Urban food system and nutrition assessment in Pune, Maharashtra, India
Project report
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Project report
# CONTENTS

**ACKNOWLEDGEMENTS** ........................................................................................................................................................................ vi

**ABBREVIATIONS AND ACRONYMS** .................................................................................................................................................. vii

1. **BACKGROUND** ........................................................................................................................................................................... 1
   1.1. Administrative overview ......................................................................................................................................................... 1
   1.2. Socio-economic profile ............................................................................................................................................................... 2
   1.3. The malnutrition situation in Pune district .......................................................................................................................... 2
   1.4. Food security and nutrition programmes in Pune ................................................................................................................ 3

2. **DIETS** .......................................................................................................................................................................................... 7

3. **CONSUMER BEHAVIOUR** .............................................................................................................................................................. 15
   3.1. Socio-economic characteristics ............................................................................................................................................. 15
   3.2. Accessibility of food ................................................................................................................................................................. 16
   3.3. Desirability and acceptability of food ................................................................................................................................. 21
   3.4. Consumption patterns ............................................................................................................................................................ 23
   3.5. Food shopping and preparation ........................................................................................................................................... 26

4. **FOOD ENVIRONMENTS** ............................................................................................................................................................. 31
   4.1. Availability and accessibility of food ................................................................................................................................... 31
   4.2. Marketing and regulation ......................................................................................................................................................... 37
   4.3. Food quality and safety ............................................................................................................................................................. 40

5. **FOOD SUPPLY CHAINS** .............................................................................................................................................................. 47
   5.1. Access to services ................................................................................................................................................................. 49
   5.2. Post-harvest, processing and distribution .......................................................................................................................... 49
   5.3. Management of resources and agribusiness practices ........................................................................................................ 52

6. **GEO-MAPPING OF KEY FOOD SYSTEM ACTORS AND AVAILABILITY OF KEY FOOD GROUPS IN PUNE** ................................................................................................................................. 53

**REFERENCES** .................................................................................................................................................................................. 55
TABLES

Table 1. PMC ward population data (urban)...... 1
Table 2. Prevalence of key nutrition indicators in Pune................................. 2
Table 3. Overview of consumer behaviour in Pune........................................ 13
Table 4. Distribution of food items and food groups, overall (N=185)............... 31
Table 5. Frequency and percent distribution of food marketing and advertisement at food service outlets (N=23) ......................... 40
Table 6. Indicative distribution of food products according to supply and demand, as reported by traders, intermediaries, wholesalers, and small and medium processors........... 45

FIGURES

Figure 1. Distribution of food consumption on daily basis by gender (N=451) ........ 5
Figure 2. Distribution of food consumption on a weekly basis by gender (N=451; female=310, male=141) ......................... 8
Figure 3. Percent of consumption of food groups by female and male respondents during the previous 24 hours (N=451) ......................... 9
Figure 4. Distribution of individual dietary diversity score by income group (N=451, p<0.05) ................................. 9
Figure 5. Percent of consumption of food groups by women of reproductive age during the previous 24 hours (N=261) ................................. 10
Figure 6. Distribution of MDD-W by income group among women of reproductive age (15–49 years), (N=261, p<0.05) ................................. 10
Figure 7. Distribution of socio-demographic profiles (N=451) .......................... 15
Figure 8. Distribution of household expenditure, by income group (N=451, p<0.01) ... 16
Figure 9. Distribution of household expenditure on food (N=451) .......... 16
Figure 10. Distribution of consumers’ preferred retail outlets (N=451) .............. 17
Figure 11. Consumers’ preferred retail outlets of choice, according to income groups (N=451) ................................. 17
Figure 12. Distribution of frequency of food purchases from the retailer (N=451).... 18
Figure 13. Preferred means of transportation to access retail outlets (N=451) ....... 18
Figure 14. Distribution of food purchases, by location (N=451) ...................... 19
Figure 15. Distribution of food purchases, by type of retailer (N=451) .............. 20
Figure 16. Median money spent by consumers on each occasion, by food items (N=451) ........................................ 21
Figure 17. Distribution of factors affecting consumers’ food purchase patterns (N=451) ........................................ 22
Figure 18. Dietary patterns of households (N=451) ........................................ 23
Figure 19. Distribution of consumers’ reasons for not consuming food .......... 24
Figure 20. Distribution of food shopping and preparation patterns in the household by gender (N=451) ........................................ 26
Figure 21. Distribution of nutritional awareness, information received about healthy diets and actions changed by the consumers (N=451) ... 27
Figure 22. Food safety practices at the household level (N=451) .................... 27
Figure 23. Distribution of type of retailers interviewed for the assessment (n=66) ........................................ 31
Figure 24. Distribution of food items and repurchasing frequency by retailers (N=185 food products) ................. 32

Figure 25. Distribution of retailers’ main sources of food purchase, by food system actor (N=185 food products) .. 33

Figure 26. Mode of transportation of food items from suppliers to retailers (N=185) ........................................... 34

Figure 27. Distribution of the food products sold to food system actors by retailers (N=185 food products) ........ 35

Figure 28. Distribution of retailers’ sales expectations for the same time the following year (2021) (N=185) ............... 35

Figure 29. Percent distribution of common food items advertised by formal retailers (N=78 food products) .......... 37

Figure 30. Distribution of total food and beverage products advertised by formal retailers (N=78 food products) 37

Figure 31. Distribution of food and beverage products advertised by formal retailers, by place of advertisement (N=78 food products) .................................. 38

Figure 32. Percent distribution of food safety concerns reported by retailers (N=185) ........................................ 40

Figure 33. Self-reported food losses at the retail level (N=185 food products) ...... 41

Figure 34. Distribution of strategies implemented by retailers to reduce losses of food products (N=185) ...... 41

Figure 35. Distribution of major problems retailers faced with suppliers (N=185) 42

Figure 36. Distribution of traders, wholesalers and processors interviewed for the assessment (n=50) ....................... 47

Figure 37. Distribution of food system actors: buyers for traders, wholesalers and processors (N=61 food products) .... 47

Figure 38. Distribution of traders’, wholesalers’ and processors’ sales expectations for the same time the following year (2021) (N=61 food products) ............. 48

Figure 39. Crops cultivated and farm size (N=45 farmers) ........................................... 48

Figure 40. Reasons for cultivation (N=45) ................. 49

Figure 41. Mode of transport used to deliver food to traders, wholesalers and processors (N=61 food products) ...... 50

Figure 42. Distance between traders, wholesalers and processors and their food suppliers by food products 50

Figure 43. Food losses reported by traders, wholesalers and processors (N=61 food products) .................................. 51

Figure 44. Key strategies implemented by farmers to reduce crop losses and improve crop safety (N=45) ............... 51

Figure 45. Distribution of farmers, traders, wholesalers and retailers in Pune, by survey type ............................................. 53

Figure 46. Distribution of farmers, traders, wholesalers and retailers in Pune, by food group ................................. 54
ACKNOWLEDGEMENTS

This report is an outcome of the Urban Food System Assessments for Nutrition (UFSAN) project of the Food and Agriculture Organization of the United Nations (FAO). The objectives of the UFSAN project were to: (i) develop and pilot 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; (ii) pilot the tool in four cities: Ahmedabad and Pune, in India, and Pokhara and Kathmandu, in Nepal; and (iii) disseminate the findings of the UFSAN tool among nutrition and food systems stakeholders in these cities. For detailed information about the rationale of the project, the methodology underpinning the tool and a step-wise guide to its implementation, readers are referred to the Technical guidance note on Urban food system assessments for nutrition and healthy diets.

This report presents the key findings of the application of the UFSAN tool in Pune, India. It was written by Ahmed Raza (FAO), Himanshi Pandey (Public Health Foundation of India [PHFI], New Delhi), Ameeka Shereen Lobo (PHFI, New Delhi), and Anjali Ganpule Rao (PHFI, New Delhi), with helpful feedback from Isabela Sattamini (FAO).

