



Consumers' health and food safety perceptions in the Dhaka metropolitan area

Harriëtte M. Snoek, Haki Pamuk, Ireen Raaijmakers, Valerie C.J. Janssen, Kulsum Begum Chowdhury, Mahsina Syeda Akter, and Siet J. Sijtsema



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Colophon

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Summary

The aims of the consumer study were to receive more insights in the local buying, handling and consumption behaviour as well as consumer food safety and health perceptions. And to investigate how demographics and socio-psychological determinants relate to buying and consumption behaviour, including the influence of COVID-19 crisis. And finally, to test the differences between household income groups (low income poor, low-middle poor, and middle class and above) and the four Dhaka metropolitan areas (DMA) in buying and eating behaviour. In chapter 1 the objective of the study is explained and in chapter 2, relevant literature is summarized.

A mixed method was used that combined qualitative and quantitative data collection, see chapter 2 for more details on the data collection methods. Survey data were collected from a large sample of 2027 adults and 299 adolescents via phone interview (see Figure 1). A total of 32 focus group discussion were held, including 192 respondents, both men and women (in separate groups). For both data collections all city corporations (CCs) of the Dhaka metropolitan area were included: North Dhaka CC, South Dhaka CC, Gazipur CC, and Narayanganj CC. The focus on the study was on consumers with a low income (on

average under the poverty threshold) and high food insecurity (98.8% in the low-income group) but also middle and high income were included in the survey. Since data were collected during the COVID-19 crisis, questions were included on the degree of impact of the crisis on respondent's situation, income, and food intake.

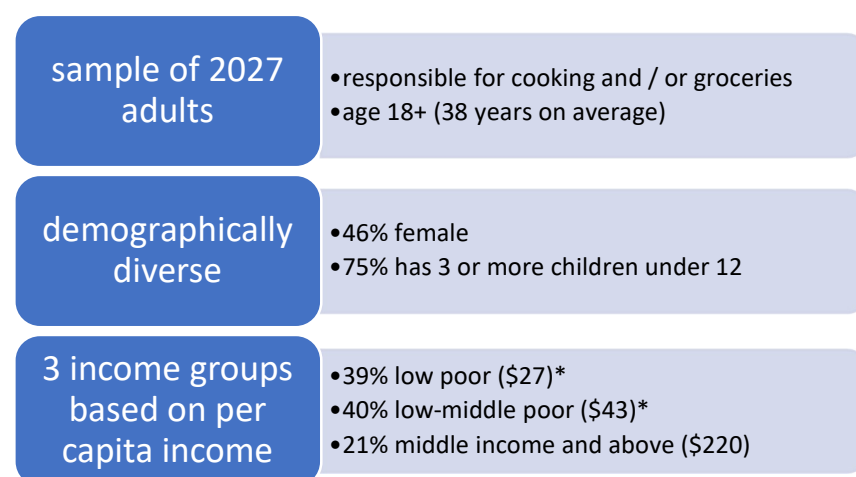


Figure 1: description of the adult sample, * below poverty threshold

In chapter 4, the results on food purchase and expenditure are presented. On average 52% of the income was spend on food. Wet markets were the main outlets to purchase all food groups for all income groups (see Figure 2). Neighbourhood stores were visited by consumers especially to purchase dry goods and also vegetables, and eggs. Mobile door to door vendor was another important outlet to purchase vegetables. The higher income group went less frequent to outlets to purchase food.

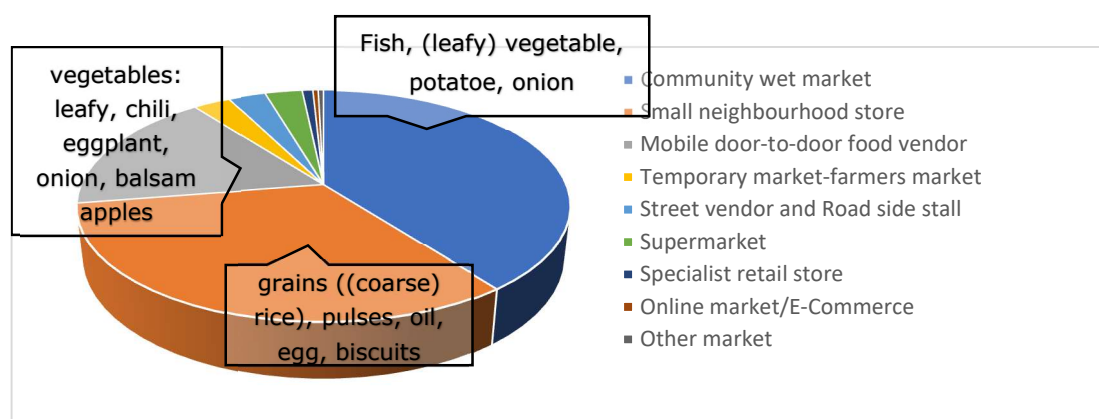


Figure 2: number of households visiting an outlet and foods mainly bought at that outlet

The intake of protein rich foods (except pulses) and fruit was much lower for the consumers from the lower income group compared to other income groups. Green leafy vegetables were consumed less than half of the days and less frequent than other vegetables but intake frequency not differs between income groups. Low income consumers ate dried fish more often compared to other income groups while big fish were eaten less often by consumers from the low-income group. Home gardening practices such as growing crops or to keep animal was not common among household and increased by income level as high-income household have better access to land than low-income families. Out of home consumption of food is equally common among households from different income groups; on average 12 days per month. The most frequently patronized outlet were formal medium-small sized restaurants (in Bangladesh also named "hotels"). Compared to poor households, middle income and above households ate more often at big formal restaurants and fast food outlets and less often from street vendors, or roadside stalls.

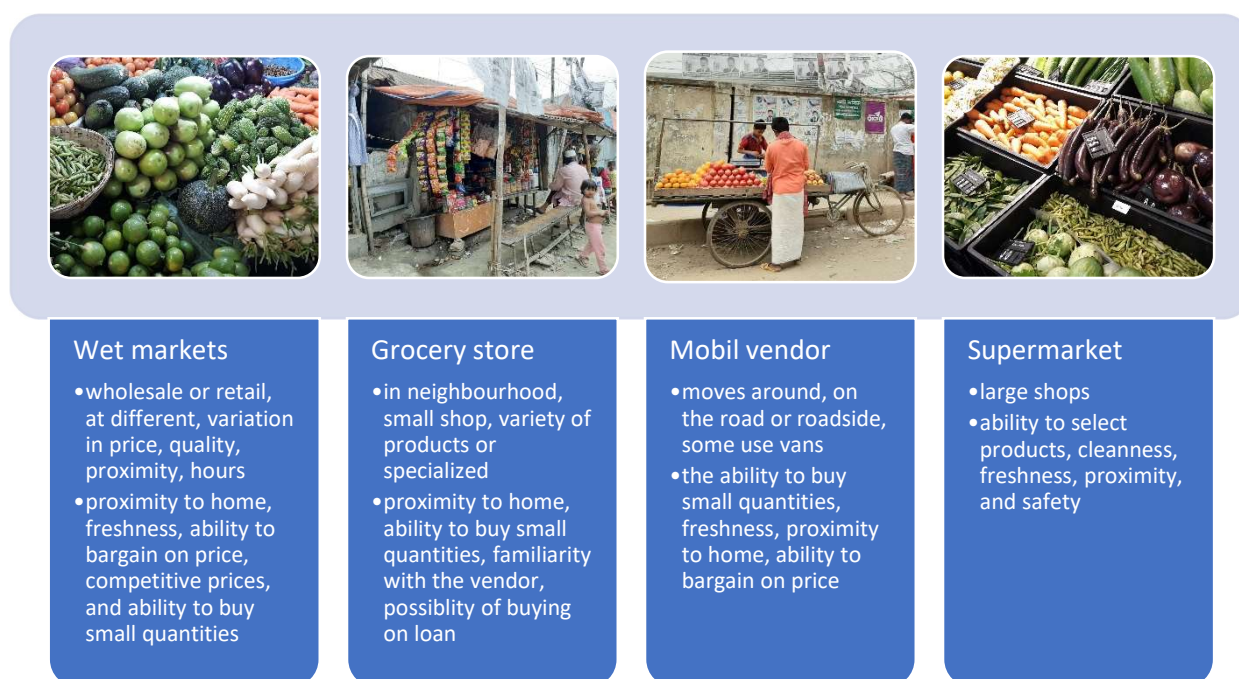


Figure 3. Description of the main outlets and reasons to buy from this outlet.

In chapter 5, the results on consumer motives for food choice are presented. The choice for an outlet mainly depended on price and proximity (see Figure 3). Consumers with low incomes were also driven by moment of the day, they can buy food at the end of a working day when they have money and prices are lower in the evening. Additional to proximity and price, consumers said they go to wet markets because

of availability (always available and larger choice) and freshness. Grocery stores were frequented especially for their proximity, convenience, ability to buy small quantities and buy on loan. For roadside stalls, ability to buy small quantities and freshness were important additional to convenient location. Consumers with low incomes were also strongly restricted by money in their choice for food and food outlets. For some, food is an issue of survival, they do not have much choice and it is crucial that food provides energy. Price was also related to quality by some consumer: the more expensive the better whereas others like what they can afford. Health and food safety were also two of the major drivers for consumers' food choices, together with price, convenience, and sensory appeal.

In chapter 6, results on consumer health and food safety perceptions are presented. Consumers mentioned food contaminations, adulterations, and fraudulent practices as their main concerns of food safety; all food groups were reported to be affected by adulterations. Also, respondents reported food to be of bad quality and not fresh. For health, most perceptions were related to a healthy body, functioning of the body, strength and energy and nutritional content. Money is a problem, consumer with a low income feel that healthier and safer food are more expensive and not affordable for them. The source of food is also important, both for health and safety perceptions respondents mentioned home grown, local breeds, and local production to be better. The specific aspects that respondents related to food safety and to health differed between consumers. The figures 4 and 5 give an overview of all aspects.

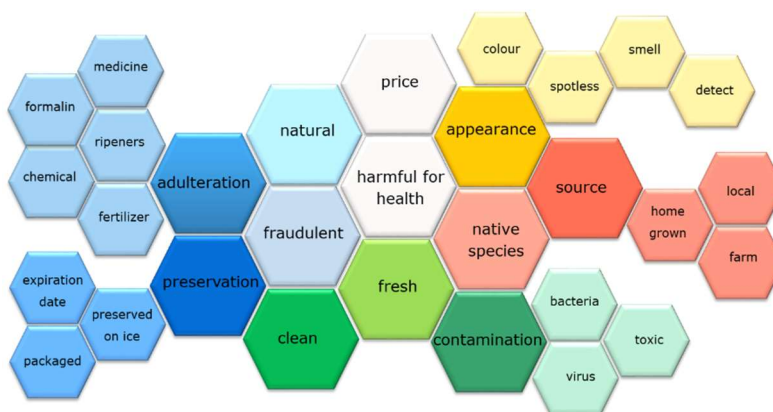


Figure 4. Aspects related to safety of food by consumers

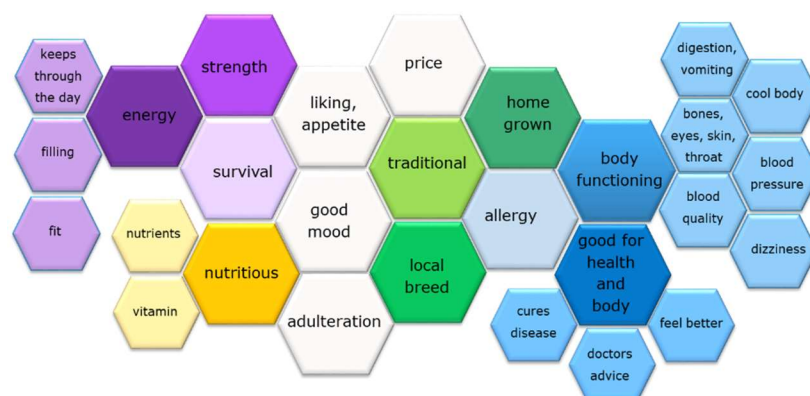


Figure 5. Aspects related to healthiness of food by consumers

All consumers have food safety concerns but their reactions to the situation differ and seem to be related also to personal coping strategies: *submit* to the fact that there are no safe foods, *anger* about their weak position and the fraudulent sellers, *critically inspect* the foods they buy and the packaging, and also *consider the source* of production (including home grown, animal feed), *choice of safe foods* that are less often / not adulterated especially traditional Bengali foods such as lentils and local varieties.

Also, the safety perceptions of out of home food was low and out of home food was also mentioned as one of the major perceived causes of suffering from diarrhoea. Vomiting and diarrhoea due to food contamination was reported more often by consumers from the lower income group. Consumer with higher income levels rated health and food safety as more important than those from the lower income groups and felt more confident that they could purchase, prepare and consume healthy and safe foods, also food safety and health were considered more important in their food choice.

