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No. 14: The State of Household Food Security in Bangalore, India

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HUNGRY CITIES PARTNERSHIP

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Jyothi Koduganti, Charrlotte Adelina, Mohanraju JS and Shriya Anand

Series Editors: Prof Jonathan Crush and Dr Liam Riley

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No 11 *The State of Household Food Security in Nairobi, Kenya*
No 12 *The State of Household Food Security in Cape Town, South Africa*
No 13 *The State of Household Food Security in Mexico City, Mexico*

Contents

List of Tables

List of Figures

Executive Summary

This report presents and analyzes the findings of a household food security survey conducted by the Indian Institute for Human Settlements (IIHS) and the Hungry Cities Partnership (HCP) in Bangalore, India, in 2016. The survey was administered to 1,700 households in 40 randomly-selected wards across the city. This is the first large-scale survey of household food security in Bangalore and should be read in conjunction with the background information on the city's food system in *HCP Report No. 5: The Urban Food System of Bangalore, India* (Surie and Sami 2017). The two reports aim to provide researchers and policy-makers with detailed data and information about food security in Bangalore, as well as insights into the city's food system.

The introduction is followed by a detailed description of the survey methodology. The next section presents a demographic and economic profile of the sampled households. This is followed by a description of the measures of household food security used in the survey and an analysis of the findings on levels of food insecurity in the city. The food sourcing behaviours and patterns of the sampled households are then discussed.

The survey used two main food security indicators – the Household Food Insecurity Access Scale (HFIAS) and the Household Food Insecurity Access Prevalence (HFIAP) indicator – and found very low levels of food insecurity in Bangalore in terms of availability and accessibility of food:

- The mean HFIAS score of the sampled households was a low 0.71 out of a possible 27. Of the seven Global-South cities in the HCP, only Nanjing (China) had a lower mean score. Most Bangalore households (87%) have a score of less than 2, and less than 1% of the sample have a score greater than 9.
- Answers to the nine frequency-of-occurrence HFIAS questions found extremely low rates of worrying about not having enough food, not eating preferred foods, eating fewer and smaller meals, having no food in the house, and going hungry;
- A question about the frequency of going without sufficient food in the previous year found that over 95% of households had never gone without.
- The HFIAP typology shows that 83% of households are food secure and 17% are food insecure, including 13% who are severely food insecure.

Although the surveyed households had high levels of food access, the quality of their diet varied considerably. The HDDS indicator measures how many food groups (out of a possible 12) were consumed in the household in the 24 hours prior to the survey. The major findings were:

- The average HDDS was 6.0, indicating that on average the households consumed foodstuffs from only six out of 12 food groups.
- 55% of the households have an HDDS of five or less and a just over one-third have an HDDS of 4 or less. A score of 5 or less is generally considered to be inadequate nutritionally and associated with poor nutritional outcomes.
- One-third of the households had HDDS scores of 7 or more, indicating considerable inequality in dietary diversity.
- The core components of the diet of most households come from four food groups: cereals, vegetables, sugar/jaggery/honey, and foods made with oil/butter/ghee.

The survey provides important insights into the food purchasing behaviour of Bangalore households:

- The most frequented food sources in the city are small neighbourhood kirana shops (90%), followed by dairy kiosks (69%), informal carts (68%), restaurants/cafés/bakeries (64%), and meat shops (60%).
- HOPCOMS outlets are patronized by around 40% of households and street vendors, and public distribution system (PDS) shops by just less than one-third.
- The main city markets are patronized by around 20% of households.
- While there has been considerable controversy about the expansion of supermarkets in India, only 20% of the surveyed households shop for food at the major supermarket chains.
- While dairy kiosks are patronized on an almost daily basis, most other outlets are frequented weekly. The major exceptions are PDS stores, small retail outlets, and supermarkets, where most households shop on a monthly basis.
- Most households purchase foods either within the neighbourhood or no further than 5km away. Around 40% of common foods are primarily purchased within walking distance. Dairy products (milk, yoghurt, and butter) and eggs are bought almost exclusively in the neighbourhood. Many non-perishables are primarily purchased at more distant outlets.
- Vegetables are purchased both within the neighbourhood and further away, which is primarily a function of household proximity to city markets and street sellers.

Small food outlets and informal vendors in markets and on the streets play a critical role in Bangalore's food system and in ensuring the low levels of household food insecurity found in the city. Given the importance of the informal food sector, a follow-up survey was conducted in 2018 on informal food vending in the city and its results and implications will soon be published.

1. Introduction

This report presents and analyzes the findings of a household food security survey conducted by the IIHS and the Hungry Cities Partnership in Bangalore, India, from April to September 2016. Surie and Sami (2017) provide essential contextual background for this report on Bangalore's history, demography, economy, and changing food system. This report describes the survey and presents and discusses its findings. It then analyzes the food security situation and food system functions in Bangalore. The report thus provides solid background information for future research on Bangalore's food system and lays the foundation for comparative studies with the other cities of the Hungry Cities Partnership project.

The report first provides an overview of the sampling strategies for the city-wide household survey in Bangalore. It then profiles the surveyed households in terms of their demographic characteristics, economic data, livelihoods and occupations, poverty indicators, and use of social grants. The following section discusses the prevalence of food insecurity in Bangalore using various food insecurity measurements. It also explores the factors affecting food security, the impact of food price changes on food accessibility, and the relationship between food security and household characteristics. The report then examines Bangalore's food system through people's usage of various food sources, what foods they buy, and how they perceive supermarkets and urban agriculture.

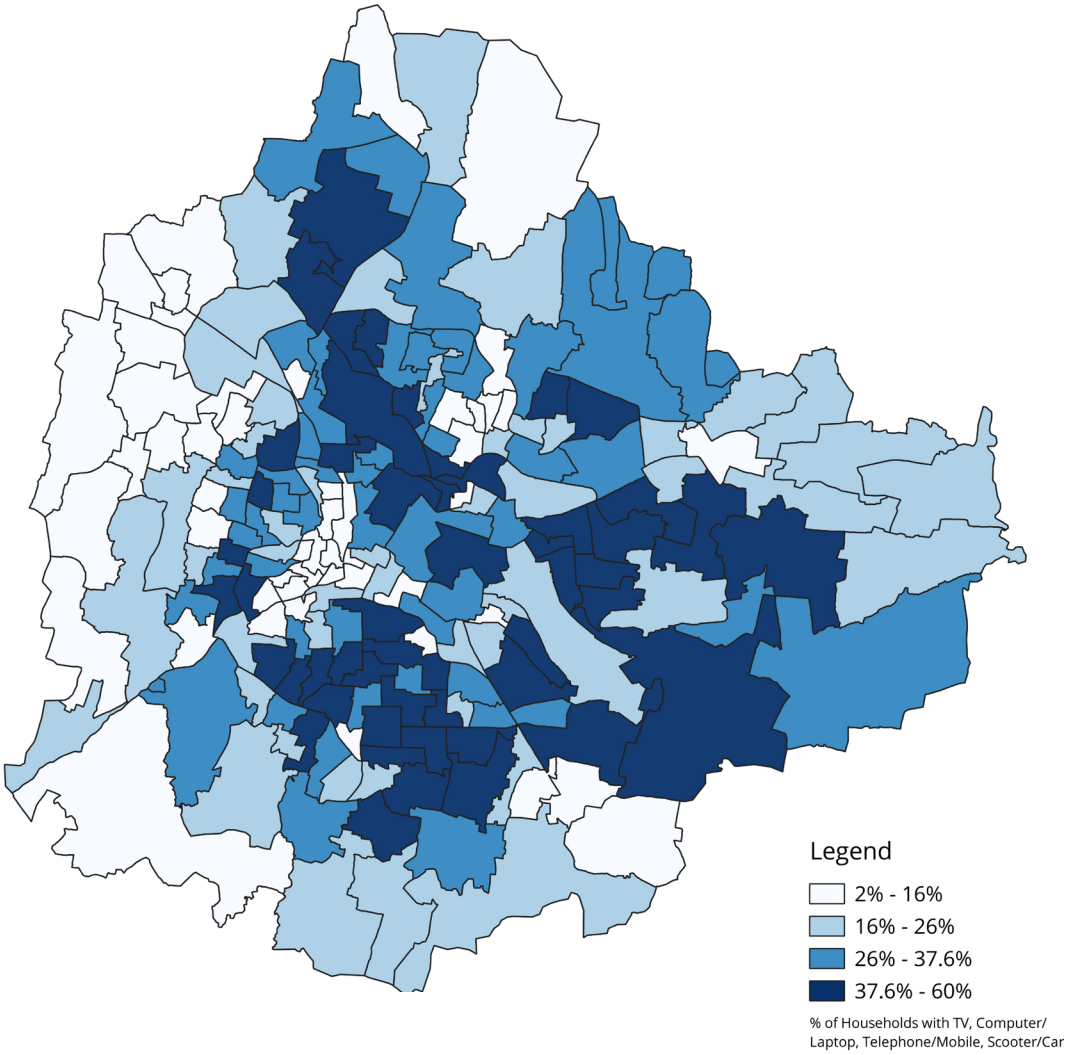
2. Methodology

The Hungry Cities survey in Bangalore was conducted from April to September 2016. The standard HCP questionnaire was modified to take into account the Bangalore context. The data from the first round of the survey yielded some errors and close to 800 households were resampled. The final result was a sample that included 1,700 households across 40 of 198 wards (local administrative units within the city) in Bangalore. The survey was administered by 12 enumerators guided by three field supervisors with additional help from IIHS researchers.