The local research team in Pune was composed of Bhushana Karandikar and Manasi Phadke. The data collection was done by Vaishali Vaidya, Neha Agashe and Amit Marathe. Overall guidance to the implementation of the tool in Pune was provided by Ahmed Raza (FAO), Anjali Ganpule Rao (PHFI) and Lindsay Jaacks (University of Edinburgh), with support from Manu Raj Mathur (PHFI, New Delhi) and Prabhakaran Dorairaj (PHFI, New Delhi).

The document was edited by Sarah Pasetto, and Davide Cascella was responsible for the layout and the development of the illustrations. Bianca Carlesi and Chiara Deligia provided communication support.
ABBREVIATIONS AND ACRONYMS

IDDS  individual dietary diversity score
MDD-W  minimum dietary diversity - women
PMC  Pune Municipal Corporation
UFSAN  Urban Food System Assessment for Nutrition

INR  Indian Rupee*

* INR 1 = USD 0.0135 (average 2020 rate)
1. BACKGROUND

Pune is the ninth most populous city of India, the second largest in the state of Maharashtra and one of the fastest growing cities in the Asia-Pacific region. Today, Pune has emerged as a new start-up hub and is rapidly transforming into a bustling economic centre of India. In the Mercer 2017 Quality of Living Rankings, which evaluated living conditions in more than 440 cities across the world, Pune ranked 145th – the second city in India after Hyderabad, which ranked 144th. The same ranking featured Pune among the evolving business centres and emerging nine cities in the world, and was described as a city that “hosts IT and automotive companies” (District Pune, 2021).

With this dramatic level of economic and demographic growth, the city’s demand for food-supplying outlets has increased. Retail food stores in the city carry a wide range of foods and beverages, and restaurants, café lounges and shopping malls are proliferating. Pune is experiencing rapid urbanization, and trends in food consumption patterns indicate opportunities for companies to supply diverse, nutrient-rich and safe foods and beverage products to its burgeoning retail, bakery, and e-commerce markets.

The Pune Municipal Corporation (PMC), Pune’s civic body, ranked second in the 2015 Smart City Challenge launched by the Government of India. In 2016, Pune won three awards for smart city projects (District Pune, 2021).

1.1. Administrative overview

The PMC was established in 1950, under the Bombay Provisional Municipal Corporations Act, 1949. Today, Pune is divided into four main zones, which are further subdivided into 15 administrative wards. In administrative terms, these 15 wards are further divided into 76 prabhags, which are classified in two groups – “A” and “B” – and overseen by a total number of 152 councillors. These councillors, together with five appointed members, comprise the General Body, which is headed by the Mayor. The governance is distributed, with policymaking entrusted to the General Body and financial decision-making to the Standing Committee. The Municipal Commissioner is the Chief Executive of the PMC (Gadgil, Vernekhar and Madhale, 2015).

Table 1 presents the population of the PMC’s 15 wards.

### TABLE 1.

<table>
<thead>
<tr>
<th>Serial number</th>
<th>Ward name</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aundh</td>
<td>181 124</td>
</tr>
<tr>
<td>2</td>
<td>Ghole Road</td>
<td>171 678</td>
</tr>
<tr>
<td>3</td>
<td>Kothrud</td>
<td>209 331</td>
</tr>
<tr>
<td>4</td>
<td>Warje</td>
<td>233 999</td>
</tr>
<tr>
<td>5</td>
<td>Dholepatil Road</td>
<td>155 413</td>
</tr>
<tr>
<td>6</td>
<td>Nagar Road</td>
<td>239 564</td>
</tr>
<tr>
<td>7</td>
<td>Sangamwadi (Yerwada)</td>
<td>261 957</td>
</tr>
<tr>
<td>8</td>
<td>Tilak Road</td>
<td>242 290</td>
</tr>
<tr>
<td>9</td>
<td>Bhavani Peth</td>
<td>192 932</td>
</tr>
<tr>
<td>10</td>
<td>Shakarnagar</td>
<td>205 441</td>
</tr>
<tr>
<td>11</td>
<td>Kasbavishrambaug</td>
<td>178 484</td>
</tr>
<tr>
<td>12</td>
<td>Hadapsar</td>
<td>324 751</td>
</tr>
<tr>
<td>13</td>
<td>Bibvewadi</td>
<td>291 446</td>
</tr>
<tr>
<td>14</td>
<td>Dhankawadi</td>
<td>236 648</td>
</tr>
<tr>
<td>15</td>
<td>Yewalewadi</td>
<td>7 685</td>
</tr>
</tbody>
</table>

*Source: Census 2011 (India), 2021.*
1.2. Socio-economic profile

According to the 2011 census, the population of Pune is of 3 124 458 people, who reside in an area of 244 km² (Census 2011 (India), 2021). The core of Pune is the most densely populated area, with some pockets having more than 100 000 persons per km². Bhavani Peth, the centrally located ward, has the highest population density, followed by the area of Vishram bagh Wada-Kasaba Peth. This area includes Laxmi Road (the city's main hub) and Tulsi Bagh, a major market. The southeast and southwest areas of the city have witnessed a highly dynamic population growth.

The reasons for the increased population are a function of land prices, the ease of accessibility to workplaces and the availability of basic services. As per the 2005 population estimates, the Tilak Road ward (to the southwest of the city) is experiencing a rapid population growth, of 50 percent. The Kothrud ward (Karve Road) ward is growing at a rate of 32 percent, the Bibewadi ward (to the southeast of the city), with its proximity to the Solapur bypass, is growing at a rate of 38 percent, followed by Hadapsar, at 26 percent. In 2008, the average population density of the city was recorded to be approximately 10 410 people/km². As per the 2011 census, this figure has grown to 12 800 (Gadgil, Vernekar and Madhale, 2015).

As of 2009, approximately 40.6 percent of Pune’s population lives in slums. This is a tremendous increase from 1951, when the figure was 8 percent of the total population. Out of the 564 slums in Pune, 353 have been notified, or legally designated, as slums, making them eligible for redevelopment; 211 have not been notified. Approximately 25 percent of Pune’s slum population lives in non-notified areas. The population density in these areas is of 2 399 people/ha – a high rate. As per the PMC’s records, no database on slum dwellers’ access to basic facilities is as yet available (Gadgil, Vernekar and Madhale, 2015).

1.3. The malnutrition situation in Pune district

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stunting (children &lt; 5 years of age)</td>
<td>22.4</td>
</tr>
<tr>
<td>Wasting (children &lt; 5 years of age)</td>
<td>23.4</td>
</tr>
<tr>
<td>Underweight children (&lt; 5 years of age)</td>
<td>25.6</td>
</tr>
<tr>
<td>Anaemia among children (&lt; 5 years of age)</td>
<td>53.4</td>
</tr>
<tr>
<td>Anaemia among women (15–49 years of age)</td>
<td>50.0</td>
</tr>
</tbody>
</table>

Source: NITI Aayog State Nutrition Dashboard
1.4. Food security and nutrition programmes in Pune

**Integrated Child Development Services**
In Pune, there are more than 1,000 *Anganwadis* (child care centres), serving more than 100,000 children (Maharashtra State Directorate of Economics and Statistics, Planning Department, 2014). The centres provide both take-home rations for children and cooked food. The Integrated Child Development Services have not been incorporated into the Smart Cities Mission spearheaded by the Government of India (Maharashtra State Directorate of Economics and Statistics, Planning Department, 2014).

**Midday Meal Scheme**
In Pune, the PMC provides a midday meal to children across 690 schools (Maharashtra State Directorate of Primary Education, 2013). The initiative is funded through a mix of central and state government funds.

**Anaemia Mukt Bharat Strategy**
This is a six-part strategy, including supplementation, fortification, deworming, testing for anaemia, behaviour change campaigns and addressing non-nutritional causes of anaemia (Anemia Mukt Bharat, 2018). It will be implemented through existing programmes such as the National Iron Plus Initiative and the Weekly Iron Folic Acid Supplementation programme.

**Pune Food Hub**
The Pune Food Hub is an online portal designed to “bridge the gap between the prospective entrepreneurs, the suppliers, the venders of the product, manufacturing equipment and the public who is interested in buying the finished product at very competitive prices” (Scott, 2018). It is funded by a number of partners such as the International Bank for Reconstruction and Development and the Department for International Development of the United Kingdom of Great Britain and Northern Ireland.