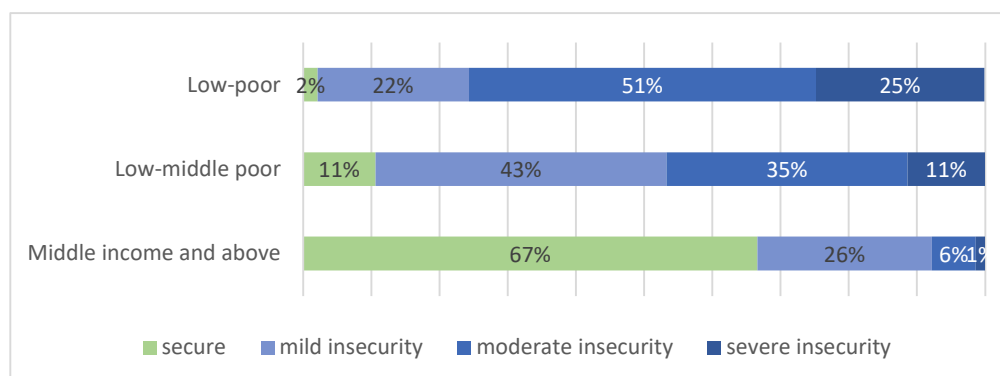


Figure 6. Percentage of respondents by level of food insecurity per income

In chapter 7, results on the influence of COVID-19 on food purchase, intake and security are presented. During the time of the data collection, August 2020, the COVID crisis influenced daily life and food purchase in several ways. Food insecurity was very high in our sample, especially in the lower income groups (see Figure 6).

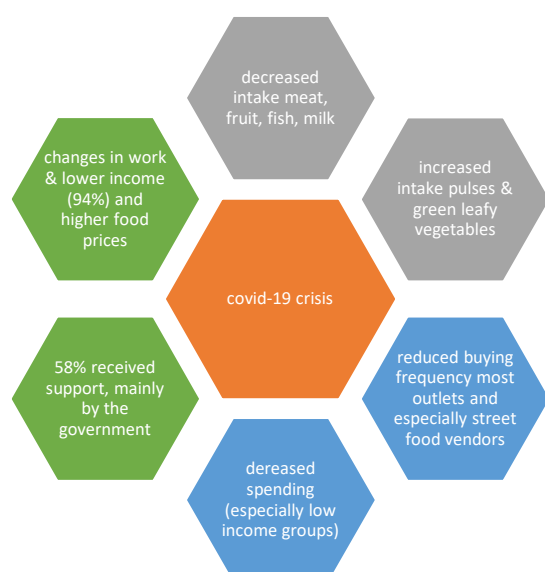


Figure 7. Impact of the COVID-19 crisis

In chapter 8, the results from the adolescent survey are presented.

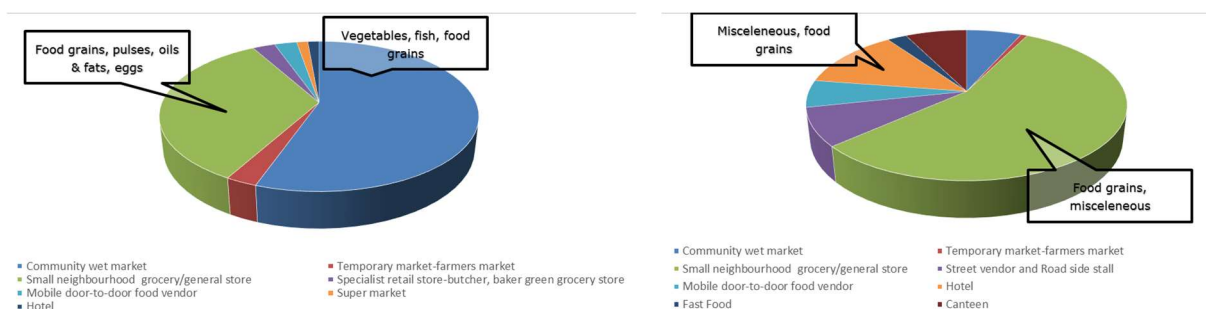
- There were differences between adolescents in involvement with cooking and food purchase with a quarter being involved almost daily, while other are never involved or several times per week. Adolescents were more likely to be involved in food preparation or cooking than in the decision making process on what to buy and cook.
- All adolescents consumed products from the food group *staple* foods and *vegetables* and almost 9 out of 10 consumed products out of the *animal origin protein* group. Within the animal origin group fish and seafoods and eggs were consumed most frequently. Also, white roots/tubers, legumes, and dark green leafy vegetables were regularly consumed. Compared to adults, the intake of fruit was higher. Consumption of

vitamin A rich fruits and vegetables was low.

- Almost all adolescents, indicated to consume fish usually. Interesting is that when big and small fish were consumed in the past week, they were more likely to be consumed on more than one moment on that consumption day, this was not the case for dried fish. Adolescents were not a fan of dried fish in comparison with big and small fish.
- Popular outlets for adolescents when they were buying food for themselves were the small neighbourhood store followed by a formal medium-small sized restaurant, while the community wet market was by far the most popular place when they were buying food for their household.
- When buying food for themselves adolescents mainly buy products from the groups *food grains* and *miscellaneous* (see Figure 7). Interesting is that they seem to have a preference for specific products at a specific outlet. For example they were more likely to buy chips at the small

neighbourhood store, puri, chola makha and parota at the formal medium-small sized restaurant and tea with sugar at the street vendor or road side stall.

- when buying food for their households adolescents seem to buy products from all food categories (vegetables, food grains and fish) that contribute to dishes (see Figure 8).



- On food choice motives, adolescents scored quite similar to their parents, adolescents seem to perceive safe as more important than adults and health equally important. Adults seem to perceive price to be more important than adolescents. Similar to the adults, adolescents perceive rice and pulses to be most safe and milk, fish and fruits to be somewhat less safe in comparison with the other food products/categories. Foods consumed outside home were perceived as least safe. Adolescents also seemed to perceive plant based proteins and vegetables (both the leafy as the other vegetables) to be more healthy than animal based proteins.

Main outcomes and implications are discussed in chapter 9. Based on the results some suggestions for interventions can be made:

- Consumer awareness campaigns on the point of purchase tailored at consumer motives, perceptions of health and safety, and coping strategies. Focus on main outlets and foods for the urban poor.
- Tailor wet markets to the poor by: 1. increasing quality and hygiene without compromising on price, 2. increasing shelf-life fresh products by looking for cheaper cold storage options on wet markets and/or community storage opportunities. Keep a good quality at the end of the day when many urban poor do their shopping.
- Consider specific interventions for the urban poor. The results of the Dhaka consumer study show the vulnerability of the urban poor with low consumption levels of energy dense foods, high food insecurity and part of the consumers relies on monetary and food support. Consumer campaigns and improving the food availability by chain interventions and market interventions might not be sufficient to enable them to buy an adequate healthy and safe diet.
- Supply chain interventions to improve freshness of food that are commonly consumed by the urban poor. Determine the most preferred cheap food products (e.g., animal sourced foods, fruit and vegetable, pulses) and focus on the value chains of those products to improve food safety.

Increase availability of fresh products such as vegetables, fruits and animal sourced foods in neighbourhood stores. For example by access to cold storage, better linkages with fresh food market, and vendor training on daily supply chain management. This outlet has however clear advantages over wet markets (the proximity, the known seller and possibility to buy on loan) and a potential to increase access to fresh products.



Study objective and research questions

1 Study objective and research questions

The overall aim of the project is to contribute to the development of a safe, sustainable and resilient food system for the Dhaka Metropolitan Area (DMA) through an iterative action learning approach. Key output is the development of an appropriate food agenda for the DMA that supports the government of Bangladesh. On one hand it will build urban food planning capacity and skills, while it will also explore policy options to improve access to and distribution of safe, healthy and nutritious food within the DMA, reduce urban food waste and encourage consumers to make more informed food choices. This report encompasses results of the consumer study as part of the food system approach applied to develop the food agenda for the DMA.

The objective of the consumer study is twofold: (1) To receive insights in the buying, handling and consumption behaviour of urban Bangladeshi and their perceived food safety issues regarding specific product groups, and (2) to identify entry points/issues for the design of the intervention that aims to influence food choices of these specific product groups by creating consumer awareness of urban residents living in DMA. Additionally, since data was collected during the COVID-19 pandemic and lock-down, we also aimed to check the influence of the COVID-19 situation on food intake and purchase patterns. The specific aims of the consumer study are:

1. To receive more insights in the local buying, handling and consumption behaviour of the targeted product groups in household income groups
2. To receive insights in the perceived food safety issues of the targeted product groups
3. To investigate how demographics and socio-psychological determinants of buying, handling and consumption behaviour of these targeted product groups are related with its buying, handling and consumption behaviour.
4. To investigate the differences between household income groups (low income poor, low-middle poor, and middle class and above) and the four DMA corporations in their local buying, handling and consumption behaviour and perceived food safety issues of these targeted product groups.
5. To investigate how consumers perceive the influence of COVID-19 crisis on their buying and eating behaviour.

The following research questions are formulated:

1. What are the local buying, handling and consumption behaviours of the targeted products groups of urban Bangladeshi living in MDA, differentiated to 3 household income groups?
 - a) Who makes the decision to buy?
 - b) Where, when, how and how often are the targeted food products bought, handled, consumed?
 - c) Household expenditure on food in total?
2. How is the local buying, handling and consumption behaviour of the targeted product groups related to demographics and socio-psychological determinants?
 - a) What are the perceived motives and barriers for buying, handling and consuming the targeted product groups?
 - b) What is the perceived food safety for food in general and for the targeted product groups?
3. What are the similarities and differences between the different income groups?
4. What are the similarities and differences between the 4 DMA corporations?
5. How does COVID-19 crisis change the local food purchase, handling, and consumption behaviour?
 - o How has COVID-19 altered food safety perceptions of urban consumers?
 - o How has food intake and availability of selected groups been changed after COVID-19 crisis?



Theoretical background

2 Literature background

2.1 Current situation in terms of health and food intake

2.1.1 Nutritional status

Among the Bangladeshi population, 22% children are born with low birth weight (LBW), over a third of children suffer from protein energy malnutrition: stunting 41%; wasting 16% and underweight 36%. Common deficiencies are energy, iron, vitamin A, iodine, and zinc deficiency. Just over a fourth of women have chronic energy deficiency and half of them are deficient in zinc and iodine. In Bangladesh anaemia (Iron deficiency) is common among all age groups and both sexes, especially children and women (pregnant and non-pregnant), overall anaemia seemed to be declining (Nahar, 2013).

At the same time recent evidence from the non-communicable disease risk factor survey Bangladesh 2010 (WHO, 2011) has shown that 17.6% of the Bangladeshi population are overweight and obese and noticed that urban population (25.1%) are more prone than rural population (10.2%). About 8.4 million people are reportedly suffering from diabetes mellitus (Nahar et al., 2013).

2.1.2 Diet and food consumption

The last conducted National Food Consumption Survey in Bangladesh was in 1995/1996. A new National Food Consumption Survey is expected to be implemented soon to provide more recent data. Most studies in the field of nutrition and food intake used the Household Income and Expenditure Survey (HIES) from 2000, 2005 and/or 2010. The most recent HIES is from 2016. The Bangladesh Integrated Household Survey also included data on food intake in its survey. The HIES includes data on consumption of the major food items (in grams) per year, between rural and urban areas, and between poor and non-poor households are included. Special attention has been paid to protein intake (Bangladesh Bureau of Statistics, 2017a).

In a recent study Waid et al. (2018) assessed the dietary change in Bangladesh using FAO balance sheets and the HIES. For the fulfilment of macro- and micro-nutrient requirements, 50g of pulses, 130g of animal products (fish, meat, eggs), 100 g leafy vegetables, 200 g non leafy vegetables, 100g seasonal fruits and 130ml of milk or milk products have been proposed (Nahar, 2013). To make sure that the standard units were comparable, Waid et al. (2018) converted each individual in a household into his/her Adult Male Equivalent (EMA) based on average energy requirements and divided the food items consumed in a household by the AME sum of the household. In this way it was possible to compare Bangladeshi intake data with desirable dietary patterns for the different major food groups. The analysis showed that 2 out of 12 included food groups are consumed in sufficient amount: starches and spices. Deviations from the recommendations was highest for eggs (22% consumption of the recommendation), pulses (31%), milk (31%), and fruit (38%). Also, meat (55%), vegetables (61%), fish (70%), sweets (76%) and oil (87%) were consumed in lower amounts than the recommendations.

In addition, large differences were found between urban/rural and the different income groups. All food items seem to be consumed in larger amounts and/or portion sizes in urban areas than in rural areas, except for rice and miscellaneous foods. Interesting is that the total calorie intake in rural areas is higher than in urban areas (2240 kcal vs 2130 kcal in 2016). Especially fruits and out-of-home consumption was higher for urban populations, though fruit intake was still below recommended levels. When comparing income groups, all food items seem to be consumed in larger amounts and/or portion sizes in non-poor households compared to poor household, except for rice. The consumption of vegetables, and meat products are especially higher for the non-poor households.

2.1.3 Consumption of specific food groups

In their study Waid et al. (2018) also looked into the different food products within the major food groups. **Fish.** Different fish species are consumed in Bangladesh. The HIES data revealed that the consumption of

fish species has changed over time. The consumption levels of the national fish of Bangladesh, *Hilsa fish*, is drastically declined over the years. This decline is among both the poor and the rich and in rural areas. In urban areas the consumption lowered but is stable for the last 10 years. The consumption of “other fish” (i.e. common carp, *Pangas fish*) strongly increased.

