegetable oil 8 = Bottled water 9 = Eggs 10 = Other (specify)	
	Are there any fresh fruit or vegetables outside, in front of the retailer (such as in produce bins)?	1 = Yes 0 = No	

The following set of responses should be recorded for formal retailers (small food outlets, supermarkets, etc.).

No.	Directly observe the following:	Options	Response
Are there any food or non-alcoholic beverage advertisements on/near the:			
	Entrance	1 = Yes 0 = No	
	If yes, what foods and beverages are advertised? Note: this includes foods and beverages that are specifically placed/promoted near the entrance. *Check all that apply.*	1 = Soft drinks 2 = Crisps 3 = Biscuits 4 = Ice cream 5 = Confectionery 6 = Milk 7 = Vegetable oil 8 = Bottled water 9 = Other (specify)	
	Checkouts	1 = Yes 0 = No	
	If yes, what foods and beverages are advertised? Note: this includes foods and beverages that are specifically placed/promoted near the checkouts. *Check all that apply.*	1 = Soft drinks 2 = Crisps 3 = Biscuits 4 = Ice cream 5 = Confectionery 6 = Milk 7 = Vegetable oil 8 = Bottled water 9 = Other (specify)	
	Ends of aisles	1 = Yes 0 = No	
	If yes, what foods and beverages are advertised? Note: this includes foods and beverages that are specifically placed/promoted at the ends of aisles. *Check all that apply.*	1 = Soft drinks 2 = Crisps 3 = Biscuits 4 = Ice cream 5 = Confectionery 6 = Milk 7 = Vegetable oil 8 = Bottled water 9 = Other (specify)	

No.	Directly observe the following:	Options	Response
Are there any food or non-alcoholic beverage advertisements on/near the:			
	Floor	1 = Yes 0 = No	
	If yes, what foods and beverages are advertised? *Check all that apply.*	1 = Soft drinks 2 = Crisps 3 = Biscuits 4 = Ice cream 5 = Confectionery 6 = Milk 7 = Vegetable oil 8 = Bottled water 9 = Other (specify)	
	Ceiling	1 = Yes 0 = No	
	If yes, what foods and beverages are advertised? *Check all that apply.*	1 = Soft drinks 2 = Crisps 3 = Biscuits 4 = Ice cream 5 = Confectionery 6 = Milk 7 = Vegetable oil 8 = Bottled water 9 = Other (specify)	

The following should be recorded for food service outlets (such as restaurants).

Directly observe the following:	Options	Response
Is any nutritional information posted on the menu or menu board?	1 = Yes 0 = No	
Does the menu specifically identify healthier options?	1 = Yes 0 = No	
Is a choice of healthy sides available? (e.g. salad, fruits, steamed/boiled vegetables)	1 = Yes 0 = No	
Are healthy cooking options available? (e.g. baked, boiled, steamed)	1 = Yes 0 = No	
Are diet beverages or water available?	1 = Yes 0 = No	

Inputs *(e.g. access to extension services)*

The following should be recorded for farmers, traders, wholesalers and processors.

Questions	Options	Response
Are you a member of a farmer/ producer/trade association?	1 = Yes 0 = No	
If yes, what services does the farmer/producer/trade association provide? *Check all that apply.*	1 = Extension/technical production advice 2 = Market information 3 = Sourcing of inputs 4 = Mechanization services 5 = Publicity and advocacy 6 = Assistance with licenses and compliance with regulations 7 = Negotiation with authorities 8 = Other (specify)	

Post-harvest, processing and distribution *(e.g. management of natural resources and agribusiness practices)*

The following should be recorded for farmers, traders, wholesalers and processors.

Questions	Options
For the main food commodity that you produce for sale or sell, to whom do you sell? *Check all that apply.*	1 = Consumers direct 2 = Sell through a farmers' association/ cooperative 3 = Traders/distributors 4 = Wholesalers 5 = Other food retailers 6 = Food service 7 = Other (specify)
In a typical week, what quantity of this product do you sell? *Hint: all purchasers combined.*	kg
In a typical week, what is the value of sales for the product? *Hint: all purchasers combined.*	Local currency (price per kg)
Do you deliver the product or does the buyer collect?	1 = Collect 2 = Delivered 3 = Other (specify)
How far is the buyer from your premises?	km
How is the product transported from your premises?	1 = Open vehicle 2 = Closed vehicle 3 = Push cart 4 = Bicycle 5 = Other (specify)
Does the vehicle that transports the product to your premises have cold storage?	1 = Yes 0 = No
At what times of the year is the demand most subdued?	[month][begin][end]
When are the peak periods of demand?	[month][begin][end]
Around this time next year, would you expect your sales to have increased, decreased, or stayed about the same?	1 = Increased 2 = Decreased 3 = Stayed about the same
Why?	Text
What are the major problems that you currently experience with your buyers?	1 = No problem 2 = Multiple intermediaries involved 3 = High cost of transport 4 = Long delivery time 5 = High price/unit 6 = Poor communication 7 = Other (specify)

The following should be recorded for farmers, traders, wholesalers and processors.