**Initiatives by United Nations organizations**
Despite Maharashtra being the wealthiest state in terms of annual gross domestic product, there are disparities in children development outcomes. In Maharashtra, the United Nations Children's Fund is working to improve the lives of undernourished children by reducing the number of children affected by severe acute malnutrition through collaborative action on capacity building and standardizing case sheets on severe acute malnutrition. Furthermore, UNICEF is engaged in advocating for improvements in the coverage of a Weekly Iron and Folic Acid Supplementation programme targeting adolescent girls and women (United Nations Children's Fund, 2020).
OVERVIEW OF DIETS IN PUNE

- Over ninety percent of the participants consumed starchy staples and fresh milk daily.
- Forty-five percent consumed legumes (nuts and seeds), and 46 percent consumed milk products on a daily basis.
- Approximately one quarter of the participants consumed eggs and fruits and vegetables rich in vitamin A daily.
- Forty-nine percent consumed dark green leafy vegetables and 44 percent consumed other fruits and vegetables daily.
- Less than 15 percent consumed packaged foods daily.

- Less than 15 percent consumed flesh foods daily.
- The mean individual dietary diversity score (IDDS) was 5.1. Seventy-nine percent of the participants reported a dietary diversity score of four and above.
- The mean minimum dietary diversity score for women of reproductive age (15–49 years) (MDD-W) was 5.02. Approximately, 78 percent of this population group recorded a dietary diversity score above 4.
- Higher-income individuals reported a higher IDDS and MDD-W.

FIGURE 1.
Distribution of food consumption on daily basis by gender (N=451)

<table>
<thead>
<tr>
<th>Food groups</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starchy staples</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beans and peas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuts and seeds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fresh milk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk products</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flesh foods (Red meat, mutton/goat)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chicken</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eggs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish and seafood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dark green leafy vegetables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin A fruits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin A vegetables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other fruits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other vegetables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Packaged savoury snack foods</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Packaged sweet snacks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oils and fats</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condiments and seasonings</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Authors’ own elaboration.
2. DIETS

In total, 451 food consumers were interviewed across two wards in Pune. The interviews were conducted by telephone.¹

A high proportion of respondents reported consuming on a daily basis starchy staples (95 percent), fresh milk (90 percent), and beans and peas (72 percent), in comparison to fruits (52 percent), dark green leafy vegetables (49 percent), milk products (46 percent), nuts and seeds (45 percent), vegetables (36 percent), condiments and seasonings (36 percent), vegetables rich in vitamin A (28 percent), fruits rich in vitamin A (20 percent) and eggs (23 percent), which were consumed in lower proportions.

Almost 84 percent of respondents reported consuming oils and fats daily. Very few mentioned the consumption of chicken (15 percent), flesh foods (3 percent), and fish and seafood (2 percent) on a daily basis. Packaged savoury snacks and sweets were reported to be consumed by 18 percent and 10 percent of respondents, respectively.

The participants’ weekly food consumption also revealed a higher consumption of staples, beans and peas, fresh milk as well as dark green leafy vegetables (as seen in Figure 1). Concernedly, the consumption of packaged savoury snack foods and packaged sweet snacks was high – 32 percent and 20 percent, respectively. The consumption of oils and fats was reported to be 85 percent.

¹ The consumer interviews were conducted from 12 October 2020 to 10 November 2020.
The mean individual dietary diversity score\(^2\) (IDDS) was 5.17 with significant gender differences. Female respondents (n=310) reported a mean IDDS of 5.15 and male respondents reported a score of 5.23 (n=141). Approximately 79 percent of the respondents recorded an IDDS of 4 and above.

\(^2\) The dietary diversity score was calculated considering ten food groups: starchy staples, legumes, nuts and seeds, milk and milk products, flesh foods, eggs, dark green leafy vegetables, vitamin-A rich fruits and vegetables, other vegetables, and other fruits.
There was a significant increase in IDDS as income levels increased (as seen in Figure 4).

The mean minimum dietary diversity score for women of reproductive age (15–49 years) (MDD-W) was 5.02. Approximately 78 percent of this population group recorded a dietary diversity score above 4.
FIGURE 5.
Percent of consumption of food groups by women of reproductive age during the previous 24 hours (N=261)

There was a significant increase in MDD-W as income levels increased (as seen from Figure 6).

FIGURE 6.
Distribution of MDD-W by income group among women of reproductive age (15–49 years), (N=261, p<0.05)

Source: Authors’ own elaboration.
The majority of the participants were female and married.

One third of the participants were between 25 and 35 years of age.

The majority of the participants owned a refrigerator and a freezer.

Piped water was the main source for cooking and drinking purposes.

Half of the participants owned a microwave and a moderate number had paid help for cooking.

The participants had a median household food expenditure of INR 18 000 per month.

With higher household incomes, food expenditure was reported to increase.

Most of the participants’ food expenditure was made at the retailer level.

More than 40 percent of the participants preferred to purchase grains and pulses from grocery stores.

The majority of the participants purchased dairy, sweets and bakery products from speciality stores.

Permanent wet markets were a major source of fresh fruits and vegetables.

Most participants purchased flesh foods, eggs, packaged foods, fried snacks and soft drinks from small local shops.

Most consumers preferred to:
- buy in small quantities;
- from retailers who offer them a competitive price;
- buy close to their homes;
- from retail outlets which were open at suitable timings; and
- from retail outlets that provided a “one-stop shop” for all food items.

Most consumers considered quality of service as an important factor when making purchases.

Consumers valued freshness of food items, food safety, taste, availability of a wide range of products, longer shelf life, quality assurance and presentation of food.

Food shopping and preparation is primarily a task for women.

Within households, other members of the households or domestic helpers supported women in food preparation.

Spouses tended to share tasks related to food shopping.

The main source of the nutritional information was noted to be social media.

The majority of the consumers reported spoilage before consumption as the prime reason for not consuming food.

Most participants reported no food waste.

For grains (including flour), more than 58 percent reported no food wastage, while 19 percent reported throwing food away in the trash bin. This trend was common to other food items.

<table>
<thead>
<tr>
<th>Socio-economic characteristics</th>
<th>Accessibility of food</th>
<th>Desirability and acceptability of food</th>
<th>Food preparation</th>
<th>Eating patterns</th>
</tr>
</thead>
<tbody>
<tr>
<td>The majority of the participants were female and married.</td>
<td>Most of the participants’ food expenditure was made at the retailer level.</td>
<td>Most consumers preferred to:</td>
<td>Food shopping and preparation is primarily a task for women.</td>
<td>The majority of the consumers reported spoilage before consumption as the prime reason for not consuming food.</td>
</tr>
<tr>
<td>One third of the participants were between 25 and 35 years of age.</td>
<td>More than 40 percent of the participants preferred to purchase grains and pulses from grocery stores.</td>
<td>- buy in small quantities;</td>
<td>Within households, other members of the households or domestic helpers supported women in food preparation.</td>
<td>Most participants reported no food waste.</td>
</tr>
<tr>
<td>The majority of the participants owned a refrigerator and a freezer.</td>
<td>The majority of the participants purchased dairy, sweets and bakery products from speciality stores.</td>
<td>- from retailers who offer them a competitive price;</td>
<td>Spouses tended to share tasks related to food shopping.</td>
<td>For grains (including flour), more than 58 percent reported no food wastage, while 19 percent reported throwing food away in the trash bin. This trend was common to other food items.</td>
</tr>
<tr>
<td>Piped water was the main source for cooking and drinking purposes.</td>
<td>Permanent wet markets were a major source of fresh fruits and vegetables.</td>
<td>- buy close to their homes;</td>
<td>The main source of the nutritional information was noted to be social media.</td>
<td></td>
</tr>
<tr>
<td>Half of the participants owned a microwave and a moderate number had paid help for cooking.</td>
<td>Most participants purchased flesh foods, eggs, packaged foods, fried snacks and soft drinks from small local shops.</td>
<td>- from retail outlets which were open at suitable timings; and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The participants had a median household food expenditure of INR 18 000 per month.</td>
<td></td>
<td>- from retail outlets that provided a “one-stop shop” for all food items.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With higher household incomes, food expenditure was reported to increase.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. CONSUMER BEHAVIOUR

3.1. Socio-economic characteristics

The majority of the participants were females (69 percent), married (82 percent) and graduates (37 percent). One third of the participants were between 25 and 35 years of age. One third were between 35 and 45 years of age and 33.9 percent were over 45 years of age. The mean age of the participants was 41.9 years. Almost one third of the participants earned up to 50 000 INR per month, and three quarters of the households followed a nuclear family pattern with four family members (Figure 7).