Eggs, milk & Meat. Large differences in the quantity of the consumption of animal-based protein sources are found between the poor and rich. The poor mainly uses liquid milk as a source for animal proteins, while the rich have a larger variety of protein. The consumption of liquid milk stayed stable, while the consumption of poultry seemed to have slightly increased over the last 5 years among the poor.

Fruits and vegetables. The variety of vegetables consumed stayed rather similar over the time. Leafy vegetables are in the top of most eaten vegetable types. When looking at fruit, the consumption of mangoes, guava/apple/pear and other fruits increased. Large differences are found between the poor and rich. The poor consume less fruits, the most eaten fruit are mangoes. Onions are considered as spices rather than vegetables (Nahar, 2013)

Pulses. The consumption of pulses decreased drastically over the last years, especially *Khesari dal*. Differences in consumption amounts are found between the poor and rich. The poor consume less *Masur dal* and seem to consume slightly more *Khesari dal*. The consumption variety in pulses also differs between rural and urban areas. In Urban areas the consumption of *Masur Dal* is higher than in rural areas.

2.1.4 Out of home and street food consumption

In Dhaka the term “street food” is considered as being foods or beverages that are sold basically by informal sector small entrepreneurs (Islam, 2017). Street foods are sold from stands or stalls (usually no permanent structures) on the footpath of busy streets in Dhaka. The variety of street foods is large and ranging from snacks (sweets, different types of fries, vegetables, foods and drinks), but also cooked foods including dishes (Islam, 2017). The street foods are mostly prepared and processed manually and sold to the public at carious lorry terminals, by the roadside or by itinerant vendors (Mamunm, Rahman & Turin, 2013). The NaDhaLi study states that in Dhaka, street food vending is an important aspect of urban food security. More than half of the city’s population buy street food every day but due to poor hygiene conditions, food safety and public health are often compromised. Street food reflects a specific street culture that enriches urban life, even though street vendors’ appropriation of public space often evokes conflict because street food vending is illegal in Dhaka (NaDhaLi study). Especially people from poor & lower class eat street foods (Islam, 2017). Students, youth, street people, day labourer rickshaw puller, hawker, vendor etc. These people cannot afford to go to a restaurant during break time.

One of the aims in the study of Islam and colleagues (2017) was to investigate the reasons for eating street foods by people of Dhaka city (dwellers/street food lovers). Of street food habits there are three factors underlying the motives : Pleasure and soundness, convenience and variety, cost and attractiveness. Nutritional value on the other hand did not significantly influence the street food habits (Islam, 2017). The results of the NaDhaLi study show that some consumers eat street foods more than once a day. Especially rice is consumed often, also pre-prepared foods are bought since in the slums consumers are not always able to cook or cannot afford gas (NaDhaLi study). In total 13 percent of the food consumed within the household was purchased from restaurants and food service outlets. Low income households ate out more often than higher income households, but high-income households spend significantly more. The most common outlet to buy pre-prepared food was restaurant or formal medium-small sized restaurant (86%), also fast-food restaurants and Chinese/Thai were mentioned. The majority of that food (61%) was eaten on the premises, with some 31 percent purchased for consumption at home and a further 7 percent purchased for consumption elsewhere. Also, Khondoker and colleagues (2017) aimed to examine the factors affecting a Bangladeshi household’s decision to consume foods away from home (FAFH). They found that in general, the more affluent and higher educated urban households are spending proportionately less on FAFH. Consumers in Dhaka, Rasjhahi, and Sylhet are less likely to consume and spend on FAFH which might be attributable to the fact that consumers in Dhaka are more affluent and more aware of the food quality. Next, it might be economically for an urban household to prepare hygienic food in their home. The likelihood of consuming

FAFH increases with household size: when household sizes increases, they are more likely to consume FAFH, however they spend less of their food expenditure on FAFH so cheaper options are bought. Interestingly also is a study of Khairuzzaman and colleagues (2014) that shows that in Dhaka due to its rapid urbanisation there is a need for relatively inexpensive and ready-to-eat foods as many urban residents spend most of the day outside the house and have little time and money to spend on the food. The number of street food vendor is increasing

2.1.5 Summary of main dietary issues

In summary, undernourishment is common in Bangladesh as well as obesity and related health issues. Large differences were found between poor and non-poor household with lower intake of all food groups and total energy for the poor. Studies on nutritional status show that common deficiencies are energy, iron, vitamin A, iodine, and zinc deficiency. When analysed at the level of food groups, the deviations from the recommendations was highest for eggs, pulses, milk, and fruit. With a lower deviation also meat, vegetables, fish, and sweets and oil were consumed in lower amounts than the recommendations. For vegetables a focus on green leafy vegetables (GLVs) seems rational since these are one of the most used vegetable types by the poor. Also, GLVS have a high potential due to their high content of micronutrients. For example, Indian spinach is a key food for the intake of folic acid, vit A, vit C, vit B2, magnesium, and sodium and among the key foods for fibre. Increasing the intake of fruits might also provide health benefits since the consumption of fruits is very low among the urban poor. However, the low intake also shows that consumption of fruits must be hindered strongly by barriers and/or there is a low motivation that might hinder the intake. When it comes to protein rich foods, especially meat but also egg and milk is consumed in very little amounts by consumers with a low sociodemographic status (Islam et al., 2018). Waid et al (2018) suggested that the nutritional needs for animal-source foods could probably be met more easily and at lower costs with fish and eggs compared to meat. They also showed that poultry consumption has been increasing in urban poor over the past years and that milk is a common source of protein for the poor. In addition, street foods and other out-of-home consumed foods are also important for the urban poor. Although severe safety issues exist for these foods, main reasons to buy them are related to sensory appeal and variety, convenience, and cost. Given the rapid urbanization, the importance of out-of-home consumption is expected to keep increasing and are especially important for larger households with lower income and education levels (Khairuzzaman et al., 2014; Khondoker et al., 2017).

2.1.6 The implication of COVID-19 on food security and urban poverty

The COVID-19 pandemic has a major impact on Dhaka's food system, food security and the buying and consumption behaviour of the urban Bangladeshi. The Bangladesh government announced the first official positive test for COVID-19 virus on March 8, 2020. This is followed by increased social distance measures and a lockdown to reduce the spread of the virus. Many residents of the city lost their jobs and income as a result of the lockdown. Poor households who worked in the informal sector were affected most as they were mostly employed by informal sector and garment industries that were affected most by the lockdown. Food prices increased in this period. Very high prices of meat and vegetables products in the lockdown caused the increase in the prices of staples such as rice and potato. From March 22 to June 23, 2020, rice prices increased by 23% and potato prices increased by 43%. Poor households coped with the increased prices and reduced income by decreasing their food consumption and intake of micro and macro nutrients, which might have significant negative impact on overall health and economic development in Dhaka and Bangladesh. The project stakeholders suggest that middle- and high-income households try to avoid crowded places to purchase food, showing the influence of COVID-19 on food purchase behaviour. Also, in a large-scale study on several low-and-middle income countries including Bangladesh, income drops and increased food insecurity three months after the start of the crisis were reported (Eggers et al., 2021).

2.2 Current situation in terms of food safety

The NaDhaLi report summarizes some of the main issues related to food safety in Bangladesh. We copied their main results (this section needs to be adjusted). A study by the Institute of Public Health (IPH) in Dhaka revealed that food safety problems persists at every level of the food chain from food production and preparation to consumption. Food manufacturers, processors, restaurants and fast food outlets are

all involved in one way or another in this corrupt practice of adulteration. On one hand, foods are adulterated by using various harmful chemicals and artificial colouring agents, while on the other hand, rotten food is stored, sold and served to consumers in an unhygienic atmosphere. Tests amongst 400 sweetmeats, 250 biscuits, 50 breads and 200 ice cream samples showed that 96 percent of sweetmeats, 24 percent of biscuits, 54 percent of breads, and 59 percent of ice creams were adulterated. Recent statistics published by the Ministry of Health and Family Welfare (MOHFW) reveal that nearly half of the food samples tested by the IPH from 2001 to 2009 were found to be adulterated.

- Across much of Bangladesh, **pesticide residues** have been detected at or slightly above the safe level for many fruits and vegetables. Data from food market surveillance carried out by various national laboratories in association with FAO between 2014 and 2016 show that about 2 percent of fish samples had both antibiotic and veterinary drug residue levels above safe international limits. In addition, approximately 18 percent of chicken samples had both antibiotic and veterinary drug residue levels above safe limits.
- Although the use of **DDT** is prohibited in 49 countries and restricted in 23 countries around the world, in Bangladesh, DDT is commonly used in processing dried fish. The use of DDT is not only linked to breast cancer, liver cancer and pancreatic cancer, but DDT also has many adverse effects on various reproductive issues including abortion, early menopause, birth defects and low birth weight. DDT also promotes neurological issues including trembling, seizures, nausea and dizziness.
- Although the Bangladesh Animal Feed Act 2010 bans the use of **growth promotants** and antibiotics in animal feeds and Food-Safety-(Contaminants,-Toxins-and-Harmful-Residues)-Regulations,-2017 set MRL for animal originated food products, antibiotic residues are still present in poultry meat and eggs above MRL. This arises due to the injudicious use of antibiotics in the treatment or as preventive procedures in intensive livestock systems. The presence of antibiotics residues in food can result in public health hazards including: the development of resistant strains of microorganisms, hypersensitive reaction in sensitized individuals and distortion of intestinal microflora. The residues of animal drugs threaten human health by being acutely or cumulatively allergenic, organotoxic, mutagenic, teratogenic or carcinogenic. Resistant bacteria may then cause disease that is difficult to treat in humans or transfer the resistant gene to other human pathogens. Vested interest, poor regulation and low enforcement of the Act are the root causes for this situation.
- Dietary exposure to excessive **heavy metals** occurs periodically and is generally associated with food adulteration. A recent study carried out in Bangladesh showed that adulteration of turmeric with lead chromate (to enhance the yellow colour) resulted in lead concentrations as high as 483 ppm, 400 percent higher than the safe limit of lead in foods. Recycling fat from tannery wastes as poultry feed has raised concerns about exposure to high levels of chromium in the food chain, as has exposure to high levels of arsenic in the diet in Bangladesh.
- The unauthorized use of **food colours**, especially textile dyes, is common in the manufacture of various types of sweets, which are locally called 'misti'. Research suggests that these toxic colouring agents in food can create indigestion, allergies, asthmas and even cancer. The frequent consumption of these colouring agents can also lead to sleeping disorders, vomiting, diarrhoea, heart disease and several kinds of neurological disease.
- The widespread use of **formalin** in foods has been a crucial problem in Bangladesh. Retailers, especially in the traditional markets, frequently apply formalin to fruit, fish and vegetables to keep them fresh. The widespread use of formalin in various foods is considered to be dangerous for public health. Scientific evidence suggests that the consumption of formalin directly through food can cause different types of cancers, especially lung cancer. In last few years formalin using reduced, as the government don't allow to import formalin by any private sector (see <https://www.dhakatribune.com/uncategorized/2013/09/08/tcb-to-import-formalin>, <https://www.dhakatribune.com/bangladesh/nation/2019/06/11/bsti-finds-no-formalin-in-265-seasonal-fruit-samples>).
- Use of **carbide and hormones** to ripen the fruit is another major issue in Bangladesh. This not only harmful for health, but also decreases the nutritional value of the food.

- Use of **UREA and fattening pills** for beef and goat fattening is prevalent in the country. Thought the medicines and chemicals are forbidden to import they are available in the market through smuggling.

2.3 Consumer perceptions of food safety

There is ample research on how to define and measure consumer perception of food safety and the determinants related to food safety attitudes and behaviours. Below we summarize the literature on how to define and measure consumers perceptions of food safety, the determinants related to it, and the theoretical model used as the basis for the questionnaire.

Food safety can be defined as food that does not contain anything that can cause harm to health such as harmful bacteria, viruses, parasites or chemical substances. Food safety, nutrition and food security are closely linked since the consumption of unsafe food creates a vicious cycle of disease and malnutrition, contributing to food and nutrition insecurity ([Food Safety \(who.int\)](https://www.who.int/news-room/fact-sheets/detail/food-safety-and-food-security)). In short, food safety perception is related to determinants divided in the following three categories:

- Person: such as personality, knowledge, and norms
- Product: such as risk and benefit perceptions and specific product attributes (e.g. perceived naturalness)
- Actors: trust and concerns and familiarity in the information and the source of information e.g. from companies and or government

2.3.1 Consumer perceptions of food safety

De Jonge et al. (2007), show that confidence is 2-dimensional; namely, optimism and pessimism. Other: trust and risk perception. Consumer can be both optimistic about the food safety of a product and pessimistic about the food safety risks. For example, in a study by Li et al. (2019) about milk and instant milk formula in China where consumers both moderately optimistic and pessimistic at the same time. A review on the role of trust in risk hazards in general showed that different types of trust seems to be directly and indirectly associated with risk perception in different situations (Siegrist 2019). Benson et al. (2020) reviewed consumer trust measures and used factor structure analysis to identify six types of trust: organisation trust, product trust, interpersonal trust, trust in the food chain, organisation distrust, and general distrust.

In addition to consumers' general perception of food safety there is their perception of their personal risk. Generally, consumers express confidence in their own abilities (e.g. Redmond and Griffith, 2005). And extensive review by Byrd-Bredbenner et al. (2013) list the main reasons for consumers' mishandling of food practices as well as entry points of changes. Main reasons are: routines and habits, responsibility deflection (consumers do not consider it their responsibility), preferences for risky foods (e.g. raw egg, meat), the benefit is considered too small to make up for the extra efforts, social fears, low perception of current problems, optimistic bias (It won't happen to me beliefs), and illusions of control.