Questions	Options	Options
Before selling, what post-harvest activities do you perform to prepare the products for sale? *Check all that apply.*	1 = Harvesting (handling) 2 = Threshing 3 = Cleaning and drying 4 = Storing 5 = Processing 6 = Packaging 7 = Transport 8 = Marketing 9 = Other (specify)	
Approximately how much does it cost to perform these activities? *Hint: all purchasers combined.*		
How do you store the product?	1 = Sheds 2 = Ventilated stores 3 = Cold storage (refrigerators) 4 = Other (specify) 999 = Not applicable	
For how long do you store the product?	Number	
Unit	1 = Days 2 = Weeks 3 = Months	
Approximately how much food is lost post-harvest?	1 = 5% 2 = 10% 3 = 15% 4 = 25% 5 = 50% 6 = 75% 7 = Other (specify)	
Why do you throw it away? *Check all that apply.*	1 = Fails to meet my expectations 2 = Does not sell 3 = No cold storage 4 = Other (specify)	
What do you do with it when you throw it away? *Check all that apply.*	1= Discard as waste 2= Bring home for consumption 3= Other (specify)	

Questions	Options	Options
What strategies are you implementing to reduce those losses? *Check all that apply.*	1 = Sourcing good-quality food 2 = Improving storage facilities 3 = Improving transport infrastructure and facilities 4 = Improving packaging 5 = Reduce damage caused by rodents, insects and pests 6 = Other (specify)	
What concerns do you have about the safety of the product?	Text	
What strategies are you implementing to minimize the risk of a food safety incident?	1 = Adhering to Good Agricultural Practices (GAP) 2 = Adhering to Good Hygiene Practices (GHP) 3 = Taking part in trainings on food safety 4 = Other (specify)	
The list of food items may include: Meat or poultry, Dairy, Eggs, Rice or flour, Fresh fruits or vegetables, Soft drinks, Crisps, and Sweet biscuits or confectionery		

The following set of questions can be administered for all food system actors, namely retailers, processors, wholesalers, traders and farmers.

In relation to each of the following municipal services and infrastructure, how well do you rate [READ ALL]	**Not applicable**	**Poor**	**OK**	**Good**
Availability of cool/cold storage	0	1	2	3
Availability of transport infrastructure	0	1	2	3
Waste collection	0	1	2	3
Provision of water supply	0	1	2	3
Drainage	0	1	2	3
Provision of electricity supply	0	1	2	3
Gas supply	0	1	2	3
Telecommunications network	0	1	2	3
Food safety education and training	0	1	2	3
Hygiene and food safety inspection	0	1	2	3
Support for establishing new businesses	0	1	2	3
Contract enforcement	0	1	2	3
What things would you improve?				

Resource Management *(e.g. management of natural resources and agri-business practices)*

The following should be recorded for farmers.

Questions	Options	List of commodities
What crops do you grow at the moment?		
What is the area over which these crops are grown? *Hint: all items combined.*	acres	
What is the quantity of each crop that you produce? *Hint: all items combined.*	kg	
Of the quantity produced, how much do you retain for household consumption? *Hint: all items combined.*	kg	
What is the quantity of each crop that you sell? *Hint: all items combined.*	kg	
The list of commodities may include: grains (rice, wheat, maize and barley), fresh fruits or vegetables, pulses (lentils), herbs and spices, dairy (milk, yogurt and eggs), poultry (chickens and ducks) and other.		

The following set of questions can be administered for all food system actors, namely retailers, processors, wholesalers, traders and farmers.