**FIGURE 7.**
Distribution of socio-demographic profiles (N=451)

- **Gender:** 68.7% female (n=310), 31.3% male (n=141)
- **Age group:** 31.7% < 35 years old (n=143), 34.4% 35-45 years old (n=155), 33.9% ≥ 45 years old (n=153)
- **Education:** 1.3% illiterate (n=6), 33.7% literate (n=152), 37.0% up to graduation (n=167), 27.9% above graduation (n=126)
- **Number of people in the household:** 78.3% 4 people (n=353), 19.0% ≥ 5 – ≤ 6 (n=86), 3.0% >6 (n=12)
- **Household income (INR/month):** 22.4% <20 000 (n=101), 31.0% 20 000 – <50 000 (n=140), 22.4% 50 000 – <100 000 (n=101), 24.2% ≥100 000 (n=109)

Percent of respondents

*Source: Authors’ own elaboration.*

Note: Graduates are persons who have received a degree or diploma upon completing a course of study in a university or college.
The majority of the participants owned a refrigerator (89 percent) and a freezer (87 percent), and used piped water within their dwelling as the source of cooking water (89 percent) and drinking water (87 percent). Half of the participants owned a microwave (51 percent) and one third had paid help (34 percent) for cooking. Sixty-five percent of the participants treated water before use, with an electronic water purifier as the most common method to treat water (58 percent).

The consumers who participated in the assessment had a median household food expenditure of INR 18 000 per month and the food expenditure increased with household income (Figure 8).

**FIGURE 8.**
Distribution of household expenditure, by income group (N=451, p<0.01)

Most of the food expenditure was made at the retailer level (Figure 9).

**FIGURE 9.**
Distribution of household expenditure on food (N=451)

### 3.2. Accessibility of food

For consumers in Pune, grocery stores, small local shops, speciality stores (bakeries, dairy shops, etc.) and temporary wet markets were the most popular type of retailers from which to purchase food. The least popular type of retailers included government ration shops and mobile door-to-door vendors (Figure 10).
For low-income households (having a monthly income less than INR 20,000), small local shops were the preferred place for food purchase (86 percent), followed by grocery stores (65 percent), temporary wet markets (59 percent) and street vendors (59 percent). Among households having a monthly income of more than INR 20,000, the majority reported grocery stores as the main source of food purchase (Figure 11).

**FIGURE 10.**
Distribution of consumers’ preferred retail outlets (N=451)

For low-income households (having a monthly income less than INR 20,000), small local shops were the preferred place for food purchase (86 percent), followed by grocery stores (65 percent), temporary wet markets (59 percent) and street vendors (59 percent). Among households having a monthly income of more than INR 20,000, the majority reported grocery stores as the main source of food purchase (Figure 11).

**FIGURE 11.**
Consumers’ preferred retail outlets of choice, according to income groups (N=451)

Source: Authors’ own elaboration.
Consumers did their daily shopping at small local shops and specialty stores. Weekly shopping was done by most consumers at wet markets (permanent and temporary), specialty stores and street vendors. On the other hand, grocery stores and government ration shops were the preferred places to shop on a monthly basis (Figure 12).

**FIGURE 12.**
Distribution of frequency of food purchases from the retailer (N=451)

The majority of the respondents preferred either walking or using a motorbike as a means to purchase food from retailers (Figure 13).

**FIGURE 13.**
Preferred means of transportation to access retail outlets (N=451)
All of the participants purchased most of their food predominantly from retail outlets (Figure 14). For instance, a high proportion bought the following from retailers: grains, including flour (89 percent), pulses and nuts (90 percent), dairy (82 percent), fresh fruits and vegetables (91 percent), purchased foods, such as biscuits and crisps (75 percent), eggs (68 percent), bakery products (61 percent), Indian sweets (46 percent), fried snacks (36 percent) and soft drinks (32 percent).

**FIGURE 14.**
Distribution of food purchases, by location (N=451)

Various types of retailers were preferred for different food items (Figure 15). Grains (including flour) were mostly purchased in grocery stores (43 percent), followed by small local shops (16 percent). Similarly, for pulses and nuts, the preferred location of purchase were grocery stores (45 percent) followed by small local shops (20 percent). Fresh fruits and vegetables were mostly purchased at wet markets – permanent wet markets (29 percent) and temporary wet markets (20 percent) – as well as in small local shops (21 percent). Dairy products were purchased primarily in speciality stores (38 percent) and small local shops (22 percent). These small local shops were also the main source of purchase for eggs (42 percent), packaged foods, such as biscuits and crisps (32 percent), fried snacks...
(18 percent), soft drinks (18 percent) and flesh foods (10 percent). Speciality stores were preferred for the purchase of bakery products (41 percent) and Indian sweets (20 percent). Government ration shops were seldom frequented except for the purchases of grains, including flour (8 percent), while street food vendors were sometimes preferred for the purchase of fresh fruits and vegetables. Purchases made through the Internet (e-commerce) and mobile door-to-door vendors were negligible (Figure 15).

**FIGURE 15.**
Distribution of food purchases, by type of retailer (N=451)

On each occasion, the consumers’ highest expenditure was made on staples, followed by pulses and nuts, and fresh fruits and vegetables. The maximum median amount spent on major food items was as follows: grains, including flour – INR 1 000; pulses and nuts – INR 700; fresh fruits or vegetables – INR 500; meat or poultry – INR 500; Indian sweets – INR 250; bakery products – INR 200; dairy – INR 200; packaged foods, such as biscuits and crisps – INR 150; fried snacks, such as samosas, namkeen and chaat\(^3\) – INR 100; soft drinks – INR 100; and eggs – INR 80.

\(^3\) Popular Indian snack foods.
3.3. Desirability and acceptability of food

Respondents were asked to identify their preferences when making food purchases across the following four factors: affordability, convenience, quality of service and quality of products (Figure 17). Under food affordability, most consumers preferred to buy in small quantities (71 percent) and from retailers who offer them a competitive price (68 percent). In terms of convenience, most consumers preferred to buy close to their homes (85 percent), and from retail outlets that were open at suitable timings (84 percent) and provided a “one-stop shop” for all food items (79 percent).

Most consumers considered quality of service as an important factor when making purchases, valuing the presence of a clean and comfortable environment (97 percent), friendly service (95 percent), a feeling of safety and security (94 percent) and trust in the food vendor (89 percent). In terms of the quality of products, consumers valued freshness of food items (99 percent), food safety (99 percent), taste (96 percent), availability of a wide range of products (84 percent), longer shelf life (78 percent), quality assurance (77 percent) and presentation of food (71 percent).
FIGURE 17.
Distribution of factors affecting consumers’ food purchase patterns (N=451)