According to Byrd-Bredbenner et al. (2013) food safety education programs built on the constructs have the potential to help consumers gain the knowledge, skills, motivation, and confidence needed to handle foods more safely. These are: boost knowledge, highlight responsibility, heighten recognition of susceptibility and severity of outcomes, emphasize behavioural control, build confidence, offer cues to action. Similar barriers and facilitators were identified by Young and Wadell (2016) in a review of qualitative studies: confidence and perceived risk (such as high confidence in own practices); knowledge-behaviour gap (such as misconceptions of practices); habits and heuristics (rules of thumb and routines); practical and lifestyle constraints (such as facilities and lack of time); food preferences (food choices are driven by preferences and convenience rather than food safety); and societal and social influences (common practices and healthcare providers). Young and Wadell (2015) also found that 1) safe food handling behaviours were mostly habituation; 2) most consumers are not concerned about food safety

and are generally not motivated to change their behaviours; and 3) consumers are amenable to changing their safe food handling habits through relevant social pressures.

2.3.2 Determinants of food safety attitudes and behaviours

A commonly used model is the KAP model referring to knowledge attitudes and practices. In this model, knowledge and attitudes are perceived as the main determinants of behaviour and it is widely used both for consumer and food handlers. Also, knowledge, attitudes and practices are key entry points for interventions. A review study on 10 studies concluded that there was a somewhat positive outcome of food safety interventions based on KAP determinants (Milton and Mullan, 2010) whereas a later review did not find a clear consensus in the (Young et al., 2015). Young et al. (2015) also considered KAP in their review as well as behavioural intentions and stages of change, two concepts from the theory of planned behaviour. The Theory of Planned Behaviour, which suggests that an individual's behaviour is mediated by their intentions to perform the behaviour, and that their intentions can be predicted by their attitudes toward the behaviour, their subjective norms (i.e. social pressure to perform the behaviour), and their perceived behavioural control (i.e. perceived ability to perform the behaviour). The theory of planned behaviour has been applied in interventions (e.g. Milton and Mullan, 2012) and especially behaviour intention is an aspect that has been related often to food safety behaviours (Young et al., 2015). A third model that has been proposed is the temporal self-regulation theory. In their review of food-safety education interventions, Sivaramalingam et al. (2015) report the importance of using behaviour-change theories as a basis of interventions, as well as the use of validated instruments to measure outcomes.

On the other hand, Brewer, Sprouls, and Craig (1994), revealed that there are six important factors that dominate the consumers behaviours and choice toward food safety. These are; chemical issues (e.g. hormones and food additives), health issues (e.g. cholesterol content and nutritional imbalance), spoilage issues (e.g. microbiological load and contaminations), food regulatory issues (e.g. food inspection and labels), deceptive practices (e.g. weight-loss diets) and ideal situations (e.g. length of time for pesticide safety assessment).

De Jonge (2008) identified several potential determinants related to consumer confidence in food safety. First, consumer trust in the actors in the food supply chain is considered an important driver of consumer confidence (Berg et al., 2005; de Jonge et al., 2007). As the food production system becomes more complex, consumers tend to place more weight on trust in the actors involved in the food system to compensate for their lack of knowledge of food safety (Lassoued et al., 2015). Second, consumers' recall of food safety incidents over the past 6 months reduces their confidence in food safety. Third, consumer confidence in specific product groups, such as meat and fish, contributes to consumer confidence in the safety of food in general. Fourth, consumer concerns about food-related hazards are responsible for low consumer confidence in food safety. Consumer confidence in food safety is also related to individual differences; for example, consumers who are more prone to worry magnify the gravity of food safety incidents and tend to be more negative about food safety (see also Xu et al., 2011; Gong et al., 2012).

When it comes to knowledge, the WHO defined five keys to safer food which can be used: keep clean (e.g. wash hands), separate raw and cooked (in preparing and storing), cook thoroughly (especially meat, poultry, eggs, and seafood; preparation and reheating), keep food at safe temperatures, use safe water and raw materials (e.g. Fontannaz-Aujoulat, et al., 2019).

2.3.3 Low-and-middle income countries

In high income countries there is a strong emphasis on food safety issues during food handling at home. Also, generally consumers were generally confident about their safe food handling practices at home, even though they lacked knowledge in some areas and had some misconceptions and consumers were generally not concerned about food safety and frequently engaged in unsafe food handling behaviours even when they were aware of the recommended practice (Young and Wadell, 2016). Low-and-middle income countries might differ on these aspects from higher income countries.

An international study specifically addressed food safety knowledge attitudes and practices (KAP) in developing countries in Africa and Asia. Overall, respondents from Asia have better food safety knowledge than respondents from Africa Odeymi et al., (2019). Many of the theoretical models and frameworks have been developed in high income countries and not all have been tested in the context of low-and-middle income countries or even more specifically urban area's in low and middle income countries.

2.3.4 Theoretical model consumer perception food safety

In this study, determinants at the level of person and foods were included. The role of vendors, actors, and policy makers is beyond the scope of this study. Several health behaviour change theories, such as the Health Belief Model, Theory of Planned Behaviour, and Social Cognitive Theory, provide valuable roadmaps for identifying key constructs to address when aiming to effect behaviour change. Since the aim of this consumer study is to provide input for food systems policies for healthy and safe food the determinants were structured to dimension relevant for behaviour change interventions: motivations, abilities and opportunities (Thøgersen, 1995; Flynn et al., 1999). People need the motivation and the environmental or contextual opportunity to eat healthily. On top of the motivation and opportunity people need to be able to conduct the intended behaviour and therefore ability is the third factor in the MOA model. Ability refers to skills and knowledge to perform behaviours. On the one hand, this refers to more practical skills and knowledge that are needed, such as cooking techniques for preparing vegetables, knowledge on recommended vegetable intake, etc. Finally, consumers take food safety precautions only when they perceive a risk. At other times, consumers may be acting out of habit and make food handling mistakes because they lack "cues to action".



Methods

3 Methods

3.1 Highlights

- A mixed method was used that combined qualitative and quantitative data collection.
- Survey data was collected from a large sample of 2027 adults and 299 adolescents via phone interview.
- A total of 32 focus group discussion were held, including 192 respondents, both men and women (in separate groups).
- All city corporations (CCs) of the Dhaka metropolitan area were included: North Dhaka CC, South Dhaka CC, Gazipur CC, and Narayanganj CC.
- The focus on the study was on consumers with a low income (on average under the poverty threshold) and high food insecurity (98.8% in the low-income group), in the survey also middle and high income were included.
- Data was collected during the COVID-19 crisis therefore question were included on the degree of impact of the crisis on respondent's situation, income, and food intake.

3.2 Study location

Participants for the consumer household survey were recruited across the wards in the following City Corporations (CC): North Dhaka CC, South Dhaka CC, Gazipur CC, and Narayanganj CC. These CC were selected as they form together the DMA. Each CC covers the five included income groups, namely (i) low poor SES, (ii) low middle poor SES, (iii) middle SES, (iv) higher middle SES and (v) higher SES. Potential respondents were selected across the different wards in each CC. See **Table 1** for an overview of the wards that were included in the survey.

Table 1: Overview of the included wards numbers in the consumer household survey

CCs ¹	# wards	Selected wards numbers	# selected
DNCC	54	1,3,4,5,6,7,10,12,13,17,19,20,21,22,24,25,27,28,29,30,31,32,33,34,37, 38,40,41,42,45,48, 49,50,54	34
SDCC	75	1,2,3,4,5,6,7,8,11,14,15,16,17,18,22,23,24,25,27,30,32, 33,34,35,36,37,38,39,40,41,45,48,49,51,53,55,61,65,66,67,69	41
GCC	57	19,24,25,2,6,27,28,29,30,31,40,49,51,52,53	14
NCC	27	2,5,6,7,8,9,11,12,13,14,15,16,17,18,22, 25	16

¹ City Corporations: North Dhaka (NDCC), South Dhaka (SDCC), Gazipur (GCC), and Narayanganj (NCC)

3.3 Focus group discussion approach

The FGD were conducted in January 2020 in the four city corporations of Dhaka metropolitan area (DMA) (North Dhaka City Corporation, South Dhaka City Corporation, Gazipur City Corporation, Narayanganj City Corporation). In each of these four city corporations, subjects with and low and a low to middle socio-economic status (SES) were recruited. Per city cooperation, 8 FGDS were conducted, resulting in a total of 32 FGDs and 192 respondents. All FGD were led by a moderator from the research team together with an assistant following a guideline in which the tasks and questions we defined. Prior to the FGD the purpose of the study, data handling and privacy issues were explained, respondents could ask questions and finally signed an informed consent form. Each participant received an incentive.

Inclusion criteria were that participants were 1. adult, aged 18 years or over, 2. From low or low-middle socio-economic status, based on assets, 3. one of the key decision makers for household food purchase and/or preparation, 4 willing to comply with all the study procedures and the informed consent. Separate discussion groups were held per city cooperation, for men and women separately, and for respondents

with a low and the low-middle income level separately to avoid that people would feel uncomfortable to speak. Within these groups the respondents were mixed in terms of age and household composition

Characteristics of the sample were: 1. Income: around Tk.5000-7000, 2. Accommodation: Participants stay at rented house (one room house) with shared bathrooms, kitchen and premises, 3. Asset: Participants have some common asset on their own, like mobile phone set, TV set, dressing tables and utensils. 4. Cooking facilities: Participants share common cooking place and burners with illegal connection of gas supply which the house owners arrange for them. 5. Bath rooms facilities, water and sanitation: They share common latrine and get shower in share bathrooms. Water and gas supply are not intermittent. 6. Education: The participants have no education.

Given that high safety issues exist for all foods but especially fresh products the following foods were chosen as target foods in this study: fruits, vegetables (especially the green leafy ones), fish, egg, milk, and poultry.

3.4 Survey approach

3.4.1 Inclusion and exclusion criteria

Study respondents were Bangladeshi living in one of the four CC in DMA. In order to be eligible to participate in this study, a respondent met all of the following criteria: (1) be an adult, aged 18 years or over, (2) live in DMA, (3), one of the key decision makers for household food purchase and/or preparation, (4) comply with all the study procedures, and (5) sign informed consent. No exclusion criteria were used and respondents from different SEC were included according to quota (see **Table 2**). Initially, we aimed to have equal parts of women (1/3), men who were key decision makers for buying and actually buying the groceries (1/3), and men who were buying but not the key decision maker (1/3). During the survey, the results showed that almost all men were both buying and deciding, only less than 1% was not also a key decision maker. Therefore, the two groups of men were combined into one group and we adjusted our quota to equal numbers of male and female rather than 1/3 female and 2/3 male. Since recruitment was already halfway, this quota was not entirely reached. In the end, 54% of the respondents were male.

3.4.2 Recruitment procedure

All respondents were selected by the Bangladesh Centre for Advanced Studies (BCAS) the research institute that also conducted the field work. To make sure that we have a good distribution of the SEC, especially the poor and lower middle class, a list of criteria was used in the recruitment process. The following criteria were used to allocate potential respondents to one of the SEC: occupation, number of children within the household, number of rooms in the house, and income level

From the Poor Federation President and the Federation team leaders of the four CC contact details of Ward commissioners were received. These Ward commissioners listed potential respondents (name and phone number) and allocated them to one of the SEC using the criteria. To meet the number of respondents for the three higher SEC groups personally known persons/friends/relatives of the team members were also listed. Due to COVID-19 crisis, recruitment in the field was no longer considered safe for trained enumerators and respondents. Therefore, respondents were recruited via phone. Trained locally enumerators (n=23) contacted the listed potential respondents by telephone. Adolescents were recruited and selected during the household survey. In the survey respondents were asked whether there were adolescents in their family willing to participate in the adolescent survey. These adolescents were listed, and their privacy was insured.

Table 2: Criteria and quota of the respondents.

Income Groups	Criteria of income groups	Final Quota of the SES groups by no. and gender	
	Monthly HH income	% of respondents	Gender (Male: Female)
Low Poor	up to Tk.10,000	40%	50: 50
	Tk. 10001-20,000	40%	50: 50

<i>Middle</i>	Tk. 20001-50,000	8%	50: 50
<i>Higher Middle</i>	Tk. 50001-100,000	7%	50: 50
<i>Higher</i>	Tk. 100001 and above	5%	50: 50

Before deciding to participate, the enumerators explained their affiliation and that this study was about food and the decision that people make when buying food. Next, they explained the procedure. If potential participants considered to participate, we checked whether they met the inclusion criteria. If so, an informed consent was read out to explain that the data was handled confidentially, the interview was voluntary, they had the right to stop this interview at any moment without providing a reason and that the researchers from BCAS and Wageningen University and Research in The Netherlands would be processing their anonymously given answers. Respondents were then asked if they agreed with this statement and their answers were recorded. None of the respondents were paid for their participation. After finishing the questionnaire, a small incentive was provided. The lower income groups received 100 BDT in airtime. For higher SEC 100 BDT was paid to them or donated to Biddhyananda (Ek Takar Ahar) House-13, Road-2/B, Pallabi, Residential Area, Mirpur-111/2, Dhaka. b-Kash no. 01708521957-958 Tk. 200 on behalf of these respondents. The total donation was shared with a Twitter account.