The overall sampling procedure could not follow a pure randomization strategy because of the absence of a comprehensive household list from which to draw a random sample. City wards were therefore used as the sampling unit. The sampling was based on stratified random sampling to select wards to be surveyed. Because of variations in income and wealth within the city, wards were classified into four strata based on ward-level percentage of asset ownership (Figure 1). Ten wards were sampled in each stratum. More samples were allocated to the lower two income strata in order to understand the food security situation of lower-

income households. After allocating the total sample size for each stratum, the sample size for each ward within a strata was determined using proportionate allocation based on the total population of that ward. The number of households interviewed in each stratum is shown in Table 1.

FIGURE 1: Spatial Distribution of Asset Ownership, 2011



Source: Surie and Sami (2017)

TABLE 1: Sample Size by Asset Ownership Strata

Stratum	No.
1	520
2	526
3	306
4	344

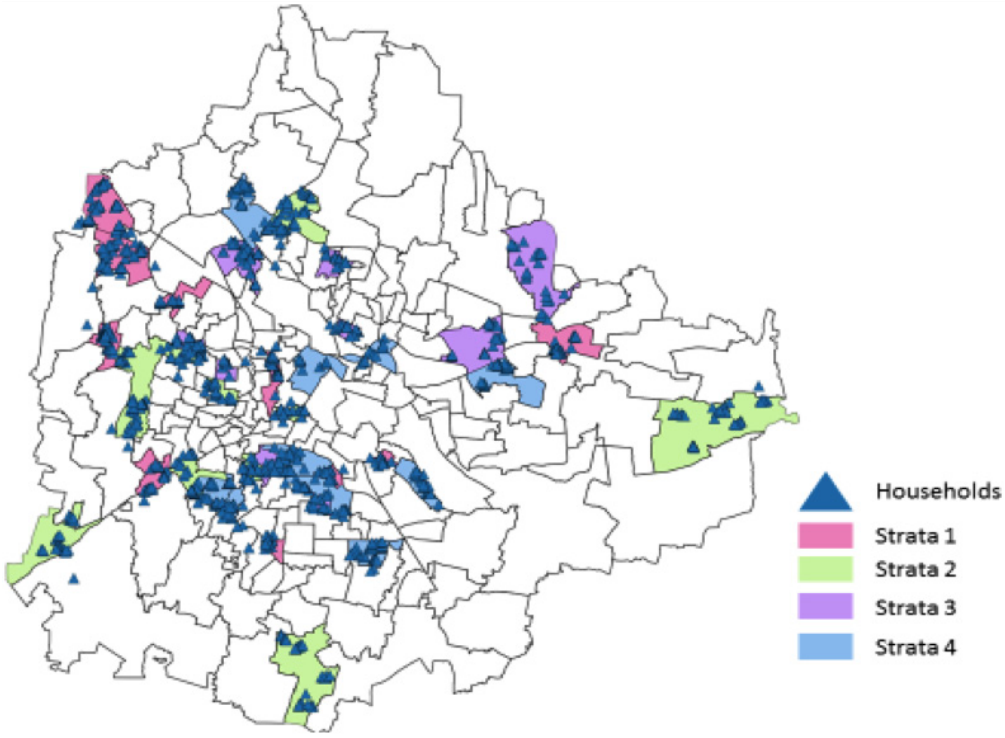
In the absence of data to identify actual households within a ward, transects were marked within ward boundaries using Google Earth for the enumerators to follow. The aim was to cover as much of the ward area and built-form diversity as possible through the mapping of transects. Transects passed through different built-form types, including slums, apartment complexes, and housing layouts with large and small independent houses. Within each transect, households were randomly selected with enumerators administering the survey to every third household. Table 2 shows the names of the surveyed wards, which stratum each ward was located in, and the number of households interviewed in that ward. Figure 2 shows the spatial distribution of sampled strata and households.

TABLE 2: No. of Households Sampled in Selected Wards

Ward	Stratum	No.	%
Bagalakunte	1	85	5.0
Chokkasandra	1	82	4.8
Lakshmi Devi Nagar	1	42	2.5
Devasandra	1	38	2.2
Hegganahalli	1	87	5.1
Subhash Nagar	1	37	2.2
Nilasandra	1	27	1.6
Nayandahalli	1	49	2.9
Siddapura	1	32	1.9
Banashankari Temple	1	41	2.4
Kodigehalli	2	77	4.5
Kottegepalya	2	76	4.5
Shakthi Ganapathi Nagar	2	50	2.9
Hagadur	2	58	3.4
Dr. Raj Kumar Road	2	43	2.5
Chikpete	2	24	1.4
Hanumath Nagar	2	38	2.2
Deepanjali Nagar	2	59	3.5
Kengeri	2	45	2.7
Gottikere	2	59	3.5
J.P. Park	3	33	1.9
Hebbal	3	25	1.5
Ramamurthy Nagar	3	35	2.1
Mathikere	3	29	1.7
Benniganahalli	3	38	2.2
Ramaswamy Palya	3	22	1.3
Shankar Mutt	3	51	3.0
Shivanagara	3	25	1.5
Sunkenahalli	3	29	1.7
Byrasandra	3	19	1.1
Dodda Bommasandra	4	34	2.0

C.V. Raman Nagar	4	49	2.9
Pulakeshi Nagar	4	21	1.2
Vasanth Nagar	4	16	0.9
Visweswara Puram	4	29	1.7
Ejipura	4	42	2.5
Jayanagar	4	34	2.0
Girinagar	4	37	2.2
Katriguppe	4	39	2.3
BTM Layout	4	43	2.5
Total		1,700	100

FIGURE 2: Distribution of Sampled Wards and Households



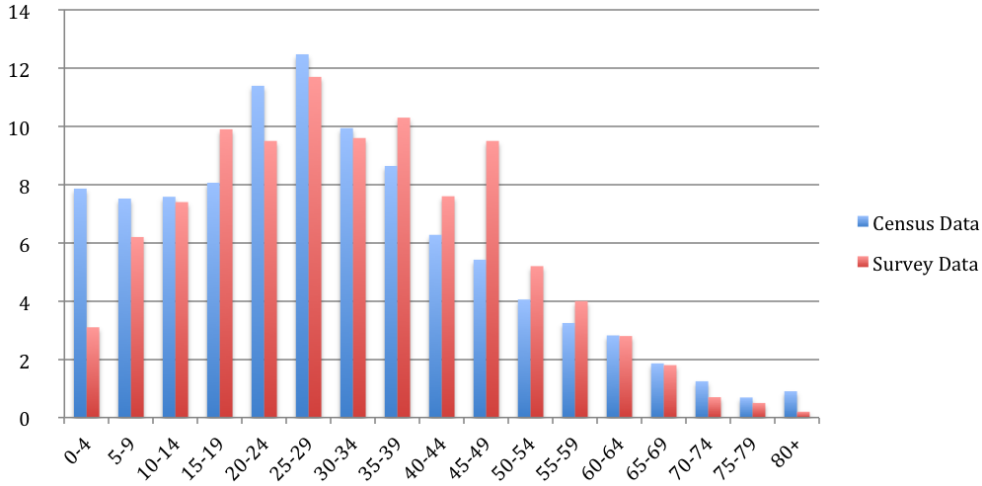
The surveys were administered to an adult member of the household capable of answering questions about its finances and food purchasing patterns. In the case of dwellings with more than one household, the first available household was surveyed. Checks were conducted every few days by the field supervisors. The survey was conducted using tablets. Enumerators had three days of intensive training before the survey.

The sampling procedure adopted means that the sample is not necessarily statistically representative of the city as a whole. In addition, the survey did seem to miss very marginal populations such as migrant workers, construction workers, and people living in temporary arrangements such as hostels. Also, the enumera-

tors faced difficulties gaining access to households in gated communities (which represent the upper end of the income distribution in Bangalore). Therefore, the survey probably under-represents the very poor and the very rich. To assess whether the sample was still broadly representative, the survey findings were compared with two demographic indicators from the 2011 Census.

First, the gender ratio (male to female) of the surveyed households was 1.105. The ratio in the 2011 Census was only marginally lower at 1.0917. Second, the age distribution of the two data sets was compared. As Figure 3 shows, the 2011 Census found a greater proportion of children under the age of 10, and the survey found a greater proportion of working-age adults over 35. However, in none of the age cohorts was there a difference of over 5%. Accepting that the demographic situation may have changed between 2011 and the date of the survey, it seems that the survey may have over-represented working adults and under-represented dependent children.