<table>
<thead>
<tr>
<th>Factors affecting food purchase</th>
<th>Not important</th>
<th>Somewhat important</th>
<th>Important</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AFFORDABILITY</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offers a competitive price</td>
<td>9.8</td>
<td>22.6</td>
<td>67.6</td>
</tr>
<tr>
<td>I can bargain on price</td>
<td>11.3</td>
<td>37.7</td>
<td>56.8</td>
</tr>
<tr>
<td>Offers credit</td>
<td>19.5</td>
<td>33.9</td>
<td>46.6</td>
</tr>
<tr>
<td>I am able to buy in small quantities</td>
<td>13.1</td>
<td>29.0</td>
<td>56.8</td>
</tr>
<tr>
<td><strong>CONVENIENCE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Close to my home</td>
<td>3.5</td>
<td>8.5</td>
<td>88.0</td>
</tr>
<tr>
<td>Open at all times that are convenient for me</td>
<td>22.6</td>
<td>46.6</td>
<td>31.0</td>
</tr>
<tr>
<td>I can buy everything I need there [&quot;one-stop shop&quot;]</td>
<td>7.3</td>
<td>13.5</td>
<td>79.2</td>
</tr>
<tr>
<td>Offers easy parking</td>
<td>22.8</td>
<td>37.7</td>
<td>39.5</td>
</tr>
<tr>
<td>Offers home delivery</td>
<td>3.5</td>
<td>37.7</td>
<td>60.5</td>
</tr>
<tr>
<td><strong>QUALITY OF SERVICE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I trust the vendor</td>
<td>1.3</td>
<td>9.3</td>
<td>89.4</td>
</tr>
<tr>
<td>I feel safe and secure</td>
<td>0.4</td>
<td>4.7</td>
<td>95.6</td>
</tr>
<tr>
<td>Offers friendly service</td>
<td>0.3</td>
<td>5.3</td>
<td>94.2</td>
</tr>
<tr>
<td>Provides a clean, comfortable environment</td>
<td>3.5</td>
<td>26.8</td>
<td>69.7</td>
</tr>
<tr>
<td><strong>QUALITY OF PRODUCTS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has a wide range of products</td>
<td>2.7</td>
<td>13.5</td>
<td>83.8</td>
</tr>
<tr>
<td>Products taste good</td>
<td>0.4</td>
<td>3.3</td>
<td>96.3</td>
</tr>
<tr>
<td>Products are well presented</td>
<td>1.1</td>
<td>9.1</td>
<td>90.0</td>
</tr>
<tr>
<td>Products are fresh</td>
<td>2.0</td>
<td>20.4</td>
<td>77.6</td>
</tr>
<tr>
<td>Products have a long shelf life</td>
<td>1.1</td>
<td>9.1</td>
<td>90.0</td>
</tr>
<tr>
<td>Food is safe to consume</td>
<td>1.3</td>
<td>20.4</td>
<td>78.3</td>
</tr>
<tr>
<td>Product is quality assured or offers a quality assurance logo</td>
<td>5.8</td>
<td>17.3</td>
<td>76.9</td>
</tr>
</tbody>
</table>

Source: Authors’ own elaboration.
3.4. Consumption patterns

When asked about dietary patterns, the majority of the participating households were not completely vegetarian (do not eat meat or fish), mainly vegetarian (eat fish but not meat) or vegan (do not eat products derived from animals). Thirty-nine percent of the respondents reported having between one and three completely vegetarian household members.

The same proportion (39 percent) reported having between one and three non-vegetarian household members (eat both fish and meat). Respondents noted that between one and three members of the household were either trying to lose weight (20 percent), on a special diet for medical reasons (10 percent) or on a special diet for religious reasons (14 percent) (Figure 18).

FIGURE 18.
Dietary patterns of households (N=451)

<table>
<thead>
<tr>
<th>Number of people</th>
<th>Completely vegetarian (do not eat meat or fish)</th>
<th>Mainly vegetarian (eat fish but not meat)</th>
<th>Vegan (do not eat products derived from animals)</th>
<th>Non-vegetarian (eat both fish and meat)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>47.2</td>
<td>90.7</td>
<td>28.8</td>
<td>7.3</td>
</tr>
<tr>
<td>1-3</td>
<td>90.7</td>
<td>89.6</td>
<td>89.6</td>
<td>86.1</td>
</tr>
<tr>
<td>4-6</td>
<td>89.6</td>
<td>86.1</td>
<td>78.9</td>
<td>7.5</td>
</tr>
</tbody>
</table>

The participants were asked to specify the reasons for not consuming food that is purchased for the household, based on the following five factors: no storage facilities, poor food quality, food spoilage before consumption, prepared too much food and other relevant factors. The majority of the consumers reported food spoilage before consumption or not consuming food (Figure 19).

In addition, most participants reported no food waste. For instance, for grains, including flour, more than 58 percent of participants reported no food wastage, while 19 percent reported discarding the food as waste. This trend was common to other food items.
FIGURE 19.
Distribution of consumers' reasons for not consuming food

Source: Authors’ own elaboration.
3.5. Food shopping and preparation

Forty-three percent of all respondents did food shopping on their own, and almost 22 percent shared the responsibility with their spouse. Among women respondents, around 50 percent reported doing shopping on their own, followed by sharing responsibility with their spouse (19 percent) and another family member (19 percent). Among male respondents, 27 percent mentioned that they shopped themselves, followed by sharing responsibility with their spouse (26 percent) and their spouse alone (25 percent).

Fifty-one percent of all respondents did food preparation on their own, and 16 percent noted that their spouses did food preparation. Among women respondents, approximately 68 percent mentioned that they prepared food themselves, followed by sharing responsibility with another family member (13 percent) or a domestic helper (9 percent). Among male respondents, only 13 percent noted that they did food preparation, and that their spouses did food preparation (51 percent).

FIGURE 20.
Distribution of food shopping and preparation patterns in the household by gender (N=451)

Most households (45 percent) mentioned that they had received information on nutrition and healthy diets in the last 12 months (Figure 21). The main source of the nutritional information was noted to be social media (49 percent), while only 6 percent of respondents reported having received information from governmental authorities. Even after receiving the information, 31 percent of the participants reported no change in their actions.
Most respondents (above 90 percent) noted high adherence to food safety practices of: washing food prior to cooking or storing, using clean and fresh utensils, keeping raw and cooked foods separately, and awareness of the need to completely cook food (Figure 22). On the other hand, 75 percent of consumers mentioned adherence to keeping meat and fish separate from fruits and vegetables.

The major food safety measures taken by the participants were washing food items prior to cooking, using clean utensils during cooking, keeping raw and cooked food separately, and being aware of the need to completely cook food.
OVERVIEW OF FOOD ENVIRONMENTS IN PUNE

TABLE 4.
Overview of food environments in Pune

<table>
<thead>
<tr>
<th>Availability and accessibility of food</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The assessment revealed that 185 food items were sold by retailers in the two wards.</td>
</tr>
<tr>
<td>• Wheat and rice were the main staples sold, while tur dal and mung dal were the main pulses available for consumers.</td>
</tr>
<tr>
<td>• A high proportion of retailers sold packaged foods (biscuits and crisps) and fried snacks (e.g. samosas, namkeen, chaat).</td>
</tr>
<tr>
<td>• For staple products and pulses, the main source of purchase for retailers were supermarkets (55 percent) and wholesalers (26 percent).</td>
</tr>
<tr>
<td>• Milk and milk products were mostly procured from food distributors.</td>
</tr>
<tr>
<td>• Retailers mostly procured fresh fruits from supermarkets (46 percent) and traders (36 percent), whereas vegetables were mostly obtained from other retailers (39 percent).</td>
</tr>
<tr>
<td>• Packaged foods were mostly purchased by retailers from wholesalers (56 percent), while food distributors were retailers’ main source of purchase for beverages (71 percent), fried snacks (18 percent) and other snack foods (58 percent).</td>
</tr>
<tr>
<td>• Most of the food products (94 percent) across all food groups were sold primarily to consumers.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Marketing and regulation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Formal retailers advertised most of their food products at the entrance or outside the retail outlets.</td>
</tr>
<tr>
<td>• Few informal retailers and some food service outlets advertised foods and beverages, and most of them advertised outside the retail outlet.</td>
</tr>
<tr>
<td>• Among formal retailers, the most common food items advertised were ice cream, soft drinks and biscuits.</td>
</tr>
<tr>
<td>• Approximately half of the food service outlets advertised nutritional information on menus.</td>
</tr>
<tr>
<td>• Approximately half of the food service outlets offered healthier options on the menu.</td>
</tr>
<tr>
<td>• Only 13 percent of food service outlets offered healthier sides (such as salads, fruits, steamed and boiled vegetables).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Food quality and safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>• A high proportion of retailers highlighted food affordability, convenience, service, quality and safety as important factors when choosing food products to sell, across all food groups.</td>
</tr>
<tr>
<td>• The main food safety concerns for all food items purchased by retailers were proper storage and quality of food products.</td>
</tr>
<tr>
<td>• Out of 66 retailers and food service outlets, only 15 percent received formal training in food safety management.</td>
</tr>
<tr>
<td>• The assessment revealed that at the retail level, the food losses occurring across most food groups, except staples, fall in the range of 0–24 percent.</td>
</tr>
</tbody>
</table>

Source: Authors’ own elaboration.
4. FOOD ENVIRONMENTS

In this assessment, retailers are divided into three main types: formal retailers, informal retailers and food service outlets. Formal retailers have permanent establishments with a license to sell their goods in local markets or malls. Informal retailers do not have a license and a fixed place to sell their products. Food service outlets provide ready-to-eat food and meals to customers.