3.4.3 Data procedure

Data were collected through a phone survey administered by tablets. All instructions, background information (e.g. interviewer name), questions and answer categories were programmed in the KoBo toolbox in English and then translated to Bangla. During training and piloting some issues were adjusted in the tool directly (both in English and Bangla) (see Appendix A). The survey was administered by a trained enumerator using a structured interview reading out loud the questions from the questionnaire on a tablet. The questionnaire included different measures.

3.4.4 Measures

The online questionnaire included measures related to household food purchase, out-of-home consumption, food choice motives in general and specifically related to health and food safety, psychosocial determinants including respondents' perceived own knowledge on health and food safety and belief in their ability to acquire prepare and consume health and safe food (self-efficacy), food intake, and behaviours related to the COVID-19 crisis. Most of the scales that we used have been developed and validated in previous studies. If a scale was not available in literature, we developed items or adapted items from validated scales to the local context. See table 3 for an overview of the scales in the questionnaire. Food intake was measured by frequencies, but we did not measure portion sizes.

3.5 The impact of COVID-19 crisis on the study methodology

The COVID-19 crisis influenced this study in several ways. First, due to lock down and health threats not all forms of data collections were possible which resulted in phone instead of face-to-face interviews for the survey data collection and in phone-interviews instead of focus group discussions for the adolescent study. Second, we expected effects of the crisis on some of the study measures such as income, purchase and intake patterns. Therefore, questions were added on the impact of the COVID-19 crisis on respondents' daily life. This also resulted in a somewhat different choice of the sample. Originally, we planned to focus on the urban poor and middle class, females and female workers. More than half of the households living in the division of Dhaka (58%) belong to the least wealthy to middle wealthy income group. As the COVID-19 pandemic has a major impact on the food security and food system of all inhabitants of the DMA it was decided that all SEC should be included in this study. In analysis, the three highest classes were combined to one category (middle class and above).

Table 3: Overview of the included measures in the consumer household survey

Topic	Short description	# items	Scale	Reliability
Socio-demographics	Helps to receive insights in the spatial location of the respondents' household, household characteristics and amenities. Include the standard respondent and household identification questions from DHS 2014 and Bangladesh informal urban settlement survey.	41	N.A.	N.A.
Self-reported behaviour	To learn how much money respondents spend on household expenditures, food items and at visited outlets.	3	N.A.	N.A.
	To learn where households purchase their food items on a monthly basis. This item included detailed questions on different types of outlets, and travel time to these outlets.	7	N.A.	N.A.
	To receive insights whether households grow and/or produce their own foods.	4	N.A.	N.A.
	To get insights whether households got sick due to their food choices, insights in diet preferences and chronic food-related health problems such as diabetes and blood pressure	6	N.A.	N.A.
	To learn about out of home consumption (usual and since corona pandemic), how often do the respondents buy prepared meals and/or snacks outside their homes, and where do they buy these food items.	4	N.A.	N.A.
	Food consumption frequency was measured for specific food items including green leafy vegetables, vegetables, fruit, eggs, chicken, other meat, fresh large and small fish, dried fish, liquid milk and pulses.	11	N.A.	N.A.
	To identify vulnerable populations and to assess the prevalence of food insecurity	12	N.A.	N.A.
	To measure the influence of COVID 19 on food purchase, intake, and food security, together with the compliance of the social distancing and other COVID-19 behaviour	38	N.A.	N.A.
Socio-psychological determinants	To receive insights in the motives for selecting food items	11	7-point Likert scale: from 1= not important at all to 7= extremely important	N.A.
	As the motive health and food safety are likely to be perceived as important, more detailed information on these two food motives is collected.	19	7-point Likert scale: from 1= not important at all to 7= extremely important	Health: Cronbach's alpha: 0.95 Food Safety: Cronbach's alpha: 0.93

To receive insights in whether the motives for buying specific food items at a specific outlet differs between the other outlets.	12	N.A	N.A
To measure the respondents' confidence in the safety of food in general	7	7-point Likert scale: from 1= strongly disagree to 7= strongly agree	Optimism: Cronbach's alpha: 0.93 Pessimism: Cronbach's alpha: 0.93
To measure the respondents' confidence in the safety of specific food items (e.g. fruit, green leafy vegetables, fish, etc.)	13	7-point Likert scale: 1 = no confidence at all to 7 = complete confidence. 99=not relevant (only if they never buy this food or never go to a certain outlet)	
To measure the respondents' beliefs in their own ability to perform a healthy eating behaviour	5	7-point Likert scale: from 1= strongly disagree to 7= strongly agree	Cronbach's alpha: 0.83
To measure the respondents' beliefs in their own ability to perform safety related eating behaviour	10	7-point Likert scale: from 1= I am sure I could not do it to 7= I am sure I could do it	Cronbach's alpha: 0.82



Results on food purchase and expenditure

4 Results on food purchase and expenditure

4.1 Highlights

- Survey data was collected from a large sample of 2027 adults, including both men and women from different income groups.
- On average 52% of the income was spend on food.
- Wet markets were the main outlets to purchase all food groups for all income groups. Neighbourhood stores were visited by consumers especially to purchase dry goods and also vegetables, and eggs. Mobile door to door vendor was another important outlet to purchase vegetables. The higher income group went less frequent to outlets to purchase food.

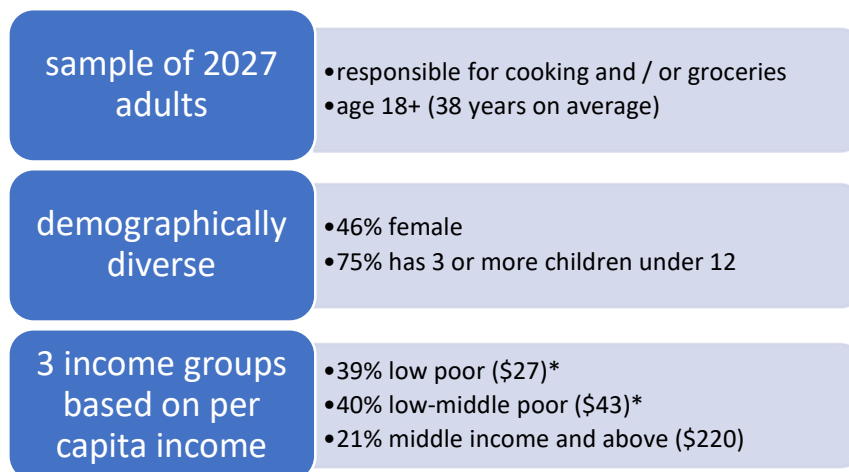


Figure 8. Sample characteristics, * below poverty threshold

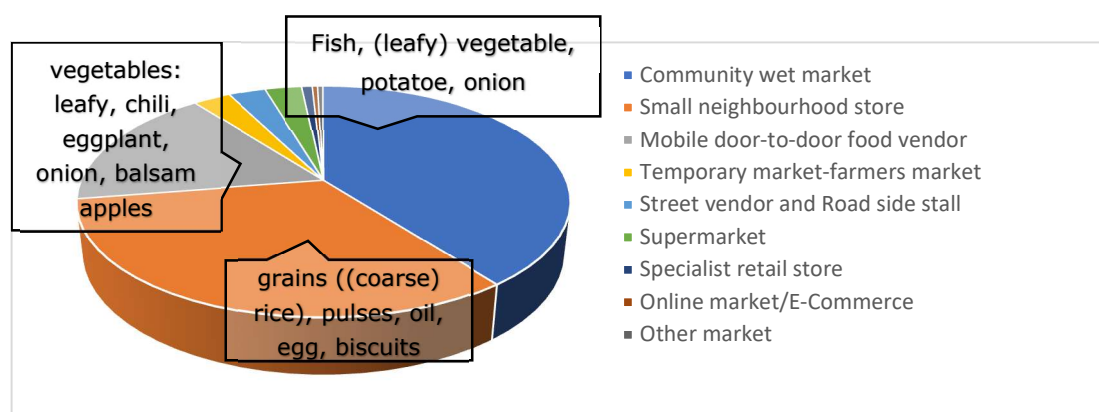


Figure 9. Number of households visiting an outlet and foods mainly bought at that outlet

- The intake of protein rich foods (except pulses) and fruit was much lower for the consumers from the lower income group compared to other income groups. Green leafy vegetable intake was low for all income groups when compared to the intake of other food groups and does not differ between income groups. Low income consumers ate dried fish more often compared to other income groups while big fish were eaten less frequently by consumers from the low-income group.
- Home gardening practices such as growing crops or keeping animals was not common among household and increased by income level as high-income household have better access to land than low-income families.
- Out of home consumption of food was equally common among households from different income groups; on average 12 days per month. The most frequently patronized outlet were formal medium-small sized restaurants (in Bangladesh also named "hotels"). Compared to poor

households, middle income and above households eat more often at big formal restaurants and fast food outlets and less often from street vendors, or roadside stalls.

4.2 Survey study sample demographic characteristics and housing conditions

General respondent and household characteristics in our sample are presented in table 4. In total 2027 adults who met the study criteria of being responsible for either purchasing or cooking food responded our survey. About 62% of them perceive themselves as household head, and they were 38 years old on average, 70% of them completed primary school, 46% were women, and 72% were regular income earners. The respondents live in households with about four household members on average (ranging from 1 to 16). 75% of the households have three or more than three children younger than 12 years old. 22% of respondents work in services sector followed by day labour (8%), garment worker (6%), or rickshaw/van driver (6%). On average, a respondent earns about 12640 BDT¹ (150 US dollar) monthly². On average, total household earnings were about 6,171 BDT (73 USD) per capita monthly. 68% owned TVs and 13% owned a scooter, motorcycle, or bicycle. 40% of households preserve food at room temperature, while 46% of the households use its own fridge, and 14% use a fridge owned jointly by neighbours to preserve food. About one third of households receive water through public tap, well, tanker truck, etc., and the rest receives water either through a pipe into the dwelling or to the yard.

Table 4: Household and respondent characteristics

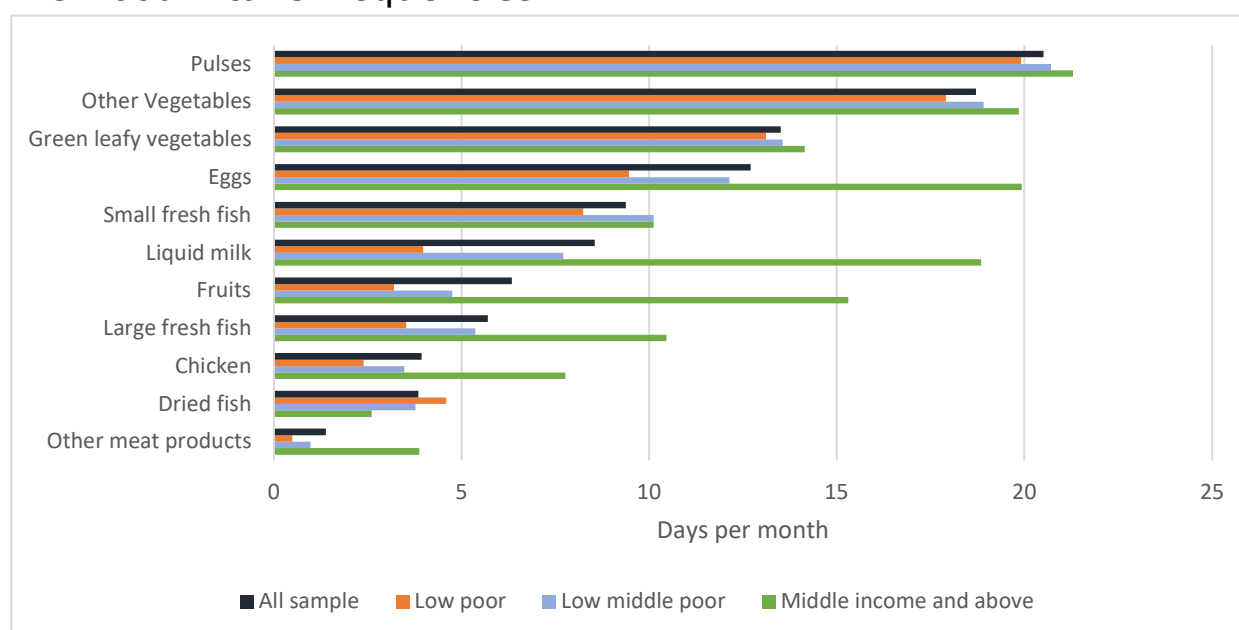
	<i>Total sample</i>	<i>Low poor</i>	<i>Low middle poor</i>	<i>Middle income and above</i>
<i>% of respondents that are...</i>				
<i>household head</i>	62%	67%	59%	58%
<i>Female</i>	46%	48%	45%	42%
<i>Earners of income</i>	46%	70%	71%	78%
<i>Completed primary school</i>	70%	56%	68%	94%
<i>Average age of the respondents</i>	38 years	37 years	37.28	41 years
<i>Respondents' income over the past month</i>	12641 BDT	4517 BDT	7105 BDT	38780 BDT
<i>% of households that...</i>				
<i>have more than 3 children 12 years old or younger</i>	75%	77%	74%	75%
<i>own television</i>	68%	47%	75%	96%
<i>own bicycle, scooter, motorbike etc.</i>	13%	4%	7%	39%
<i>receive water piped into dwelling</i>	53%	51%	57%	50%
<i>receive water piped into compound, yard or plot</i>	13%	13%	12%	11%
<i>receives water from tube well, borehole</i>	25%	29%	23%	24%
<i>store food at room temperature</i>	40%	62%	36%	3%
<i>store food at their own fridge</i>	46%	2%	47%	93%
<i>store at neighbour's fridge</i>	14%	18%	17%	3%
<i>Average total household income (BDT) over the past month</i>	24466 BDT	8151 BDT	14885 BDT	73516 BDT
<i>Average household income over the past month (BDT) per capita</i>	6171 BDT	2258 BDT	3608 BDT	18445 BDT
<i>Average household size</i>	4.21 people	3.84 people	4.4 people	4.5 people

¹ We use exchange rate 1 US dollar equals 84 BDT.