No.	Questions	Options	Response
	Have you or any members of your staff received formal training in food safety management?	1 = Yes 0 = No	
	If yes, who provided that training?	Text	
	Have you or any other person ever undertaken a food safety audit of this business?	1 = Yes 0 = No	
	If yes, who undertook the audit?	Text	
	What did they report?	Text	
	Do you currently operate under any third-party certified food safety or quality assurance programme?	1 = Yes 0 = No	
	If yes, under which food safety programme and/or quality assurance programme do you operate?	Text	
	If not, what barriers prevent you from operating under a formal food safety programme?	Text	
In the operation of your business, what are the major costs involved?			
	Rent	1 = Per month 2 = Per year	
	Electricity	1 = Per month 2 = Per year	
	Water	1 = Per month 2 = Per year	
	Telephone	1 = Per month 2 = Per year	
	Labour	1 = Per month 2 = Per year	
	Transport	1 = Per month 2 = Per year	
	Security	1 = Per month 2 = Per year	
Any other costs that were not mentioned above?			
	Other	1 = Per month 2 = Per year	

The following set of questions can be administered for all food system actors, namely retailers, processors, wholesalers, traders and farmers.

In managing your business, how much importance are you giving to each of the following issues? [READ ALL]	**Not applicable**	**Some importance**	**High importance**
Occupational health and safety	0	1	2
Antimicrobial resistance	0	1	2
Diet and nutrition	0	1	2
Production trends	0	1	2
Market demand for your products	0	1	2
Competitiveness	0	1	2
Imports and exports	0	1	2
Minimizing your carbon footprint	0	1	2
Soil health	0	1	2
Using water more efficiently	0	1	2
Minimizing food losses and waste	0	1	2
Refrigeration	0	1	2
What things would you improve?			

ANNEX 3. KEY INFORMANT INTERVIEWS WITH MUNICIPAL AND GOVERNMENT REPRESENTATIVES[2]

	Questions	Yes/ No	If Yes: a. What is its name and what is the responsible authority? b. Has it been implemented/not implemented?	If No: is it necessary, or should it be a priority?	Other comments
Food security and healthy diets					
1.	Is there a plan or policy at the city level to improve food security?				
2.	Is there a plan or policy at the city level to promote or facilitate healthy diets?				
3.	Is there a food aid programme at the city level?				
4.	If yes, does the programme have any features that facilitate use to access a healthy balanced diet?				
5.	Is there a school feeding programme at the city level?				
6.	If yes, does the school feeding programme provide clear guidance on meal composition for healthy balanced diets?				
7.	Is there attention for food and healthy diets in the educational curriculum?				
8.	Are there any promotional campaigns to increase public awareness of healthy diets?				
9.	Is there any tax strategy at the city level to discourage consumption of unhealthy food (other than alcohol)?				
10.	Is there any participatory strategy at the city level to involve community members in food-related decisions or programmes?				

[2]*Adapted from O'Brien and Denckla Cobb (2012).*

	Questions	Yes/ No	If Yes: a. What is its name and what is the responsible authority? b. Has it been implemented/not implemented?	If No: is it necessary, or should it be a priority?	Other comments
Food safety					
11.	Is there a plan or policy at the city level to improve food safety?				
12.	Is there a food safety inspection programme at the city level?				
13.	Is there any programme at the city level that assists small businesses and street vendors to comply with food safety standards?				
Environmental sustainability					
14.	Is there a policy or incentive for food businesses to reduce truck movements in the city?				
15.	Is there a policy or incentive for food businesses to invest in equipment or technologies to avoid pollution?				
16.	Are there maximum pollution rules and related inspection services for urban and peri-urban agricultural production?				
17.	Are there maximum pollution rules and related inspection services for food processors?				
18.	Is there a policy or incentive to promote the use of cleaner fuel sources for cooking or more fuel-efficient cooking technologies?				
19.	Is there a policy or plan to reduce food loss and waste in the urban food system?				
20.	Is there a policy or plan to promote recycling of organic waste and food packaging materials and use of food by-products?				

	Questions	Yes/ No	If Yes: a. What is its name and what is the responsible authority? b. Has it been implemented/not implemented?	If No: is it necessary, or should it be a priority?	Other comments
Economic sustainability					
21.	Is there a policy for local procurement for institutional food purchases?				
22.	Is there a policy to preserve suitable open space for urban agriculture activities?				
23.	Is there an infrastructure development and maintenance plan for fresh produce markets?				
24.	Is there a transport infrastructure and transport service plan that specifically addresses access to food retail outlets?				
25.	Is there a policy or effort to increase the ease of doing business in the food sector?				
26.	Are there any public incentive programmes for entrepreneurs to start a business in the food sector?				
27.	Are there any public incentive programmes for entrepreneurs to start a food retail business in underserved areas?				
28.	Are there any import restrictions or import taxes on food products or food packaging materials?				
29.	Are there fair competition laws applicable to the food sector?				
30.	Are there specific rules on opening hours for food retail outlets or restaurants?				
31.	Is there a policy for local procurement for institutional food purchases?				
Resilience					
32.	Are there public food reserves in the city?				

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