A total of 66 retailers and food service outlets were surveyed. Twenty-six (39 percent) of these comprised of formal retailers, 17 (26 percent) were informal retailers and 23 (35 percent) were food service outlets (Figure 23).

**FIGURE 23.**
Distribution of type of retailers interviewed for the assessment (n=66)

<table>
<thead>
<tr>
<th>Type of Retailer</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formal retailers</td>
<td>26</td>
<td>39%</td>
</tr>
<tr>
<td>Informal retailers</td>
<td>17</td>
<td>26%</td>
</tr>
<tr>
<td>Food service outlets</td>
<td>23</td>
<td>35%</td>
</tr>
</tbody>
</table>

Out of the 66 retailers, 47 (86 percent) had permanent structures. In this study, permanent structures are defined as shops registered for goods and service tax (GST) and that have been established in a fixed place. Temporary structures are situated in no allocated place.

Out of the 66 retailers, only 11 (17 percent) were members of a trade association and 7 (11 percent) were offered services such as publicity, advocacy and negotiation with authorities. The interviews with retailers were conducted in two wards of Pune – Aundh-Baner and Kothrud.

4.1. Availability and accessibility of food

Table 5 presents an overview of the food groups and food items sold by retailers in Pune. The assessment revealed that 185 food items were sold by retailers in the two wards. Wheat and rice were the main staples sold, while tur dal and mung dal were the main pulses available for consumers. A high proportion of retailers sold packaged foods (biscuits and crisps) and fried snacks (samosas, namkeen, chaat, etc.).

**TABLE 5.**
Distribution of food items and food groups, overall (N=185)

<table>
<thead>
<tr>
<th>Food groups</th>
<th>Food items</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staples</td>
<td>Wheat</td>
<td>18 (22.0)</td>
</tr>
<tr>
<td></td>
<td>Rice</td>
<td>14 (17.1)</td>
</tr>
<tr>
<td></td>
<td>Other staples</td>
<td>2 (2.4)</td>
</tr>
<tr>
<td>Pulses</td>
<td>Tur dal</td>
<td>8 (9.8)</td>
</tr>
<tr>
<td></td>
<td>Mung dal</td>
<td>6 (7.3)</td>
</tr>
<tr>
<td>Vegetables</td>
<td>Onion</td>
<td>5 (6.1)</td>
</tr>
<tr>
<td></td>
<td>Potato</td>
<td>4 (4.9)</td>
</tr>
<tr>
<td></td>
<td>Tomato</td>
<td>3 (3.7)</td>
</tr>
<tr>
<td></td>
<td>Other vegetables</td>
<td>5 (6.1)</td>
</tr>
<tr>
<td>Fruits</td>
<td>Banana</td>
<td>3 (3.7)</td>
</tr>
<tr>
<td></td>
<td>Papaya</td>
<td>2 (2.4)</td>
</tr>
<tr>
<td></td>
<td>Pomegranate</td>
<td>2 (2.4)</td>
</tr>
<tr>
<td></td>
<td>Other fruits</td>
<td>5 (6.1)</td>
</tr>
<tr>
<td>Milk</td>
<td>Milk</td>
<td>21 (25.6)</td>
</tr>
<tr>
<td>Milk products</td>
<td>Condensed milk</td>
<td>4 (4.9)</td>
</tr>
<tr>
<td></td>
<td>Paneer</td>
<td>7 (8.5)</td>
</tr>
</tbody>
</table>

---

4 The food service outlets in Pune included: stalls selling dosa (a type of flatbread), snack food joints, coffee shops, bakery shops, school canteens, tea stalls and Chinese food joints.

5 The retailer interviews were conducted from 12 October 2020 to 19 October 2020.
The majority of retailers selling milk, milk products, fruits, vegetables and snack foods reported repurchasing these food items on a daily basis (Figure 24). Retailers selling meat and poultry reported purchasing the items two to six times a week, and retailers selling packaged foods repurchased them mostly on a weekly basis.

### FIGURE 24.
Distribution of food items and repurchasing frequency by retailers (N=185 food products)

<table>
<thead>
<tr>
<th>Food groups</th>
<th>Food items</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat and poultry</td>
<td>Meat and poultry</td>
<td>1 (1.2)</td>
</tr>
<tr>
<td>Eggs</td>
<td>Eggs</td>
<td>6 (7.3)</td>
</tr>
<tr>
<td>Packaged foods</td>
<td>Packaged foods (biscuits, crisps)</td>
<td>18 (22.0)</td>
</tr>
<tr>
<td>Fried snacks</td>
<td>Fried snacks (samosas, namkeen, chaat)</td>
<td>33 (40.2)</td>
</tr>
<tr>
<td>Other snack foods</td>
<td>Indian sweets</td>
<td>4 (4.9)</td>
</tr>
<tr>
<td></td>
<td>Bakery products</td>
<td>8 (9.8)</td>
</tr>
<tr>
<td>Beverages</td>
<td>Soft drinks</td>
<td>7 (8.5)</td>
</tr>
</tbody>
</table>

Source: Authors’ own elaboration.
For staples, the main source of purchase for retailers were supermarkets (55 percent), wholesalers (26 percent) and traders (19 percent) (Figure 25). Milk and milk products were mostly procured from distributors – 43 percent and 82 percent, respectively. Retailers procured fresh fruits from supermarkets (46 percent) and traders (36 percent), whereas vegetables were mostly obtained from other retailers (39 percent). Packaged foods were mostly purchased from wholesalers (56 percent), while food distributors were retailers’ main source for purchasing beverages (71 percent), fried snacks (18 percent) and other snack foods (58 percent).

**FIGURE 25.**
Distribution of retailers’ main sources of food purchase, by food system actor (N=185 food products)

Source: Authors’ own elaboration.
The majority of the food products (61 percent) were transported to the food retailers using closed vehicles (Figure 26). Food items such as vegetables (56 percent) and fruits (55 percent) were transported in open vehicles. Meat and poultry (100 percent), milk products (91 percent), beverages (86 percent), eggs (83 percent), milk (76 percent), other snack foods (75 percent), packaged foods (67 percent), staples (60 percent) and fried snacks (57.6 percent) were largely transported via closed vehicles.

**FIGURE 26.** Mode of transportation of food items from suppliers to retailers (N=185)

![Chart showing mode of transportation of food items](chart.png)

Source: Authors’ own elaboration.
As expected, the maximum amount of food products (94 percent) across all food groups were sold primarily to consumers (Figure 27).

**FIGURE 27.**
Distribution of the food products sold to food system actors by retailers (N=185 food products)

Sales of most of the food products (62 percent) were expected to increase during the same time the following year (2021) (Figure 28). The most common reason for changes in sales expectations was high perceived demand.

**FIGURE 28.**
Distribution of retailers’ sales expectations for the same time the following year (2021) (N=185)
4.2. Marketing and regulation

Among formal retailers, the most common food items advertised were ice cream (29 percent), soft drinks (22 percent), biscuits (14 percent), milk (13 percent) and vegetable oil (13 percent), as shown in Figure 29.

FIGURE 29.
Percent distribution of common food items advertised by formal retailers (N=78 food products)

*Traditional Indian snack food

The most desired areas to place advertisements were entrances (34 percent) and outside the retail outlet (e.g. doors, windows, walls, fences, and parking lots: 31 percent) (Figures 30 and 31).