² Please note that these household incomes are perhaps downward biased. This is because respondents might know other households' earnings well and usually households who conducts non-wage job have difficulty to report household incomes.

Table 4 compares the respondent and household characteristics in our study sample by income groups. First, we confirm that respondent and total household incomes increase by the pre-determined income-groups. On average, respondents from low-poor income group earn about 4517 BDT (85 US dollars), from low-middle-poor earn about 7105 BDT (131 US dollars), and from middle-high income group earn about 38780 BDT (617 US dollars). While monthly per capita income was about 18444 BDT (220 US dollars) for middle- and high-income households, it was 3607 BDT (43 US dollars) for low-middle-poor households and 2258 BDT (27 US dollars) for low-poor households. This indicates that low-poor households were on average below poverty threshold of 1.90 US-dollar per capita-day (about 54 US dollars per capita-month). Second, we identify other important differences between the income groups in terms of respondent and household characteristics. When compared to low-poor and low-middle-poor group, the respondents were more educated in the middle-high income group. They were more likely to live in households with a TV, a scooter or motorbike. The majority of the respondents that were from the middle income and above income groups store food in their own fridge whereas the respondents from about 60% of low-poor income group stores food at room temperature.

4.3 Food intake frequencies



Food intake frequency of several food groups was measured by asking how often respondents consumed the food either per day, week, or month but for comparability these were all recoded to consumption frequency per month. When looking at the protein-rich foods, the respondents' households most frequently consume pulses (about 20 days per month). It seems they combine pulses with vegetables excluding green leafy ones which they eat about 18 days per month on average. The frequency of eating animal protein rich food groups such as eggs, small fish and liquid milk follows the consumption of pulses and vegetables. Households do not frequently consume fruits or protein sources such as large fresh fish, chicken, dried fish, and other meats including cow, sheet, and goat meat.

The frequency of eating different food groups varies in Dhaka by income groups of the respondents. Figure 10 shows the frequency of consuming food groups by income groups. Households from middle-income groups and above more frequently consume items high in protein than the households from low-income groups. The frequency of consuming dried fish decreases as income levels go up while consuming eggs, liquid milk, fruits, chicken, and large fresh fish increases with income. The frequency of consuming pulses and vegetables does not differ much between the income groups.

Figure 10: Monthly frequency of food group consumption by income groups on household level.

4.4 Household expenditures

On average, respondents spend around 17030 BDT (205 USD³) per month on both foods and non-food items (Figure 11). For the low-poor income group, this was 8443 BDT (102 USD), for the low-middle-poor 13221 BDT (159 USD), and for the middle- and above-income group 40545 BDT (488 USD). Household expenditures were the highest in North Dhaka CC (18335 BDT per month), followed by South Dhaka CC (17472 BDT), Gazipur CC (16676 BDT) and finally Narayanganj CC (15597 BDT).

Overall, 52% of the households' total monthly expenditures was spent on food items. This declines as household wealth increases, being the highest for the low-poor income group (54 percent) and the lowest for the middle and above (48 percent). Food expenditures as a share of total monthly expenditures were highest for households in Narayanganj CC (60 percent) and lowest for households in South Dhaka CC (44 percent).

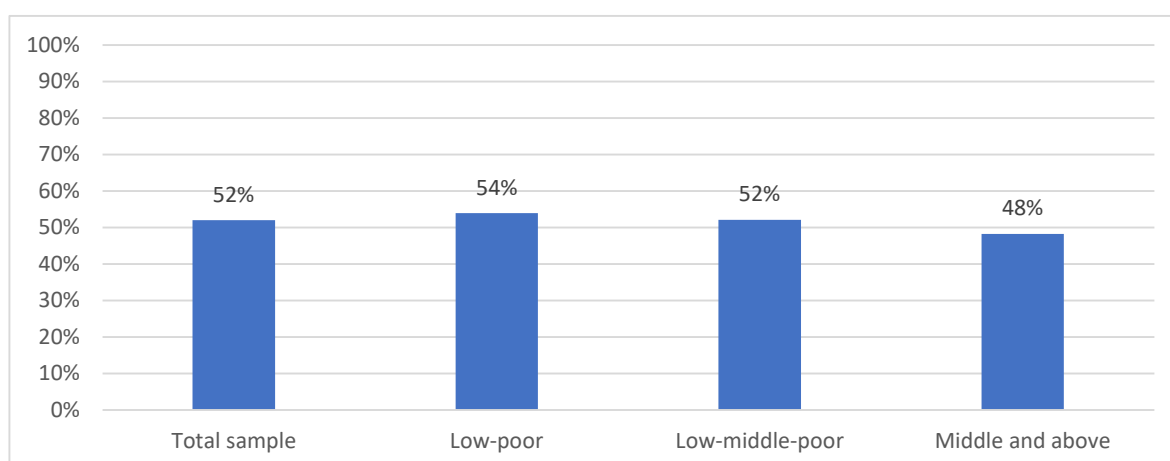


Figure 11: Percentage of food expenditures in total household expenditures

4.5 Food outlets

Households purchase their food from different types of food outlets. Almost all households indicate buying food from community wet markets (lower shares in Narayanganj CC and South Dhaka CC). Over three quarters of the households also buy from small neighbourhood grocery stores (lower shares in Narayanganj CC and Gazipur CC), and 41% of the households buy from mobile door-to-door vendors (lower shares in Narayanganj CC and Gazipur CC). Supermarkets were only visited by households from the middle- and above-income group, and especially by households living in North Dhaka CC. Table 5 below shows the percentages of households that visit each type of food outlet.

Table 5: Percentage of households visiting different food outlets, by income group ⁴

	Total sample (n=2027)	Low-poor (n=801)	Low-middle-poor (n=804)	Middle and above (n=422)
Community wet market	95%	93%	96%	97%
Temporary market-farmers market	7%	7%	8%	7%
Small neighbourhood grocery/general store	79%	81%	77%	78%
Street vendor and Roadside stall	7%	8%	9%	3%

³ At an exchange rate of 1 USD = 83.14 BDT (17-08-2020)

⁴ For the tables in this section by city corporation, please see appendix B

<i>Specialist retail store-butcher, baker green grocery store</i>	2%	0%	2%	9%
<i>Mobile door-to-door food vendor</i>	41%	43%	44%	32%
<i>Supermarket</i>	7%	0%	0%	32%
<i>Online market/E-Commerce</i>	1%	0%	0%	6%
<i>Other market</i>	1%	1%	0%	1%

Table 6 reports the percentage of households that had visited a retailer in the 30 days prior to the data collection and bought a specific food item by the retailer type and food groups. The majority of the households visited community wet market to purchase fish and vegetables including (starting with the most commonly bought) leafy vegetables, fish products such as Mala-Kachi/Chala Chapila/Khalsha, Puti/Big Puti/Telapia/Nilotica, potatoes and onions. A large portion of households also visited small neighbourhood store to buy food grains (e.g. rice) and pulses including lentils, soybean oil, farm hen eggs, biscuits and coarse rice. About two fifths of the households found mobile-door-to-door vendors to buy vegetable such as leafy vegetables, chili, brinjal (eggplant), onion and balsam apples. We also see that from supermarkets, the most commonly bought items were biscuits, cake, powder milk, soybean oil and other items. Please see appendix C for the comparison of items bought from the two major food outlets for different socioeconomic groups.

Table 6: Percentage of households buying items from specific food groups by food outlet in 30 days period, for major food markets⁵

	<i>Community wet market</i>	<i>Temporary market-farmers market</i>	<i>Small neighbourhood grocery/general store</i>	<i>Specialist retail store-butcher, baker green grocery store</i>	<i>Street vendor and Roadside stall</i>	<i>Mobile door-to-door food vendor</i>	<i>Supermarket</i>
<i>Food grains⁶</i>	29%	1%	70%	0%	5%	1%	5%
<i>Pulses</i>	11%	1%	50%	0%	0%	0%	1%
<i>Fish</i>	71%	4%	1%	0%	0%	7%	2%
<i>Eggs</i>	7%	1%	28%	0%	0%	1%	0%
<i>Meat</i>	25%	1%	1%	2%	0%	1%	2%
<i>Vegetables</i>	76%	6%	21%	0%	3%	39%	0%
<i>Milk and dairy</i>	0%	0%	3%	0%	0%	0%	2%
<i>Oil & fats</i>	10%	0%	51%	0%	0%	0%	3%
<i>Fruits</i>	1%	0%	0%	0%	1%	4%	1%
<i>Spices</i>	10%	1%	18%	0%	1%	6%	1%

Of the households that visited a specific market, the community wet markets, temporary markets and mobile door-to-door food vendors were visited most frequently (Table 7). Overall, the frequency of visiting the two most important food outlets (community wet markets and small neighbourhood grocery stores) was significantly lower for the middle- and above-income groups compared to the other two

⁵ The total of percentages does not add up to 100 because households were asked to list the top two items they bought from each market they visited over the last 30 days, and they can buy same food items from multiple stores or they might not buy any of those items.

⁶ e.g. rice or wheat

income groups. This might imply that middle income groups have good storing facilities at home. We did not detect large differences in monthly visiting frequency distributions among city corporations.

Table 7: Frequency of visiting different food outlets (in days per month) for households visiting a specific food outlet, by income group

	<i>N</i> <i>total</i>	<i>Mean</i> <i>total</i>	<i>N</i> <i>low-</i> <i>poor</i>	<i>Mean</i> <i>low-poor</i>	<i>N low-</i> <i>middle-</i> <i>poor</i>	<i>Mean</i> <i>low-</i> <i>middle-</i> <i>poor</i>	<i>N</i> <i>middle</i> <i>and</i> <i>above</i>	<i>Mean</i> <i>middle</i> <i>and above</i>
<i>Community wet market</i>	1927	14.03	745	14.30	772	14.47	410	12.71
<i>Temporary market-farmers market</i>	149	13.52	55	14.71	65	14.12	29	9.89
<i>Small neighbourhood grocery/general store</i>	1595	10.49	648	11.24	619	10.63	328	8.77
<i>Street vendor and Roadside stall</i>	145	10.99	65	11.47	69	10.76	11	9.55
<i>Specialist retail store-butcher, baker green grocery store</i>	50	3.57	0	-	13	2.53	37	3.94
<i>Mobile door-to-door food vendor</i>	832	11.50	345	11.49	350	11.44	137	11.71
<i>Supermarket</i>	140	3.85	0	-	4	1.75	136	3.91
<i>Online market/E-Commerce</i>	25	2.56	0	-	0	-	25	2.56
<i>Other market</i>	13	6.22	6	3.12	4	9.49	3	8.08

Table 8 shows the average money spent when respondents visited the food outlets. Regardless of the type of food outlet, households from higher income groups, generally spent more money when they visited food outlets when compared to their less wealthy counterparts (Table 8). Most money was spent on community wet markets, followed by small neighbourhood groceries/general stores. This holds for all the income groups. Households in Gazipur CC spent much more money on community wet markets (14198 BDT per month) compared to the households in any of the other city corporations (which range between 4593 BDT per month and 6120 BDT per month), and on average less money on all of the other food outlets.

Table 8: Average expenditures per visit-food outlet, by income group

	<i>Total sample</i> <i>(n=2027)</i>	<i>Low-poor</i> <i>(n=801)</i>	<i>Low-middle-poor</i> <i>(n=804)</i>	<i>Middle and</i> <i>above (n=422)</i>
<i>Community wet market</i>	7670	4139	5612	18292
<i>Temporary market-farmers market</i>	205	127	241	286
<i>Small neighbourhood grocery/general store</i>	3071	2048	2631	5851
<i>Street vendor and Roadside stall</i>	44	45	54	23
<i>Specialist retail store-butcher, baker green grocery store</i>	112	-	27	487
<i>Mobile door-to-door food vendor</i>	519	426	493	747
<i>Supermarket</i>	864	-	2	4146
<i>Online market/E-Commerce</i>	92	-	-	440
<i>Other market</i>	12	15	6	16

Note: includes all households, also the ones not buying from that outlet

The distance to different food outlets ranged between 4 and 15 minutes on average (Table 9). Supermarkets tended to be the furthest away from households, whereas the distance to mobile door-to-door food vendors was the smallest. There were no large differences in distances to major food outlets among city corporations.