FIGURE 3: Age Distribution of Surveyed Household Members and 2011 Bangalore Census



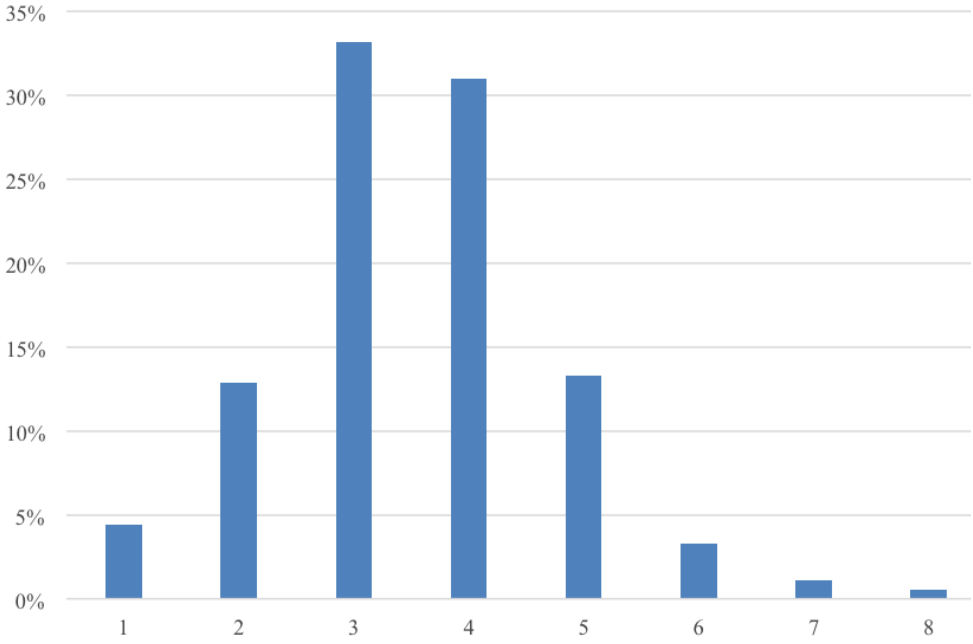
3. Household Profile

3.1. Demographic Characteristics

The mean household size was 3.5 with a standard deviation of 1.25, a minimum of one and a maximum of 10. Almost 95% of the households had five or fewer members, while 17% were one-to-two member households (Figure 4). The age distribution of household members shows that the largest proportion of the population are working-age adults between 20 and 50 years old. The most common five-year cohort was between 26 and 30 years old (Figure 3). Almost all

household members were below the age of 70. Just under 20% of the household members were younger than 20 years of age. A total of 48% of the household members were women.

FIGURE 4: Size of Surveyed Households

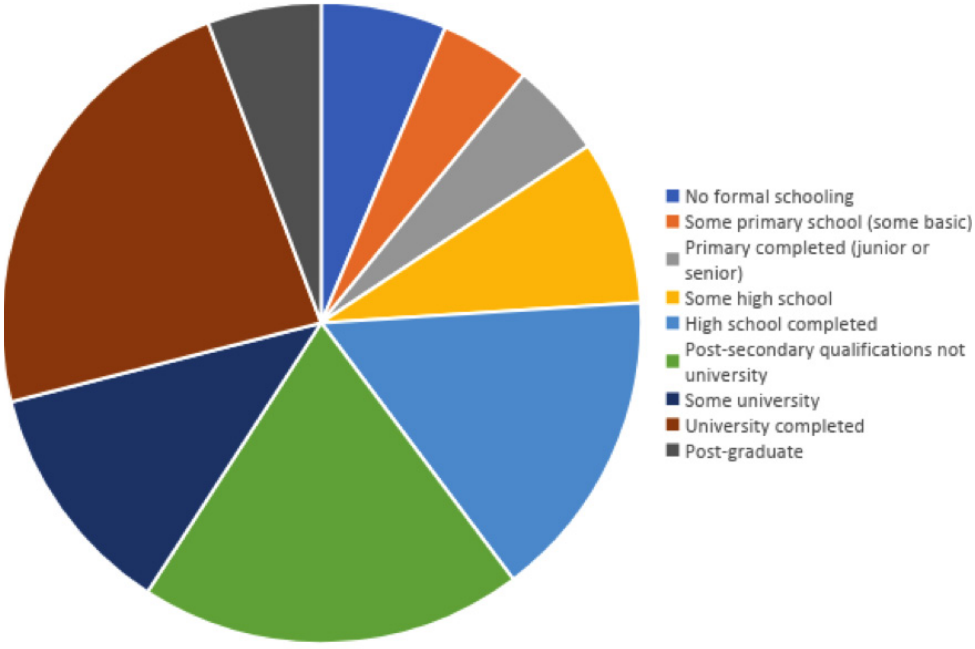


The most common household type, constituting 78% of the total sample, was the nuclear household (defined as households with a head and spouse or partner, with or without children). Eleven percent were extended households (with the same structure but including other relatives). Female-centred households (with a female head without a spouse or partner) amounted to only 7% and male-centred households (of similar structure but with a male head) to 4%.

3.2. Educational Profile

Education can shape livelihoods and social mobility and Bangalore has one of India's most educated populations. As many as 23% of surveyed adult household members had completed university and 12% had some university education (Figure 5). An additional 6% had post-graduate qualifications. This is thus a relatively well-educated population, which is consistent with Bangalore's urbanization trajectory and attractiveness to the skilled. At the same time, 23% of the population had not completed high school and 6% had no formal schooling.

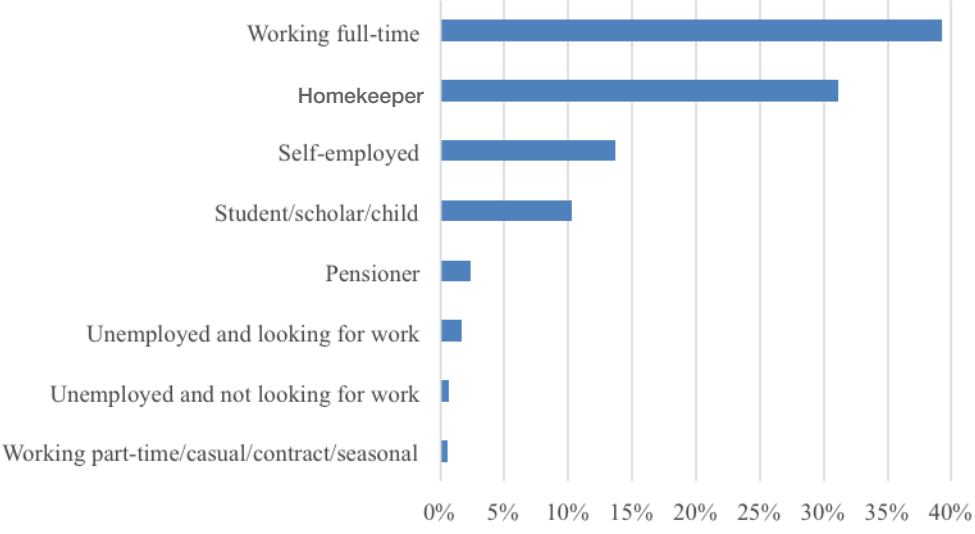
FIGURE 5: Highest Level of Education of Adult Household Members



3.3. Employment of Household Members

Almost 40% of the sampled household members were working full-time. Another 31% indicated their work status as homekeepers (Figure 6). Additionally, 14% of the sample were self-employed and 10% were at school or tertiary institutions.

FIGURE 6: Work Status of Household Members



3.4. Household Income

The average household income was INR26,763 (USD380) per month with a standard deviation of INR18,390. When the households are split into five roughly equal categories based on their monthly income, the income quintiles in Table 3 emerge. One-fifth of the sampled households earn below INR13,000 (USD180) per month.

TABLE 3: Monthly Income Quintiles

Quintiles	Income ranges (INR per month)
1	<=13,000
2	>=13,001 and <=19,001
3	>= 9,001 and <=27,000
4	>=27,001 and <=39,000
5	>39,000

3.5. Household Expenditure

Figure 7 shows the proportion of households spending money on a range of common items over the previous month. Food and groceries were the most important expenditure, with 94% of households buying these. This was followed, in order of importance, by telecommunications (89%), transportation (80%), public utilities (60%), medical care (60%), clothing (55%), entertainment (54%), fuel (52%), education (49%), and housing (34%). Only one-quarter of the households saved any income.

Table 4 shows the number of surveyed households that incurred costs in each of the expenditure categories and the average amount spent. In order of magnitude, these were household goods (although less than 10% incurred this expense), housing, education, insurance, and food and groceries. Average savings and remittances were higher in value than most of these expenses, but the number of households involved was relatively small by comparison. The average monthly expenditure on food and groceries was INR3,205 (USD45). To gain an approximate picture of the "total spend", the mean was multiplied by the number of households incurring an expense. The total spend on food and groceries was higher than for any other expenditure category at INR5.1 million.