FIGURE 30.
Distribution of total food and beverage products advertised by formal retailers (N=78 food products)
FIGURE 31.
Distribution of food and beverage products advertised by formal retailers, by place of advertisement (N=78 food products)
Few informal retailers (18 percent) advertised foods and beverages, and most of them advertised outside. The informal retailers advertised the following food items outside their outlets: soft drinks, crisps, biscuits, ice cream, milk, bottled water, chaat and ghee.

Some food service outlets (30 percent) advertised the following food items outside their outlets: soft drinks, crisp, biscuits, ice cream, milk, bottled water, idli, dosa, pavbhaji, vada pav, masala maggi, cold coffee, pulav, biryani, tea, Chinese snacks, vegetarian and non-vegetarian rolls, sandwiches, Mughlai paratha, among others.

---

6 These are all popular Indian snack foods.
7 Pulav and biryani are traditional rice-based dishes.
8 Flour-based flatbread, typically prepared with vegetable oil or ghee.
Nutritional information on menus and menu boards was observed in 52 percent of the food service outlets (see Table 5). Approximately half of the food service outlets (48 percent) offered healthier options on the menu. However, only 13 percent offered healthier sides (such as salads, fruits, steamed and boiled vegetables). A high proportion (87 percent) of food service outlets offered diet beverages and water to consumers.

TABLE 5.
Frequency and percent distribution of food marketing and advertisement at food service outlets (N=23)

<table>
<thead>
<tr>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is any nutritional information posted on the menu or menu board?</td>
</tr>
<tr>
<td>Is there any information covering the safety of foods (e.g. audit notices, references to HACCP*)?</td>
</tr>
<tr>
<td>Does the menu specifically identify healthier options?</td>
</tr>
<tr>
<td>Is a choice of healthy sides available (e.g. salad, fruits, steamed/boiled vegetables)?</td>
</tr>
<tr>
<td>Are healthy cooking options available (e.g. baking, boiling, steaming)?</td>
</tr>
<tr>
<td>Are diet beverages or water available?</td>
</tr>
</tbody>
</table>

*Hazard Analysis and Critical Control Points system

Source: Authors’ own elaboration.

4.3. Food quality and safety

Given that retailers mostly sell to consumers, their preferences related to food quality and safety are critical in understanding the food environment. For this reason, retailers were asked to identify their preferences when selecting food items to sell. A very high proportion of retailers (89 percent and above) highlighted food affordability, convenience, service, quality and safety as important factors across all food groups. Under food affordability, retailers valued the possibility of being able to obtain a competitive price and credit from the supplier. As for convenience, ease of access and proximity to the supplier, the ability to contact the supplier at all times and the possibility of delivery were important considerations. Under quality of service, retailers deemed it important for the supplier to be trustworthy, proactive in communicating supply problems and time-sensitive. As for food quality and safety, retailers valued suppliers that could provide a wide range of products, of persistently good quality and without contamination.

The main food safety concerns for all food items purchased by retailers were proper storage (35 percent) and good quality (22 percent) of food products (Figure 32). Out of the 66 retailers and food service outlets, only 10 (15 percent) had received formal training in food safety management. Some of the sources of this training were the Agraj Food Processors organization, their place of employment, the family, the municipality, and Nagarvasti Vikas Yojana Udyokjak Vikas Shibir.9

FIGURE 32.
Percent distribution of food safety concerns reported by retailers (N=185)

- Nothing 2.2%
- Pesticides 1.6%
- Limited purchase 4.3%
- Safety 1.1%
- Use of boric powder 4.9%
- Proper storage 34.6%
- Packaging 12.4%
- Good quality of food products 21.6%
- Hygiene 14.1%

Source: Authors’ own elaboration.

9 Translation – Urban development scheme: entrepreneur workshop.
The assessment revealed that at the retail level, the food losses occurring across most food groups, except for staples, fell in the range of 0 to 24 percent (Figure 33). For staples, some retailers also reported food losses in the range of 25 to 50 percent. To reduce loss of food products, retailers employed strategies such as improving storage facilities (70 percent) and sourcing good-quality foods (59 percent) (Figure 32). For vegetables (100 percent), milk products (91 percent), beverages (86 percent), milk (86 percent), other snack foods (76 percent), staples (68 percent), eggs (67 percent), packaged foods (61 percent) and fried snacks (46 percent), the most sought-after strategy to reduce food product loss was improving storage facilities. Sourcing good-quality food and improving storage facilities were the strategies chosen to reduce losses for fruits (55 percent).

**FIGURE 33.**
Self-reported food losses at the retail level (N=185 food products)

<table>
<thead>
<tr>
<th>Loss Percentage</th>
<th>Percent of Food Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-24%</td>
<td>81.6%</td>
</tr>
<tr>
<td>25-50%</td>
<td>8.6%</td>
</tr>
<tr>
<td>51-75%</td>
<td>8.6%</td>
</tr>
<tr>
<td>Others (products are sold off, zero loss)</td>
<td>1.1%</td>
</tr>
</tbody>
</table>

Source: Authors’ own elaboration.

**FIGURE 34.**
Distribution of strategies implemented by retailers to reduce losses of food products (N=185)

- Sourcing good-quality food
- Improving storage facilities
- Improving transport
- Improving packaging
- Reduce damage by rodents, insects and other pests

Source: Authors’ own elaboration.
**FIGURE 35.**
Distribution of major problems retailers faced with suppliers (N=185)

- **Vegetables**
  - Price volatility: 60%
  - High cost transport: 40%
  - Poor communication: 10%
  - High price per unit: 20%
  - Long delivery time: 80%
  - Multiple intermediaries involved: 30%
  - No problem: 20%

- **Fruits**
  - Price volatility: 70%
  - High cost transport: 60%
  - Poor communication: 50%
  - High price per unit: 40%
  - Long delivery time: 60%
  - Multiple intermediaries involved: 50%
  - No problem: 10%

- **Staples**
  - Price volatility: 50%
  - High cost transport: 40%
  - Poor communication: 30%
  - High price per unit: 20%
  - Long delivery time: 70%
  - Multiple intermediaries involved: 60%
  - No problem: 15%

- **Overall food products**
  - Price volatility: 60%
  - High cost transport: 50%
  - Poor communication: 40%
  - High price per unit: 30%
  - Long delivery time: 70%
  - Multiple intermediaries involved: 50%
  - No problem: 20%

*Source: Authors’ own elaboration.*
Few traders (and intermediaries) and small and medium processors were members of a trade association. In comparison, all but one of the wholesalers were members of a trade association.

Traders, wholesalers and processors mostly sold their food products to retailers (57 percent) and consumers (39 percent).

Two thirds of the food products (67 percent) were delivered to traders, wholesalers and processors.

The analysis revealed that only six (10 percent) of all the food products managed by traders, wholesalers and processors were transported and distributed under cold storage. However, four of these six products included beverages, packaged foods and snack foods.

Very few farmers (3 out of 45) were members of a farmers’ or producers’ organization.

19 percent of the farmers sold their crops directly to consumers, and 16.7 percent sold them through the Agricultural Produce Market Committee marketing board.

More than 50 percent of the farmers reported delivering the products to buyers; high cost of transport was reported as the major problem in this respect.

TABLE 6.
Indicative distribution of food products according to supply and demand, as reported by traders, intermediaries, wholesalers, and small and medium processors.

<table>
<thead>
<tr>
<th>Food groups</th>
<th>Supply</th>
<th>Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Staples</td>
<td>November</td>
<td>February March</td>
</tr>
<tr>
<td>Milk</td>
<td>n/a</td>
<td>All months</td>
</tr>
<tr>
<td>Milk products</td>
<td>n/a</td>
<td>All months</td>
</tr>
<tr>
<td>Fruits</td>
<td>April May – June</td>
<td>January February</td>
</tr>
<tr>
<td>Vegetables</td>
<td>July</td>
<td>December</td>
</tr>
</tbody>
</table>
5. FOOD SUPPLY CHAINS

To understand food supply chains in Pune, 50 traders (and intermediaries), wholesalers, and small and medium processors, as well as 45 farmers, were interviewed within and outside the district. The interviews with traders, wholesalers and processors were done in person,\(^{10}\) while the farmers were interviewed either via face-to-face or telephone.\(^{11}\) To identify the farmers, wholesalers were approached and snowball sampling was used for their recruitment.