Table 9: Distance to different food outlets in minutes (by income group)⁷

	<i>N</i> <i>total</i>	<i>Mean</i> <i>total</i>	<i>N</i> <i>low-</i> <i>poor</i>	<i>Mean</i> <i>low-poor</i>	<i>N</i> <i>low-</i> <i>middle-</i> <i>poor</i>	<i>Mean</i> <i>low-</i> <i>middle-</i> <i>poor</i>	<i>N</i> <i>middle</i> <i>and</i> <i>above</i>	<i>Mean</i> <i>middle</i> <i>and above</i>
<i>Community wet market</i>	1914	11	741	11	767	11	406	12
<i>Temporary market-farmers market</i>	149	9	55	10	65	9	29	9
<i>Small neighbourhood grocery/general store</i>	1594	6	649	6	618	5	327	6
<i>Street vendor and Roadside stall</i>	143	8	65	8	67	8	11	8
<i>Specialist retail store-butcher, baker green grocery store</i>	50	14	0	-	13	11	37	15
<i>Mobile door-to-door food vendor</i>	827	4	342	5	348	4	137	4
<i>Supermarket</i>	138	15	0	-	4	35	134	14
<i>Other market</i>	13	7	6	7	4	8	3	7

4.6 Home gardening

Overall, 15 percent of the households indicate that they grow crops or vegetables or keep animals at their home or in a garden close to their homes. The share of households indicating that they engage in home gardening increases with income. Only 11 percent of the low-poor income group engages in home gardening, 16 percent of the low-middle poor, and 22 percent of the middle- and above-income groups. In depth interviews of FAO team with low-income group households suggest that those households have limited access to land to conduct home gardening. Of those households that engage in home gardening, almost everyone (97 percent) consume items they have produced themselves. In contrast, only 36 percent sold items that they grew themselves over the last year. Households from the low-middle poor income group most often sold things from their home gardening (44 percent), whereas 40 percent of the low-poor income group did so, and only 25 percent of the middle- and above-income groups. On average, they have been doing so for 10 years.

The vast majority of home gardening takes place among households in Gazipur CC, where 47% of the households indicates engaging in home gardening. Households in Gazipur CC also indicate having been involved in home gardening since a longer period than households in the other city corporations.

4.7 Out of home consumption

On average households in our sample ate outside their home 12 days per month. About 77% of households eat outside at least once in a year. This frequency of eating was similar among households from different income groups. The most frequently patronized outlet for out of home consumption were formal medium-small sized restaurants (in Bangladesh also named "hotels") followed by small neighbourhood restaurants such as mudi, dikan, and departmental stores. Street vendors and roadside stalls were the third most-preferred location (Table 10). The preferences of household in out of home food outlets changed by income groups significantly. Compared to poor households, the fractions of middle income and above households that ate at big formal restaurants and fast food outlets and kiosks was higher, and that ate from street vendors, or roadside stalls was less.

⁷ We directly asked respondents how many minutes does it take them to reach the outlet, but did not ask the mode of transport. Respondents have different preferences of shopping. Some purchase when they return from job and some go directly from their houses.

Table 10: Percentage of households by the location that they most frequently eat outside home, according to income groups.

	Total sample (n=1578)	Low-poor (n=570)	Low-middle poor (n=631)	Middle income and above (n=377)
<i>Formal Restaurant (bigger places for high class)</i>	9%	1%	3%	34%
<i>Formal Restaurant (medium and small sized)</i>	44%	42%	54%	31%
<i>Small neighbourhood grocery store general store (mudi dokan/departmental store)</i>	23%	30%	23%	10%
<i>Fast food outlets and kiosk</i>	5%	1%	2%	16%
<i>Work or school canteen</i>	1%	0%	2%	3%
<i>Street vendor and roadside stall (Van/stall: chotpoti /fuchka stall with few chairs/without chairs, tong dokan)</i>	17%	26%	16%	4%
<i>Mobile door-to-door food vendor (feriwala/Jhurite kore rastai bikri- moving)</i>	0%	0%	0%	0%
<i>Supermarket</i>	1%	0%	0%	3%
<i>Other</i>	0%	0%	0%	0%



Results on consumer motives

5 Results on consumer motives

5.1 Highlights

- The choice for an outlet mainly depended on price and proximity. Poor consumers were also driven by moment of the day, they can buy food at the end of a working day when they have money and prices are lower in the evening.
- Additional to proximity and price, consumers go to wet markets because of availability (always available and larger choice) and freshness. Grocery stores were frequented especially for their proximity, convenience, ability to buy small quantities and buy on loan. For roadside stalls, ability to buy small quantities and freshness were important additional to convenient location (see figure 12).
- Consumers with low income levels were also strongly restricted by money in their choice for food and food outlets. For some, food is an issue of survival, they do not have much choice and it is crucial that food provides energy. For others price is directly related to quality: the more expensive the better whereas others like what they can afford.
- Health and food safety were two of the major motives for consumers' food choices, together with price, convenience, and sensory appeal.

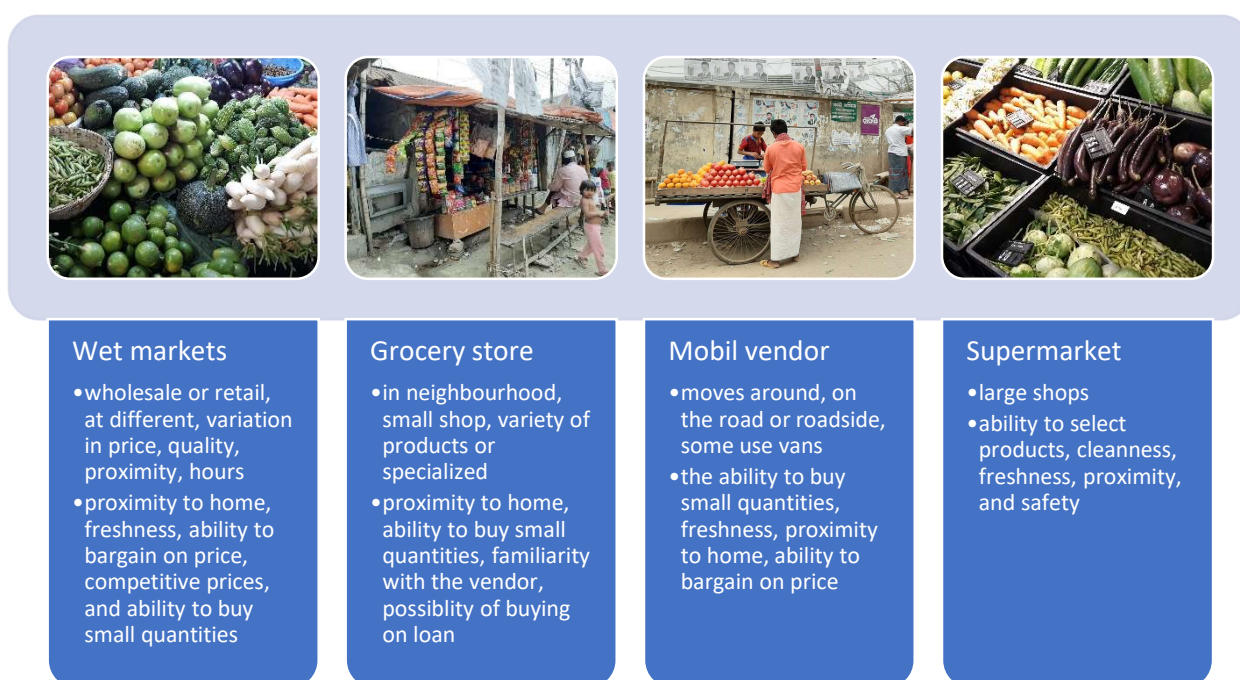


Figure 12. Description of the main outlets and reasons to buy from this outlet.

5.2 Motives for buying from specific outlets & food choice motives

5.2.1 Focus group discussion

Respondents were asked where and why they bought their foods focussing on a specific food group. In each focus group discussion two food groups were addressed: either vegetables and poultry or fish and fruit. Respondents listed all the markets they go to and per market type the main reasons to buy from there. Outlet types (see appendix D for more details) were:

- **Wet markets** were addressed by different names: kitchen market, open market, sector market, chairman market, boro bazaar, rail line bou bazar, big market and small market, farmers market. Wet markets can be either wholesale or retail markets or both. Roadside market sometimes also referred to as crossroad markets are wet markets that are close to a road and some of the shops are facing the road. There is also a difference between daily markets and week markets, the week markets are usually somewhat cheaper. Some markets operate two times at the same location, in the morning and in the afternoon until 9 pm. The main reason people go there was freshness (e.g. alive fishes), location and price, the ability to bargain on price and buy the quantity needed. Respondents also mention that there was a relation between quality and price, some markets have a better quality but are also more expensive, others are cheaper "for poor people", also whole-sale markets are a little cheaper/ Convenient locations are either close to home or on the route from work to home, in one FGD the importance of a location nearby home was stressed especially for women. For markets that are better but far from their home, respondents say they go there when they have the opportunity, or when there was an occasion to go. Other reasons to buy from wet markets were that they can check the food properly before buying, some markets were known for bringing foods directly from the agricultural land or farm and were considered safer and fresher. Another important reason to buy from wet markets is the availability of a great variation of products in high amount (abundant) and at several hours throughout the day. But again, this differs between markets. Also, specific markets were mentioned as a good place to go since this market was newly built and neat and clean. Finally, for some (nearby) markets consumers mentioned they know the vendor and can sometimes get foods on credit.
- **Grocery shops** sell from a fixed location, a small shop, and have a variety of products or are more specialised such as fruit shop, chicken shop. Those shops are in the neighbourhood (also called colony). Reasons to buy here were the convenient place, as nearby as "next to the house", that they know the owner
- **Mobile vendors** are street vendors that can move around and sell at different locations. For example, they can sell nearby schools in the morning and move to residential areas in the afternoon. Other names for this are roadside temporary shop, van vendors also referred to as "van" or "open van" or "van cars". In addition to vans some vendors use baskets to carry their goods. It was mentioned as a place they could buy from but usually they don't. Reasons to buy from mobile vendors were the convenient location and it was mentioned as an "emergency buy" or occasional buy since they were considered more expensive. Other advantages were the ability to buy the quantity needed. During the COVID-19 crisis lock-down mobile vendors were believed to be somewhat more important.
- **Supermarkets** were also mentioned as an outlet, those were considered clean

Another issue was that of time:

- In the evening the prices are lower than during daytime.
- They can only buy (fish) after work, when they have cash money. "When come back from our workplace we have to hurry up to go to market and come back home again."

There were no clear differences between the food groups except for the specialised shops such as chicken shops and fruit shops.

5.2.2 Survey

Respondents indicated their first, second, and third motive to buy food from four different outlets, if applicable to them. This showed clear differences between the outlets (see figure 13). For wet markets, proximity to home, freshness, ability to bargain on price, competitive prices, and ability to buy small quantities were the most often mentioned in people's top three motives. Proximity to home and ability to buy small quantities was also the most often mentioned motive for grocery stores, but freshness and price seemed less important there. Rather, the familiarity with the vendor and the possibility of buying on loan were important. For roadside stalls, the ability to buy small quantities was the most commonly

mentioned motive, followed by freshness and proximity to home, and the ability to bargain on price. For supermarkets, more motives were mentioned more or less equally often. Ability to select products myself was the main motive, followed by cleanness, freshness, proximity, and safety.

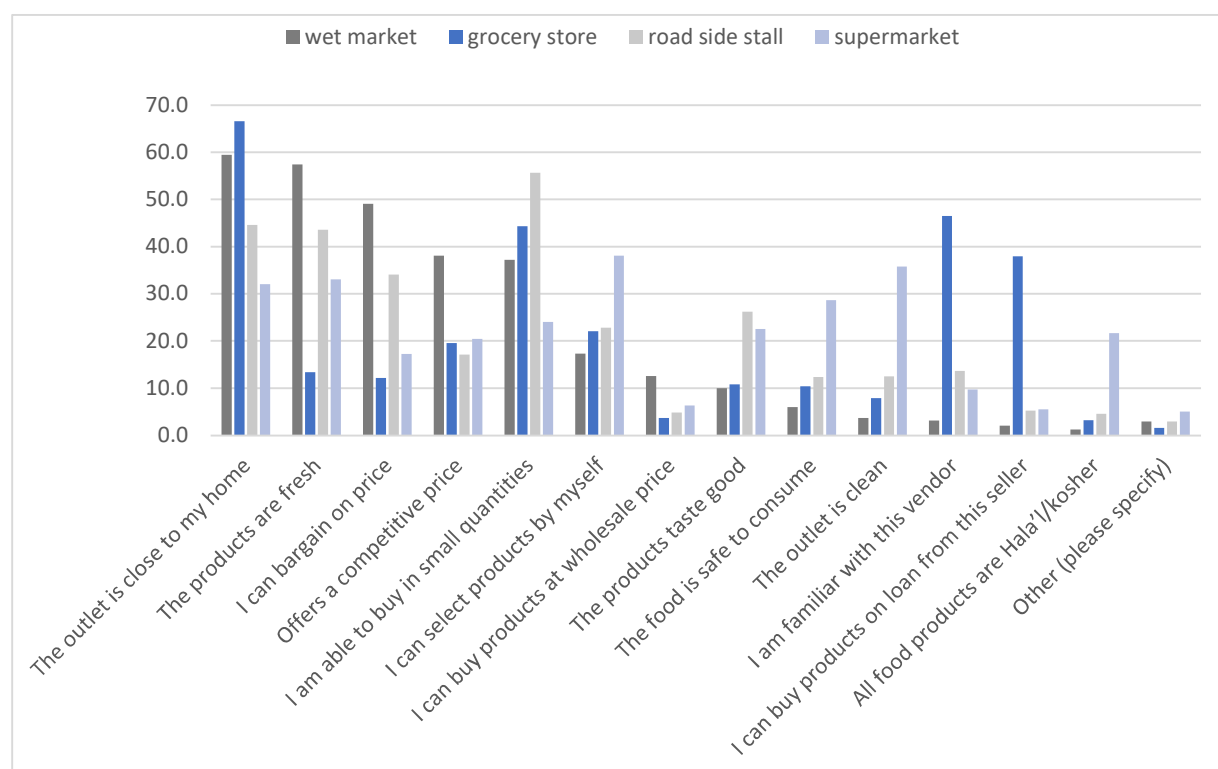


Figure 13. Most important motives (first, second, or third place) to buy from an outlet (respondents that mentioned this motive as percentage of total sample that buys from this outlet) per outlet type.