FIGURE 7: Expenditures of Surveyed Households

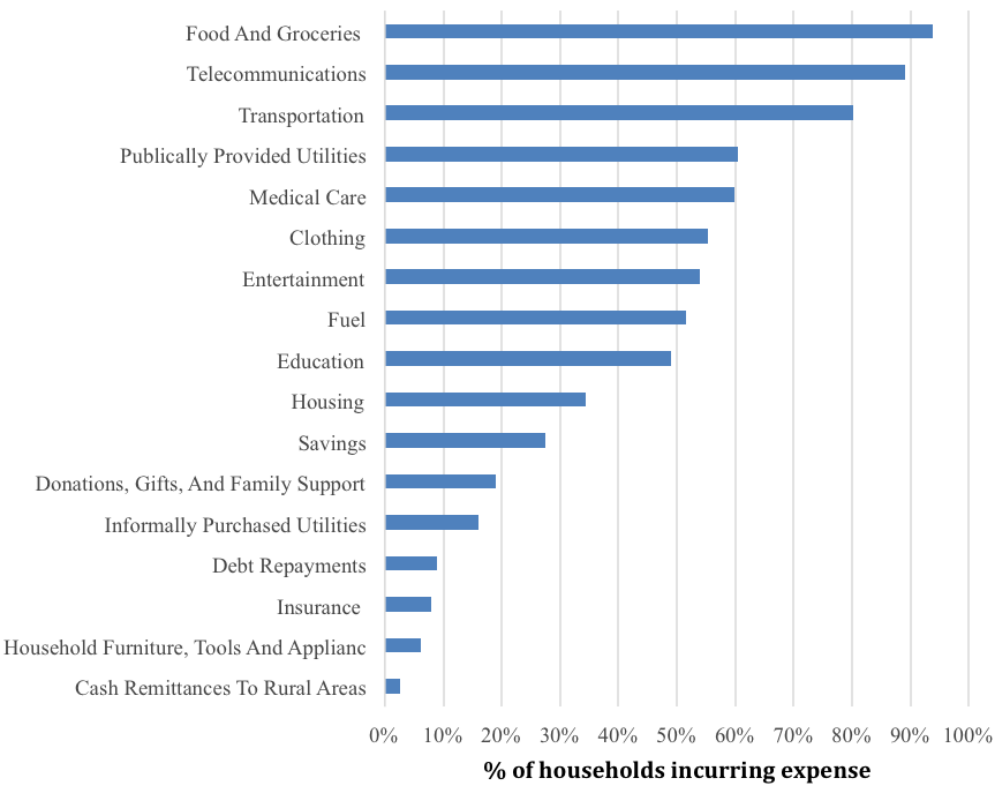


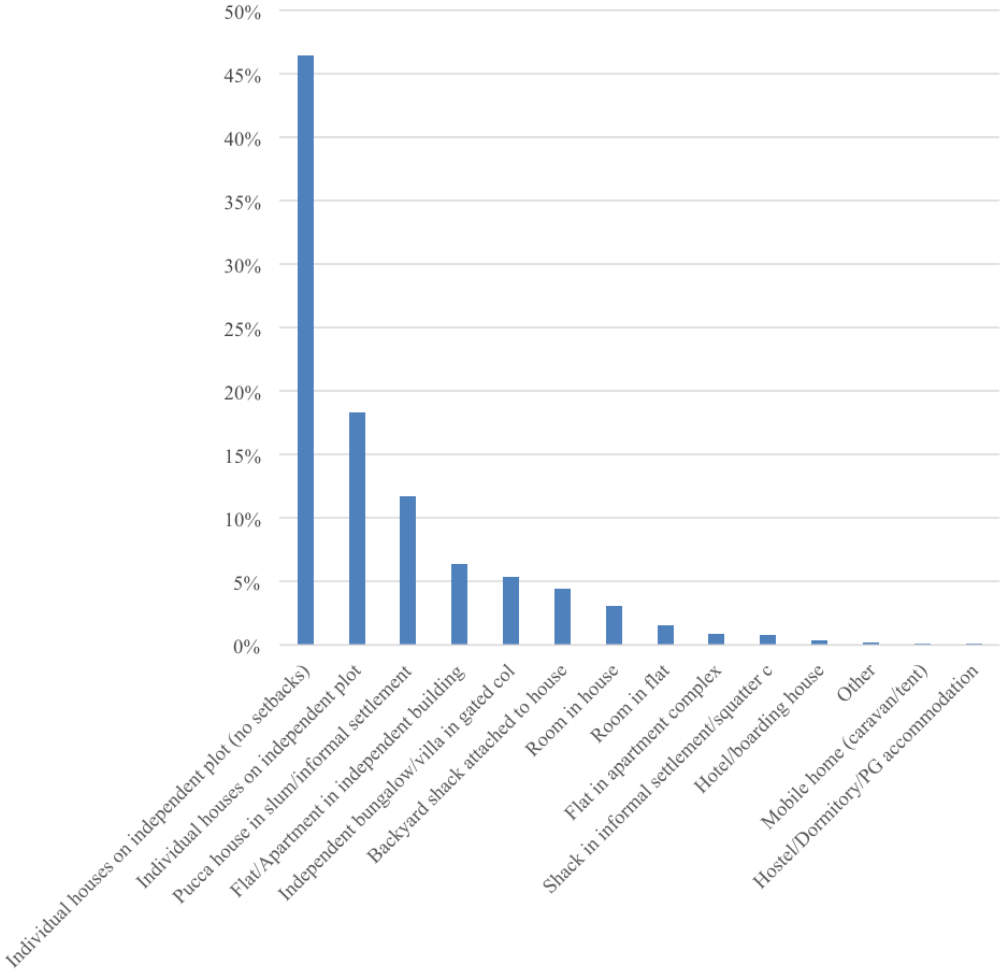
TABLE 4: Average and Total Household Expenditure by Category

Household expenditures	No. of households incurring expense	Mean monthly expenditure (INR)	Total monthly expenditure (INR)
Food and groceries	1,594	3,205	5,108,770
Telecommunications	1,514	565	855,410
Transportation	1,364	1,419	1,935,516
Publicly provided utilities	1,027	723	742,521
Medical care	1,018	1,513	1,540,234
Clothing	939	1,966	1,846,074
Entertainment	917	1,261	1,156,337
Fuel	877	727	637,579
Education	832	3,386	2,817,152
Housing	586	4,115	2,411,390
Savings	466	7,483	3,487,078
Donations, gifts, family support	324	735	238,140
Informally purchased utilities	271	439	118,969
Debt repayments	151	4,790	723,290
Insurance	135	3,307	446,445
Furniture, tools, appliances	105	6,187	649,635
Cash remittances to rural areas	45	5,978	269,010

3.6. Housing Types

About half of the sample (46%) live in structures known as "individual house on independent plot (no setbacks)" (Figure 8). Another 18% live in an "individual house on independent plot (with setbacks) ". Together, these constituted nearly two-thirds of the households. Another 5% live in bungalows and 6% in flats. This means that three-quarters of the sample had good housing conditions. About 200 households (11% of the sample) live in "pucca houses in slum/informal settlement" and 76 (4%) in "backyard shacks". Along with 0.7% of households in a "shack in informal settlement/squatter camp", about 16% of the sampled households lived in precarious housing conditions.

FIGURE 8: Types of Dwelling of Sampled Households



Note: Setbacks refer to the minimum distance required between the house and the plot boundary. In Bangalore, the planning authority sets guidelines for required setbacks and these are related to the height of the building. High-rise buildings have higher setback requirements. Other IIHS research on housing in urban Karnataka shows that houses on smaller plots tend to have fewer or no setbacks, providing some indication of household wealth.

3.7. Poverty Indicator

Indicators such as the Lived Poverty Index (LPI) take into account the experiential realities of poverty by calculating the frequency with which people experienced a lack of access to basic necessities like food, water, medical care, electricity, cooking fuel, and cash income over the past year. Figure 9 is based on the LPI categories and shows that some households experienced shortages of all these necessities. Shortages of electricity (39% of households) and clean water (20%) were experienced more frequently than the other necessities. The reported lack of access to electricity could partially be due to the frequent power outages in the city. Households went without food the least frequently with over 90% never going without, suggesting high levels of food security. At 0.23, Bangalore had the second lowest mean LPI of the cities in the Hungry Cities Partnership, after Nanjing (Table 5).

FIGURE 9: Frequency of Going without Basic Needs in Previous Year

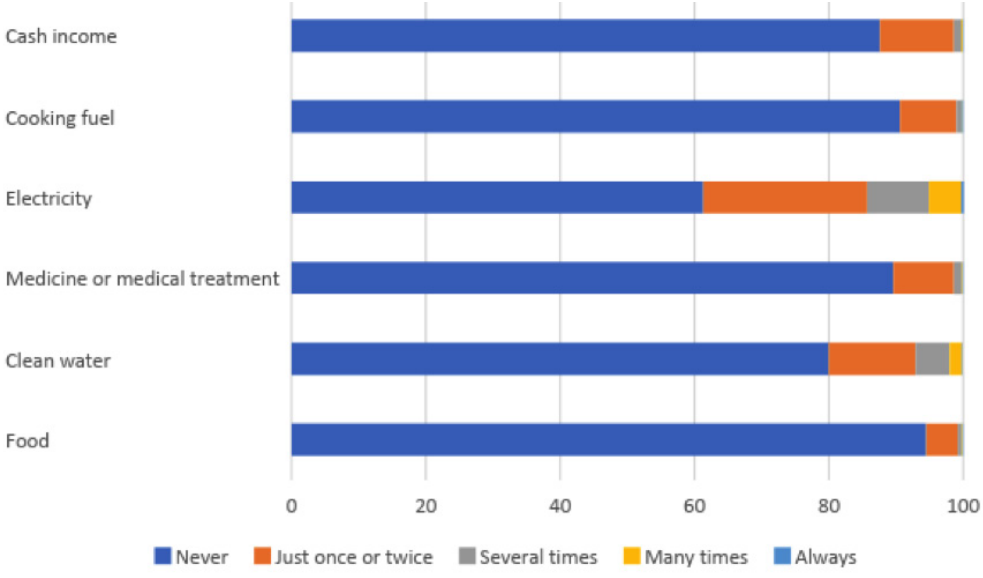


TABLE 5: Comparative LPI Scores of HCP Cities

City	Mean LPI
Nanjing, China	0.10
Bangalore, India	0.23
Mexico City, Mexico	0.27
Nairobi, Kenya	0.46
Kingston, Jamaica	0.47
Maputo, Mozambique	0.53
Cape Town, South Africa	0.65

3.8. Social Grants

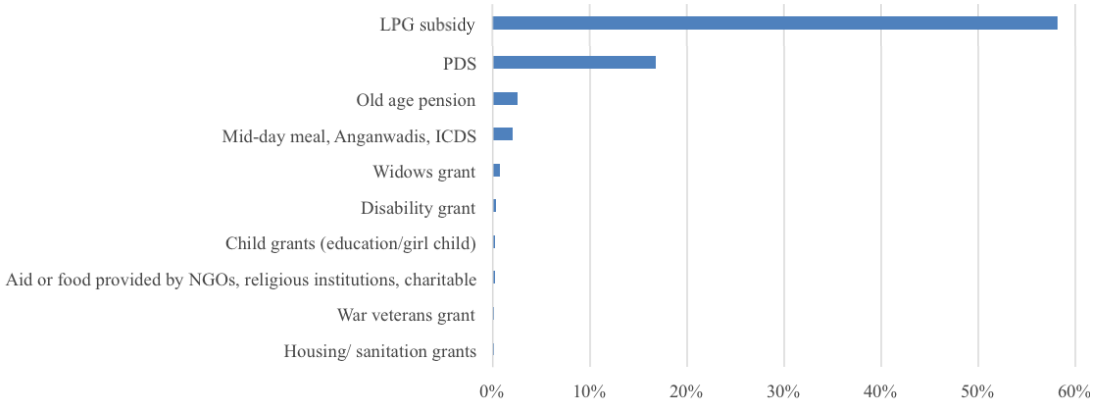
The liquefied petroleum gas (LPG) subsidy and the public distribution system (PDS) are the most common social grants in Bangalore, received by 59% and 17% of surveyed households respectively (Figure 10). Other, less common social grants include old-age pensions, meals, and widows' grants. The LPG subsidy entails the government providing people with liquefied petroleum gas cylinders at a reduced price. The PDS is a government-sponsored scheme for the distribution of subsidized food, including grains such as wheat and rice, and commodities such as kerosene and sugar. It operates through a network of ration shops that distribute basic food and non-food commodities to beneficiaries below the poverty line at subsidized prices.