The interviews with these food supply chain actors were mainly conducted around the following three food groups: staples, dairy, and fruits and vegetables. However, in the case of processors, questions were also asked on beverages, packaged foods and snack foods.

Eight traders (and intermediaries), 26 wholesalers and 16 processors were identified in ten wards in the city (Figure 36).

These wards included: Gultekdi, Lavale, Nanded, Bibwewad, Kothrud, Maharshi, Market Yard, Aundh-Baner, Pashan and Warje. These food supply chain actors mainly managed the following food items: wheat, rice and pulses (dals) (under staples); tomatoes, potatoes and onions (under vegetables); bananas and pomegranate (under fruits); and milk, paneer and condensed milk (under dairy). Farmers were the main source of purchase for food products such as fruits (86 percent), milk (75 percent) and vegetables (42 percent).

Traders, wholesalers and processors mostly sold their food products to retailers (57 percent), followed by consumers (39 percent), food services (18 percent) and distributors (16 percent) (Figure 37).

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\(^{10}\) The traders, wholesalers and processors interviews were conducted from 22 October 2020 to 9 November 2020.

\(^{11}\) The farmer interviews were conducted from 12 to 14 November 2020.

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Sales of approximately 46 percent of the food products were expected to increase during the same time the following year (2021) (Figure 38). The most common reasons for sales expectations were related to high product demand and the COVID-19 pandemic.

A total of 45 farmers were interviewed within and outside the Pune district by telephone, around the following three food groups: staples, dairy, and fruits and vegetables.

The majority of the farmers participating in the assessment were engaged in the production of vegetables (13) followed by rice (11), wheat (7) fruits (6), dairy (5), pulses (4) and millet (2). For farmers producing rice, most had a cultivated land area of 2 to 4 acres (64 percent), while 27 percent had a cultivated area of more than 4 acres (Figure 39). A more even distribution in terms of cultivated area could be seen in wheat farmers – 43 percent cultivated over 2 to 4 acres, and 29 percent each over 0 to 2 acres and more than 4 acres. All farmers growing pulses had a cultivated area between 2 and 4 acres. Vegetable and fruit producers cultivated over smaller plots, with most of them cultivating on areas less than 2 acres (62 percent and 67 percent, respectively).

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### FIGURE 38.
Distribution of traders’ , wholesalers’ and processors’ sales expectations for the same time the following year (2021) (N=61 food products)

- Increased
- Decreased
- Stayed the same

### FIGURE 39.
Crops cultivated and farm size (N=45 farmers)

<table>
<thead>
<tr>
<th>Crops cultivated</th>
<th>Percent of farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paddy (rice)</td>
<td>14.8%</td>
</tr>
<tr>
<td>Wheat</td>
<td>27.8%</td>
</tr>
<tr>
<td>Pulses and lentils</td>
<td>39.3%</td>
</tr>
<tr>
<td>Vegetables</td>
<td>10.0%</td>
</tr>
<tr>
<td>Fruit</td>
<td>12.2%</td>
</tr>
<tr>
<td>Millet</td>
<td>12.2%</td>
</tr>
<tr>
<td>Overall production</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Source: Authors’ own elaboration.

Ninety-eight percent of the farmers cultivated crops because of their knowledge, followed by 62.5 percent who cultivated because of the market price and 50 percent who planted due to climatic and weather-related factors (Figure 40). Knowledge emerges as a major reason for crop cultivation, which means that the role of agriculture departments in disseminating technical information is very important.
Nineteen percent of the farmers sold their crops directly to consumers and 16.7 percent sold them through the Agricultural Produce Market Committee marketing board.

5.1. Access to services
All but one of the wholesalers interviewed (25 out of 26) were members of a trade association. These wholesalers were mostly offered the following services by their association: market information, assistance with licenses and compliance with regulations, and negotiation with authorities.

In comparison, very few traders (and intermediaries) (two out of eight), small and medium processors (1 out of 15) and farmers (3 out of 45) were members of a trade, processors’ or farmers’ organization.

5.2. Post-harvest, processing and distribution
Two thirds of the food products (67 percent) were delivered to traders, wholesalers and processors. Food items belonging to the staples food group were mostly transported using a pushcart (59 percent) and closed vehicles (41 percent) (Figure 41). The mean distance between the supplier of staple items and the trader, wholesaler and processors was 612 km (Figure 42). In the case of milk, too, no single form of transport was predominantly used, as all modes – open vehicle, closed vehicle and pushcart – were used equally. However, the mean distance for milk and milk products from the supplier was shorter – 18 km and 6 km, respectively. To transport fruits from the supplier, both pushcarts and closed vehicles were used, and the mean distance was noted to be 171 km. As for vegetables, mostly closed vehicles were used for transportation, and the mean distance from the source was noted to be 315 km.
The analysis revealed that only six (10 percent) of all the food products managed by traders, wholesalers and processors were transported and distributed under cold storage. However, four out of these six products included beverages, packaged foods and snack foods.

Storage, processing and packaging were the main post-harvest activities undertaken by traders, wholesalers and processors. For staple foods, dairy, fruits and vegetables, wholesalers bore most of the costs associated with post-harvest activities and handled most of the volume, among the food supply chain actors interviewed in the assessment. For beverages, packaged foods and snack foods, small and medium processors bore all of the post-harvest costs and handled most of the volume.

These supply chain actors – traders (intermediaries), wholesalers, and small and medium processors – mentioned that most of the food products were sold and more than half of the products (51 percent) only experienced a loss of less than 5 percent. The most desired strategies to reduce losses across food groups were to improve storage facilities (48 percent) and source good-quality food (31 percent).
When farmers were asked about the strategies implemented to reduce crop losses, 60 percent reported improving storage facilities followed by reduction in damage caused by rodents, insects and pests (49 percent). When asked about strategies to improve crop safety, more than 60 percent reported adherence to Good Agricultural Practices, Good Hygiene Practices and use of fewer chemicals.

More than 50 percent of the farmers reported delivering the product to the buyer; high costs of transport was reported as the major problem encountered in this respect. As for the key factors considered in choosing a potential buyer, competitive prices and prompt payment were reported as the most important. Additionally, farmers prefer to sell to buyers that are trustworthy, close to their location, that provide advice in advance and that procure a large quantity and variety of products.
5.3. Management of resources and agribusiness practices

Out of the 50 traders, wholesalers and processors who were interviewed, only five had received formal training in food safety management; none of the eight traders and intermediaries interviewed had received any food safety training. The training was administered by the following persons: Bazar samiti, Katraj dairy, Mr Sambhaji Memane, the authorities of Talegava dahbade, while businesses also provided self-administered training. Furthermore, only ten actors (except for traders and intermediaries) operated under a food safety or quality assurance programme. The main barrier faced by the actors in operating formal food safety programmes was the lack of awareness of such programmes (as noted by 32 percent of the actors).

12 Bazar samiti is the Agriculture Produce market committee, Katraj dairy is a popular name for Pune District’s Milk Federation and Talegava dahbade is a small city near Pune.
6. GEO-MAPPING OF KEY FOOD SYSTEM ACTORS AND AVAILABILITY OF KEY FOOD GROUPS IN PUNE

FIGURE 45.
Distribution of farmers, traders, wholesalers and retailers in Pune, by survey type


Note: The geo-mapping was captured through the SurveyCTO Android Application & Batchgeo. SurveyCTO collects GPS coordinates using the device’s built-in GPS function.
FIGURE 46.
Distribution of farmers, traders, wholesalers and retailers in Pune, by food group

REFERENCES


Maharashtra State Directorate of Primary Education. 2013. Supreme Court Writ Petition No. 618/2013 – 1 & 2)Total No. of Schools (Govt./Aided/Local Bodies) & EGS/AIE Centres obligated to provide Mid day Meal. Total No. of Schools (Govt./Aided/Local Bodies) & EGS/AIE Centres actually providing Mid day Meal & Enrollment. Pune, India. (also available at https://education.maharashtra.gov.in/mdm/files/mdm_state_info.pdf).