Since 2001, the midday-meal scheme (MDMS) has provided every child in all government, government-aided and local-body primary schools with a prepared meal with a minimum content of 300 calories of energy and 8-12 grams of protein per day for a minimum of 200 days per year. The scheme was extended in 2002 to cover children studying in Education Guarantee Scheme (EGS) and Alternative and Innovative Education (AIE) centres.

The Indira Gandhi National Old Age Pension Scheme aims to provide social protection through a monthly pension to citizens of 60 years or older in households living below the poverty line.

The average amount received for each grant type and the number of households receiving the grant is shown in Table 6. About half (52%) of the households that received grants used the money to purchase food or groceries for the household (Figure 11).

FIGURE 10: Types of Social Grants



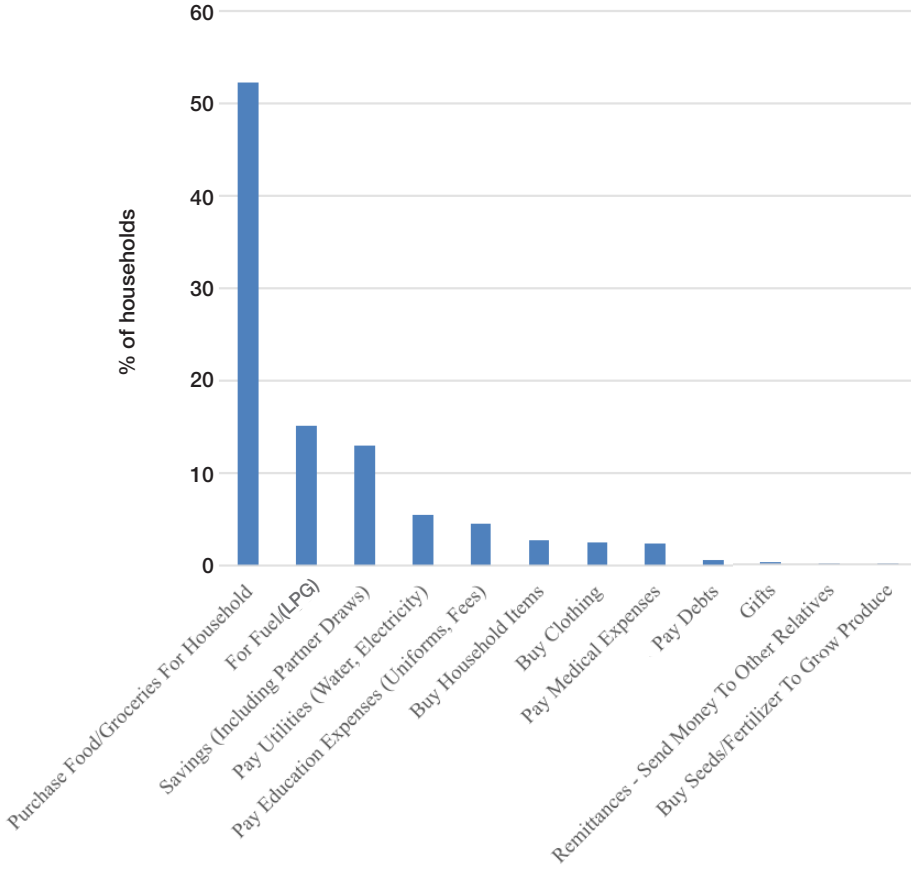
Note: Multiple-response question

TABLE 6: Average Amount of Social Grants

	No. of households receiving grant	Mean amount received (INR)	Standard deviation
Liquefied petroleum gas subsidy	1,265	154.00	33.21
Public distribution system	365	4.67	28.18
Old-age pension	56	1,294.00	1,301.00
Midday-meal scheme	44	267.00	251.13

Most households receive their cash grants through electronic deposit into a bank or Postbank account (77%), or at a PDS outlet (21%).

FIGURE 11: Use of Social Grants



4. Food Security

4.1. Measuring Food Security

Household food insecurity is multi-dimensional and highly contextual. The HCP survey focuses on household experiences of food deprivation, constrained access, and dietary choices to develop a picture of the food security situation in each city. This section reports on the levels of food insecurity and the relationship between food security and factors such as income level and housing type. The HCP uses the food security assessment methodology developed by the Food and Nutrition Technical Assistance (FANTA) project (Swindale and Bilinsky 2006a). FANTA conducted a series of studies exploring and testing alternative measures of household food insecurity in a variety of geographical and cultural contexts and developed widely-used indicators and scales to measure aspects of food insecurity. This report uses three main metrics:

- Household Food Insecurity Access Scale (HFIAS): The HFIAS score is a continuous measure of the degree of food insecurity in the household (Coates et al 2007). An HFIAS score is calculated for each household based on answers to nine frequency-of-occurrence questions designed to capture different components of the household experience of food insecurity in the previous four weeks. The minimum score is 0 and the maximum is 27. The higher the score, the more food insecurity the household experienced. The lower the score, the less food insecurity the household experienced.
- Household Food Insecurity Access Prevalence (HFIAP) indicator: The HFIAP indicator is based on the HFIAS and uses a scoring algorithm to categorize households into four levels of household food insecurity: food secure, mildly food insecure, moderately food insecure, and severely food insecure (Coates et al 2007). Households are categorized as increasingly food insecure as they respond affirmatively to more severe conditions and/or experience those conditions more frequently.
- Household Dietary Diversity Scale (HDDS): Dietary diversity refers to how many food groups were consumed within the household in the previous 24 hours (Swindale and Bilinsky 2006b). The scale runs from 0 to 12 and a score is calculated for each household. An increase in the average number of different food groups consumed provides a quantifiable measure of improved household dietary diversity.

4.2. Levels of Food Security

The mean HFIAS score of the sampled households is a very low 0.71. The skewing of the HFIAS distribution towards the left in Figure 12 indicates clearly

that the majority of the sampled households in Bangalore are food secure. Most households (87%) have a score of less than 2. Only 5% of households have a score between 2 and 3. Less than 1% of the sample have a score greater than 9, which generally indicates high levels of severe food insecurity. The highest individual score was 16 out of 27. The answers to the nine frequency-of-occurrence questions on which the HFIAS is based confirm that most interviewed households had not experienced any of these conditions (Figure 13).

FIGURE 12: Distribution of HFIAS Scores

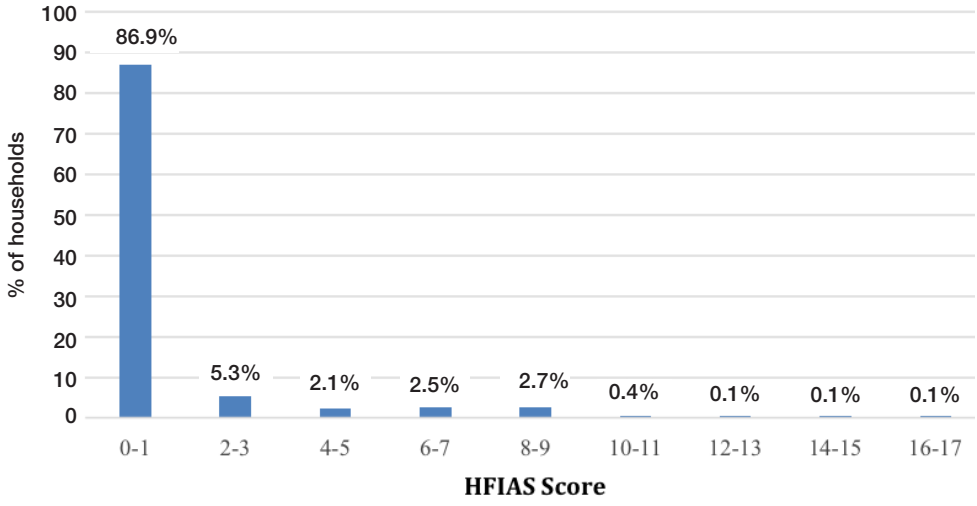
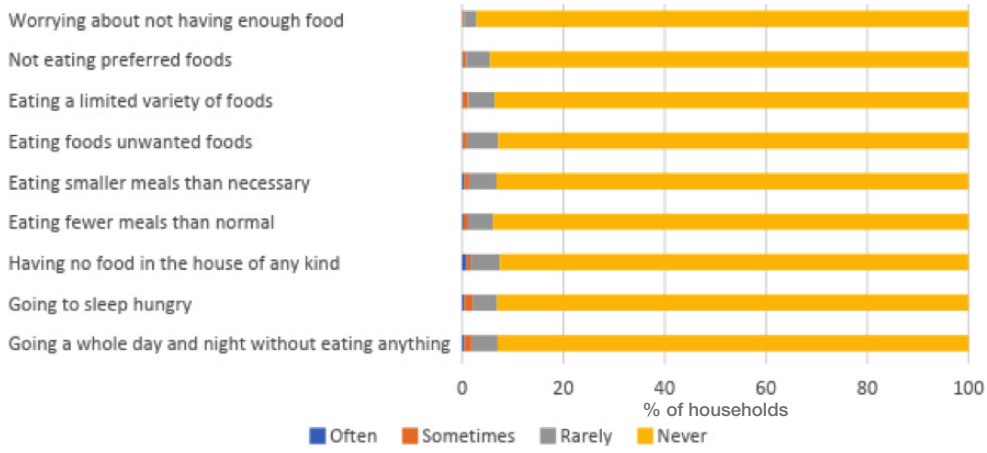
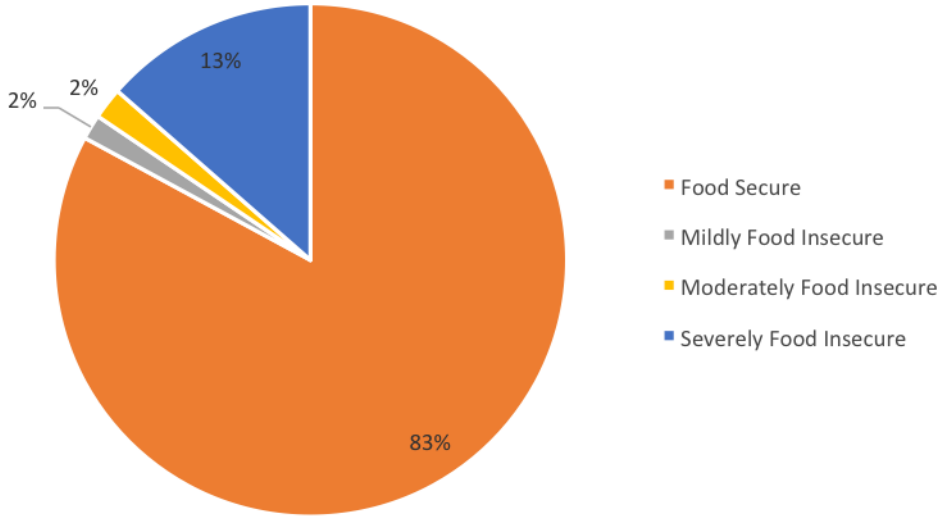


FIGURE 13: Responses to HFIAS Questions



The HFIAP indicator suggests that Bangalore has a highly food secure population overall (Figure 14). A total of 81% of the sampled households fell into the food secure category and only 13% were severely food insecure.

FIGURE 14: HFIAP Distribution



4.3. Levels of Dietary Diversity

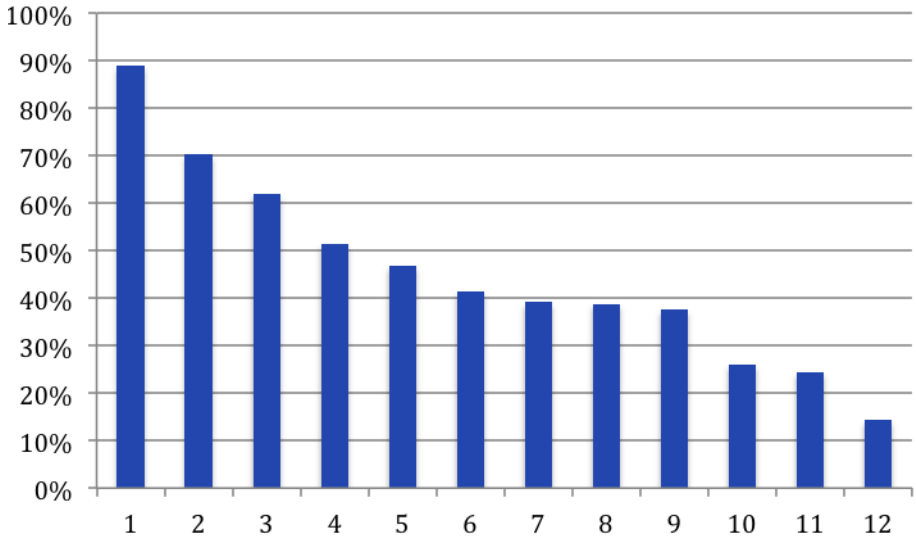
In contrast to the high levels of food security indicated by the HFIAS and HFIAP, the HDDS suggests that the sampled households have a much more varied dietary diversity. The average HDDS is 6.0, indicating that, on average, the households consumed foodstuffs from six out of 12 food groups in the 24 hours prior to the survey. However, as Table 7 indicates, 55% of the households have an HDDS of 5 or less and just over one-third have an HDDS of 4 or less. A score of 5 or less is generally considered to be inadequate nutritionally and associated with poor nutritional outcomes. At the other end of the scale, one-third of the households have HDDS scores of 7 or more.

TABLE 7: Distribution of Household Dietary Diversity Scores

HDDS	No.	%	Cumulative %
0	1	0.1	0.1
1	26	1.6	1.7
2	47	2.8	4.5
3	146	8.7	13.2
4	352	21.0	34.2
5	342	20.4	54.6
6	219	13.1	67.7
7	90	5.4	73.1
8	85	5.1	78.2
9	107	6.4	84.6
10	128	7.7	92.3
11	109	6.5	98.8
12	21	1.2	100.0
Total	1,673	100.0	

The core components of the diet of most households come from four food groups: cereals (consumed by 89% of households), vegetables (70%), sugar/jaggery/honey (62%), and foods made with oil/butter/ghee (51%) (Figure 15). All other food groups were consumed by less than 50% of the households.

FIGURE 15: Consumption of Different Food Groups



1	Cereal – rice, wheat, jowar, bajra, ragi, maize, barley, maida, suji, rawa, oats, others
2	Vegetables
3	Any sugar, jiggery, honey (including sugar in tea, coffee)
4	Any foods made with oil, butter, ghee
5	Any foods made from pulses – tur, arhar, urad, moong, masoor, gram, beans, peas, lentils, nuts, besan
6	Any foods such as condiments, coffee, tea
7	Any cheese, yoghurt, milk or other milk/dairy products like paneer
8	Fruit
9	Any potatoes, sweet potatoes, beetroots, carrots, other tubers, or any other foods made from them
10	Any beef, pork, lamb, goat, chicken, duck, other birds
11	Eggs
12	Any fresh fish, dried fish, shellfish

4.4. Food Security and Household Income

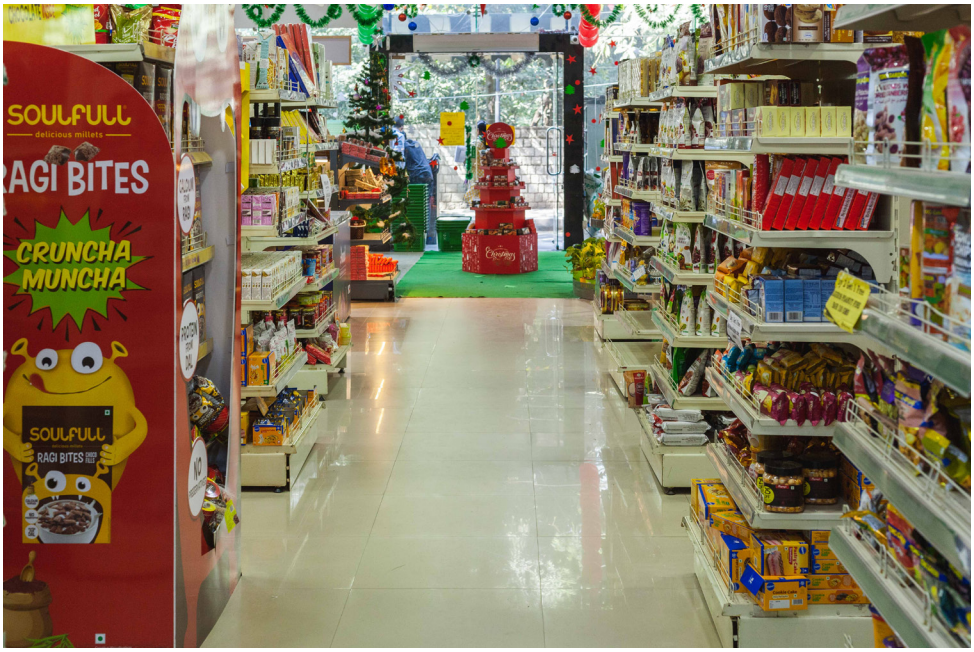
Household income can be cross-tabulated with food security scores to see if it affects food security and dietary diversity. The HFIAS shows a closer correlation with income than does the HDDS. As income increases, the HFIAS tends to fall relatively consistently. While households in the lowest income quintile clearly have the least diverse diets, dietary diversity for the other income groups is relatively similar.

TABLE 8: HDDS and HFIAS by Income Quintiles

Quintiles	Mean HFIAS	Mean HDDS
1	1.11	5.32
2	0.74	6.02
3	0.65	6.06
4	0.67	6.46
5	0.29	6.23

Food Retail Outlets in Bangalore

Snack cart



Supermarket

Bakery

Fruit vendor

Vegetable vendor

Kirana store

Meal cart

HOPCOMS store

5. Food Purchasing Behaviour

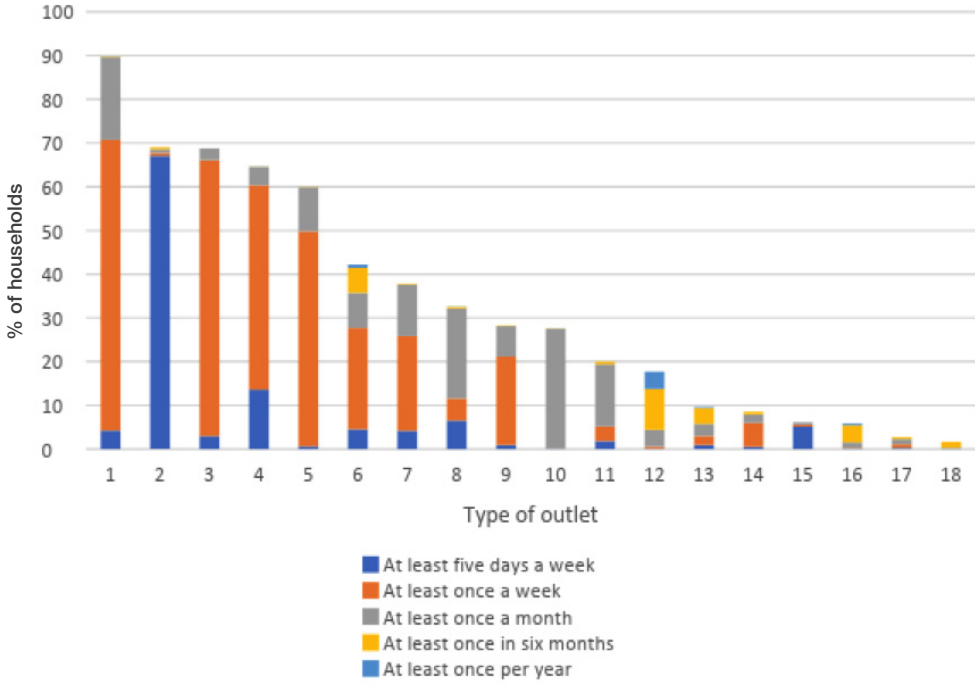
5.1. Major Sources of Food Patronage

There is a large variety of formal and informal food sources in Bangalore, and most households tend to patronize more than one type of outlet. Figure 16 details nearly 20 different sources of food, the proportion of households patronizing each outlet, and the frequency with which they do so. The most frequented food sources in the city are small neighbourhood kirana shops (90%), followed by dairy kiosks (69%), informal carts (68%), restaurants/cafés/bakeries (64%), and meat shops (60%). HOPCOMS (Horticultural Producers Co-operative Marketing and Processing Society) outlets are patronized by around 40% of households and street vendors, and Public Distribution Shops (PDS) by just less than one-third. HOPCOMS has a network of stores around the city selling vegetables and fruit at fixed prices. PDS outlets (also known as fair price or ration shops), sell commodities such as wheat, rice, and sugar at below market price. To be eligible to buy at a PDS, customers need a card showing that their household is below the poverty line.

The main city markets are patronized by around 20% of households. While the expansion of supermarkets in India has drawn considerable controversy, the survey found that only 20% of households shop for food at the major supermarket chains. While dairy kiosks are patronized on an almost daily basis, most other

outlets are frequented weekly. The major exceptions are PDS stores, small retail outlets, and supermarkets, where most households shop on a monthly basis. The number of households receiving food from relatives in rural areas or other urban areas is small.

FIGURE 16: Food Sources and Frequency of Patronage



1	Neighbourhood kirana store/small grain shops
2	Dairy kiosk
3	Informal vendor with hand-pushed cart
4	Restaurant/café/bakery
5	Meat shop (including fish, chicken, and red meat)
6	HOPCOMS
7	Street food from stall/vendor
8	Small retail outlet
9	Other street seller/trader/hawker
10	PDS shop
11	Supermarket
12	City market areas
13	Online shopping
14	Informal vendor with basket on head
15	Milk or curd delivery
16	Food sent by relatives in rural areas
17	Fast food/delivery
18	Food sent by relatives in urban areas
Note: Multiple-response question	

5.2. Food Item Purchasing Patterns

The Hungry Cities Food Purchases Matrix (HCFPM) provides insights into the purchasing of individual food items, including the number of households that purchased the item in the previous month, the major sources and their location, and the frequency of purchase (Crush and McCordic 2017). Table 9 shows the proportion of sampled households that had purchased 30 different food items. Over 90% of the households had purchased rice, milk, edible oil, and salt or sugar. Over 80% had purchased vegetables, tea/coffee, and spices. Over two-thirds had bought wheat, fruit, yoghurt, and rava. And over one-third had purchased snacks/nam keen, juices/aerated drinks, eggs, pickles, red and white meat, ghee/butter, and ragi. The consumption of various processed foods was generally much lower. A number of features of household purchasing patterns are also evident from Table 9:

- Households tend to shop for food items at more than one type of outlet, but with most products one type of outlet commands the most buyers.
- Virtually all items on the list are available at small retail outlets and kirana stores, but the latter are the dominant place of purchase for half of the items on the list (see shaded cells that represent items purchased by more than 50% of households from a source).
- Every item on the list is available at supermarkets but they command no more than 20% of the market for most products and are not the main source for any of the items.
- Neither supermarkets nor small retail outlets have more than 50% of the market for any one product.
- HOPCOMS/dairy outlets are where most households purchase their milk and yoghurt.
- Informal street sellers dominate the sale of fresh fruit and vegetables.
- Just over one-quarter of households purchased vegetables at the city markets, which are the major source of red and white meat purchase.

The majority of households purchase food both within the neighbourhood and outside it (1-5km away) (Table 10). Around 40% of the items in the HCFPM are primarily purchased within walking distance of the home (Table 10). Dairy products (milk, yoghurt and butter) and eggs are bought almost exclusively in the neighbourhood. Many non-perishables are primarily purchased at more distant outlets, which would generally involve some form of public or private transportation. Vegetables are purchased both within the neighbourhood and further away, which is primarily a function of household proximity to city markets and street sellers. A smaller number of households buy most of the products on the way to and from work. However, the proportion that buy fruit, vegetables, and snacks at these locations is higher.

TABLE 9: Food Purchases by Food Source

	% households purchasing food	% of households purchasing each food at each source								
		Supermarket	Small retail outlet	Kirana store	Butchery/ bakery	Local/city market	Restaurant/ take-away	PDS stores	HOPCOMS/ dairy outlets	Street seller/trader
Rice	97.6	17.6	25.7	60.6	0.1	0.8	-	26.5	0.3	-
Milk	95.3	2.5	4.5	17.6	13.5	-	-	0.1	72.1	0.5
Edible oil	92.8	15.4	24.4	65.9	0.1	0.8	-	22.6	0.4	-
Salt/sugar	92.2	15.2	25.2	69.8	-	1.3	-	23.7	0.1	-
Fresh vegetables	88.5	6.8	13.2	37.6	0.1	28.0	-	-	7.0	71.9
Tea/coffee	86.5	12.4	23.4	75.6	3.3	0.6	0.6	-	-	-
Spices	86.8	15.2	25.2	77.8	-	2.0	0.1	0.2	0.1	-
Wheat	77.2	18.1	25.8	51.8	-	0.8	-	28.4	0.2	-
Fresh fruit	77.1	7.5	11.2	10.8	0.3	20.7	-	0.1	41.4	54.8
Yoghurt	75.9	3.1	6.5	15.3	13.9	0.2	-	0.2	69.6	0.5
Rava	69.6	17.0	28.3	61.6	-	1.4	-	-	-	0.1
Snacks/ nam keen	57.5	9.7	11.5	50.1	70.8	0.1	-	0.2	0.2	-
Juices/aerated drinks	53.6	14.3	16.3	8.4	83.3	0.4	1.0	-	0.1	-
Eggs	51.8	4.5	12.6	91.8	0.6	-	-	-	0.2	0.1
Pickles/ chutney	43.8	16.6	29.4	59.7	0.4	0.5	-	-	-	0.1
Red meat	39.5	2.4	10.1	7.3	7.9	68.0	0.2	-	0.2	6.6
Ghee/ butter	39.4	15.5	23.1	35.5	4.2	1.3	-	0.2	31.9	0.5
White meat	38.2	1.4	4.5	7.7	5.5	81.4	0.6	-	0	1.9
Ragi	37.1	13.5	22.5	67.8	0.2	2.1	0.2	9.8	-	-
Broken rice	31.2	17.6	33.6	54.5	-	2.1	-	0.6	-	-
Sweets/ chocolate	28.5	8.3	8.9	46.0	75.7	0.6	4.5	-	0.2	-
Dried fruit	17.8	20.1	32.3	41.3	0.7	1.0	-	-	3.3	7.3
Imported food	14.5	0.4	0.4	-	0.4	0.4	46.8	0.4	-	67.1
Jam/ ketchup/sauce	11.1	36.5	48.7	22.8	1.1	4.2	5.8	-	-	0.5
Honey/ jaggery	10.4	27.3	36.9	50.6	1.1	2.8	-	-	0.6	-
Breakfast cereals	8.1	16.7	24.6	58.7	-	7.3	2.9	0.7	-	2.9
Jowar/bajra	7.7	30.5	41.2	58.8	-	0.8	0.8	-	-	-
Tinned vegetables	7.3	11.3	40.3	19.4	-	4.0	-	-	11.3	36.3
Cheese/ paneer	5.5	38.7	46.2	25.8	3.2	1.1	4.3	-	4.3	1.1
Tinned fruit	5.0	10.6	31.8	17.7	8.2	2.4	-	-	16.5	35.3

Note: Multiple-response question

TABLE 10: Food Purchases by Location of Food Source

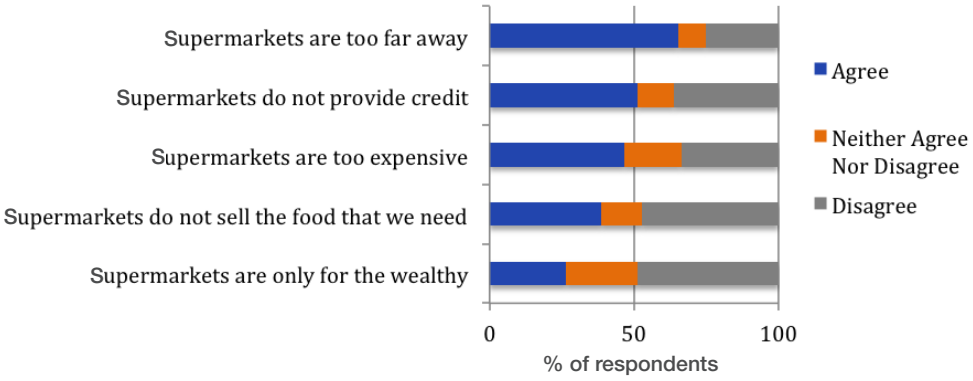
	% of households purchasing each food at each location				
	In my neighbourhood (within walking distance)	On road to or from work	1-5 km from home or work	>5 km from home or work	Outside the city
Rice	47.1	10.9	53.5	6.3	0.4
Milk	82.8	12.8	9.8	0.3	-
Edible oil	48.7	11.8	53.7	6.1	0.4
Salt/sugar	50.2	13.3	53.8	6.1	0.3
Fresh vegetables	51.5	34.6	55.6	2.9	0.1
Tea/coffee	53.2	12.6	44.5	5.1	-
Spices	54.3	11.0	45.1	6.0	0.3
Wheat	44.1	11.5	53.1	5.4	0.5
Fresh fruit	33.3	45.4	54.8	2.1	0.2
Yoghurt	80.9	13.1	9.9	0.3	-
Rava	44.3	9.4	44.3	6.1	0.4
Snacks/ nam keen	58.3	40.9	36.1	2.4	0.2
Eggs	69.7	13.3	21.3	0.7	-
Juices/aerated drinks	41.3	30.8	48.8	3.4	0.2
Pickles/ chutney	38.7	8.2	49.1	6.9	0.5
Red meat	40.1	13.7	45.3	1.5	0.2
Ghee/butter	52.4	11.9	40.3	4.0	0.5
White meat	23.4	19.7	56.2	0.9	-
Ragi	49.1	12.5	39.9	3.7	0.5
Broken rice	43.2	4.2	53.6	4.0	0.4
Sweets/ chocolate	50.9	33.4	44.5	1.9	-
Dried fruit	26.1	10.6	58.4	8.3	-
Imported food purchases	5.3	26.0	68.3	7.3	-
Jam/ketchup/ sauce	35.5	8.5	64.6	5.3	-
Honey/ jaggery	47.2	8.5	51.7	4.0	-
Breakfast cereals	64.5	8.0	28.3	2.2	1.5
Jowar/bajra	58.0	10.7	35.9	4.6	-
Tinned vegetables	64.5	17.7	27.4	2.4	-
Cheese/ paneer	43.0	14.0	51.6	7.5	-
Tinned fruit	63.5	12.9	25.9	-	1.2

Note: Multiple-response question

5.3. Attitudes to Supermarkets

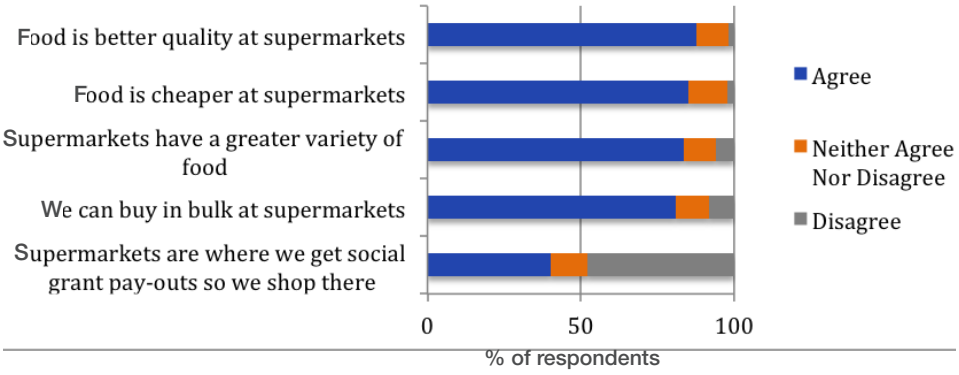
While supermarket expansion in India has been a source of controversy, it is noteworthy that supermarkets are not the major source of food for the surveyed households in Bangalore. The survey sought to gain insights into the attitudes of consumers and asked those who do not use supermarkets the reasons for this. The main reason given was that supermarkets are too far away (a statement with which over 60% agreed) (Figure 17). About half found it problematic that supermarkets do not provide credit and just over 40% found them too expensive to shop at. Other reasons, such as the perception that supermarkets do not stock the right food or are only for the wealthy, were less important.

FIGURE 17: Perceptions of Supermarkets by Non-Patrons



About one-quarter of households shop regularly at supermarkets, most on a monthly basis. These consumers were asked why they patronize these outlets. Most agreed that supermarkets offer greater variety, that food is cheaper and better quality, and that supermarkets provide the opportunity to buy in bulk.

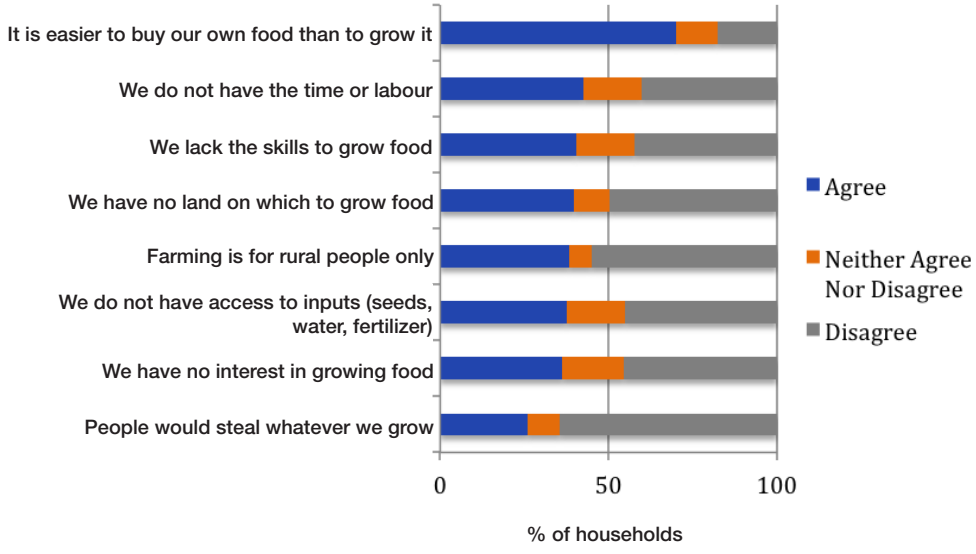
FIGURE 18: Perceptions of Supermarkets by Patrons



5.4. Urban Agriculture

Urban agriculture is extremely rare in Bangalore. Only six households (0.4%) said that they grew any of their own food in the city. Figure 19 suggests why Bangalore residents are uninterested in growing their own food. The main reason (in terms of levels of agreement) was that it is easier to buy food than grow it (70% agreed). Around 40% agreed with most of the other reasons, including lack of land, skills, inputs, time, and labour. Potential theft of produce was the only relatively unimportant reason.

FIGURE 19: Reasons for Not Growing Own Food



5.5. Informal Food Transfers

Food transfers from outside the city through non-market channels were also relatively rare. A few households receive informal food transfers from other households (Figure 15). The most common source is relatives in rural areas, received by 8% of households in total and more than half of transfer-receiving households. Almost all transfer-receiving households use the food to consume rather than to sell or give away. The most common type of food received through food transfers was grains and cereals, followed by fruit.

6. Conclusion

The important role of the small-scale food sector in Bangalore's food system is a major issue to emerge from this household survey. However, the organization and functioning of these critical elements is not well understood. Nor are the broader local, regional, and international supply chains that link them to suppliers and producers. The opportunities offered for inclusive growth in a transforming food system need particular attention. The HCP is therefore building on this report's findings by examining the functioning and role of food vendors and markets in Bangalore's food system.

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This is the first large-scale survey of household food security in Bangalore and aims to provide researchers and policy-makers with detailed data and information about food security in Bangalore, as well as insights into the city's food system. The survey found very low levels of food insecurity in Bangalore in terms of the availability and accessibility of food. However, the quality of diet varied considerably, with the household dietary diversity scores indicating that on average the households consumed foodstuffs from only six out of 12 food groups. The survey also provides important insights into the food purchasing behaviour of Bangalore households, including that the most frequented food sources in the city are small neighbourhood kirana shops, followed by dairy kiosks, informal carts, restaurants/cafés/bakeries, and meat shops. While there has been considerable controversy about the expansion of supermarkets in India, only 20% of the surveyed households shop for food at the major supermarket chains. Researchers found that small food outlets and informal vendors in markets and on the streets play a critical role in Bangalore's food system and in ensuring the low levels of household food insecurity found in the city.