Note to the Figure: respondents who never buy from this outlet were excluded resulting in n= 1964 for wet markets, 1810 for grocery stores, 1185 for roadside stalls, and 475 for supermarkets)

When looking only at the main (first) motive for buying from an outlet, proximity to the home was the first most important factor. For buying at wet markets, the competitive price and "I can bargain on price" were important. For grocery stores, familiarity with the vendor and ability to buy borrowed products were considered important. For roadside stalls, the possibility to bargain on price and to buy in small quantities were mentioned as the main reason. For supermarkets, proximity was also the most cited factor but less compared to the other outlets. Several other motives were also mentioned quite often including the ability to select products themselves, the competitive price and ability to bargain on price, buy small quantities and freshness. Respondents also reported their second and third most important motive. Ability to purchase small amounts and freshness were often mentioned as second most important motive as well as ability to bargain on price for wet markets.

We found very similar patterns between in the income groups in their motives to buy from certain outlets, only minor differences were found and especially for the highest income groups, the supermarkets, and the less mentioned motives the results can be somewhat distorted by the smaller sample sizes (see appendix B). Buying products on loan from supermarkets was important to a larger share of the respondents in the low income group and ability to choice products themselves in supermarkets was important to a larger share of respondents in the middle-low income group and a smaller share of respondents in the middle-high income group. A clean outlet and Hala'l/kosher products were more important for the middle-high income group for supermarkets. For this group, the ability to buy on loan from grocery stores was less important, also the ability to buy small quantities from wet

markets and supermarkets was important to a smaller percentage of the middle-high income group compared to the other income groups.

5.3 General food choice motives

5.3.1 Focus group discussion

5.3.1.1 Spontaneous issues mentioned in relation to food choice

Respondents were asked about their favourite dishes and why this was their favourite. This exercise brought up already the spontaneous associations that respondents have with food choice (see Table 11). The favourite meals of respondents were rice, fish (e.g. katchki, tilapia, hilsa, small fish, small shrimp), vegetables (e.g. bottle gourd, spinach, leafy vegetables) and pulses (e.g. lentils/ dal) as well as other types of meat (e.g. poultry, beef) and potato. When explaining their favourite meal several motives were mentioned of which income was a main motive. Respondents explained that they are poor and prefer foods that are not expensive and that are within their capacity since their low **income** restricts their possibilities and they cannot eat expensive food every day, *"we earn less that is why I like dal and rice"* *"When I earn more, I eat meat and fish and when I earn less I eat vegetables"*. Some state that they like fish and meat because they cannot afford it. So, some prefer what they can afford while others prefer food that is more expensive than they can afford. Closely related to income, respondents mentioned the issue of **survival**, the respondents eat what they can get to survive without paying attention to the taste. **Food providing energy** was also preferred, this is related to their low income and hard physical work. *"These foods are for the poor; they give us energy"*.

Other issues were related to taste, health, and food safety. The **tastiness** of food and pleasure to eat it, liking by themselves and family members were most often mentioned in relation to taste but also the look of it. For **health**, many different aspects were mentioned. First health in general such as "good for the body" and "keep health well", second nutrients and vitamins in general and specific (i.e. protein, vitamin C and iron), third functional and medicinal aspects of health (i.e. good for digestion, eyesight, asphyxia, purifies blood), and fourth, related to health status: two respondents mentioned they have diabetes. **Food safety** was mentioned in general *"cheaper food is usually not good food"*, as well as specific issues of adulteration: if the food is infected with insects means less contaminated, formalin, dirty feed for fish, have medicine in it, fertilizer use, problems due to frozen beef, plastics in rice and eggs, and condensed cooking oil. Finally, some issues we mentioned related to **mood**: good feelings, feel comfortable; **convenience**: easy to get, easy available, quick and easy preparation; **traditional**: national fish, related to Bengali nationality or region, food they use to eat since childhood *"because we are Bengali people and like these"*; **keeping the body cold** (in sunshine), and being a **vegetarian**.

Table 11. Spontaneous mentioned motives by participants of focus group discussions and examples of citations

Motive	Specific issues
Low income and price	The fact that they are people with low income / poor people, inability to eat food such as fish every day. Less expensive, these foods are for the poor, we eat the food that we can manage to buy, within our capacity, the main factor is money, variation in income (meat and fish when income is higher), cheap, like what they cannot afford (fish and meat). <i>"we earn less that is why I like dal and rice"</i> . <i>"We prefer these foods because we are poor"</i> <i>"if we do not have money, how can we eat any other food?"</i> <i>"I cannot manage good foods as my income is low, so I eat these foods"</i>
Survival	Certain foods are eaten because they must, for survival. We eat what we can get, we eat to survive, I eat whatever I find, we are happy with what is provided by Allah, <i>"I don't get taste in any food. I just eat to survive"</i> . Have to eat it.
Providing energy	Foods that provide much energy for physical work, that are high in energy, gives us / me energy, energetic food, foods that boost the body's energy, <i>"fish has calory that is why along with it I like vegetables"</i> <i>"we work hard. So, we need energy to work"</i>
Sensory pleasure	The food gives pleasure to eat, it is tasty, family members like it, liking, tastes (really) good, (feels) good to eat, feel like having ... Appearance <i>"I take (buy) what is beautiful to see"</i>

Health	General: Are good for health, keep their health well, remain / keep body healthy, good for the body, Nutrients: gives (us)/ contain/ provides vitamin, vitamin C, nutrient, proteins, iron, provide nutrition to the body, rich in vitamin, fill the deficiencies in the body, Functioning of the body: good for digestion (the toilet is clean), causes allergy (beef), good for eyesight, medicinal for asphyxia due to the dusty environment, gastric problems, purifies blood, diabetic patient, improves eye vision.
Food safety/ Natural content / adulteration	Foods infected with insects are less contaminated, food contaminated with formalin are not good food / will create disease, eats dirty feed (tilapia), have medicines in it (vegetables and herbs), cheaper food is usually not good food, formalin free, people become sick due to fertilizer use in poultry and fish, problems due to frozen beef, rice and uncooked egg made of plastic, cooking oil gets condensed (sediment in the bottom of the oil container due to soybean oil adulterated by pum oil), free from diseases
Mood / good feeling	Feels body good, feel comfortable
Convenience	Always available, easily available, easy to get (lentils, rice and fish), can be cooked quickly and easily (egg), available in our area
Traditional	It is our national fish, because we are Bengali people and like these, Bengali people are habituated (fish and rice), best food considering our region, used to having it (egg) from childhood
Cold body Diet	Body feels cold in sunshine, keeps the body cool I am vegetarian

5.3.1.2 Positive and negative associations with food

When consumers were asked to bring up any aspect related to “good food and less good food” several food safety issues were brought up (see appendix E for a detailed list of issues). Good food was often defined as fresh food. Freshly caught fish, vegetable fresh from the field, sold on the market in the early morning. Other aspects of **good food safety** were: living or lively, neat and clean (including packaged), not contaminated with germs, insects, formalin, good looking including a good (green) colour “*I can tell the food is good just by seeing it.*”, organic, shelf life (dry fish and small fish that they can keep alive). Also, the source was mentioned such as fish from the river, village pond, and fisheries nearby, food bought from a particular place of known seller. Local or native varieties of fish, chicken and cows were preferred over hybrid ones since hybrid one was considered less good and more adulterated. Negative aspects, of a **bad food safety** were also mentioned. Especially, foods being not fresh, rotten, decaying, dry (vegetables), old, stale, spoiled, dead (fish) wasted, and kept too long, without fridge. In addition, many aspects of food adulteration were mentioned related to contamination with formalin, insecticide, medicine, chemical fertilizers (such as for ripening of fruits), poison, and colouring. These contaminations were either added directly to the food or during the production process, for example: “*milk is not pure since vitamins are used for cows*”. Also, cultured fish, warehouse vegetables, and fishery fish were considered less good. Other contamination sources mentioned were dirt (e.g. dust and dirty water), insects, and spotted food. A bad food safety was also related to inability to detect it because: it is not possible to know what is in the food, because the food looks good but it is not, or because of lack of knowledge “*We are illiterate we don’t understand everything*”.

Price was also an aspect that was related to either good or less good food. For some, good food was the food that is within their budget, bought at reasonable price or what could be bought for more money “*If the income is good then the food is good as well*”. Similarly, good food were expensive foods, beyond their financial capacity, and expensive. Some varieties of fish or pulses are more expensive than other. Both freshness and adulteration were also related to people’s low income and inability to afford better food, “*we don’t think about the food we take. Sometimes, even knowing that the food is not good, we have to take it because of lack of money.*”, “*We are not able to buy the fresh fish in the morning, we have to wait till 11.30 to buy fishes by that time already the fish got little spoiled*”.

Also, the motive **sensory appeal** was often mentioned when discussing good and less good food. In a positive way: tasty and good-looking food, food that they like, that is ripe. Respondents explained that they carefully check the food to see if it is good. Also, fresh food was considered tastier. Negative aspects

of sensory appeal were not tasty, monotonous, and dry (not juicy) food. Cultivated fish and adulterated food was considered less tasty.

Healthy food was also defined as good food. Positive aspects of **health** were good for health in general, nutritious food, provides energy, filling, vitamin and protein content, and related to the source *"Fish from the river contains more vitamins"*. Negative aspects of health were that it makes you sick, causes gastric problems, or related to allergies.

Readily available food was considered good food as well. On the contrary, **availability** was also mentioned in a negative way that all food are contaminated and there are no good foods available *"All foods are adulterated, we have to find out which is with less chemical and formalin, whatever product we purchase, we think it mixed with chemical"*. Again, this was also related to price, some participants mentioned that all food is bad so they could just as well take the cheaper one, others said that they tried to buy the good one when they had the money.

Other motives mentioned were **convenience**, specifically the time needed to carefully check food on the market, **vendor behaviour** both in positive way (selling for good price) and negative behaviours related to rough bargaining.

5.3.2 Survey

In addition to motives for buying from a specific outlet, also general motives for food consumption were measured. Rather than related to the choice of outlets food choice motives relate to the choice of foods. On average, all motives scored above 4.0 indicating that all the motives were considered somewhat to quite important in food choice. The main reasons that defined what respondents ate on a regular day were price, health, safety, convenience, and sensory appeal. Environmentally friendliness and weight control were the least important (see Figure 14).

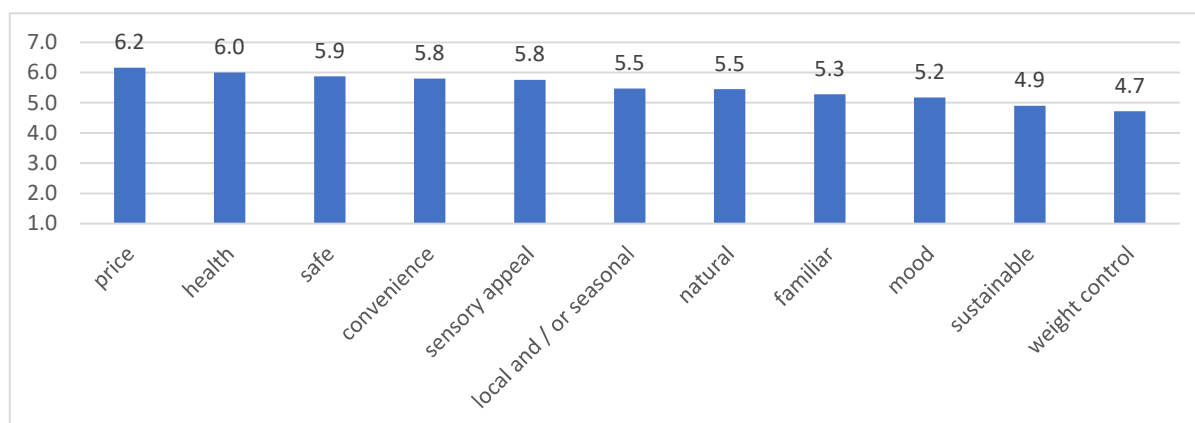


Figure 14. General food choices motives (average score on a scale from 1 (not important at all to 7 very important)

For food choice motives, significant differences were found between the income groups for all the motives (Figure 15). The middle- and above-income group attached more importance to all motives compared to the other income groups except affordable that was significantly less important to this group.

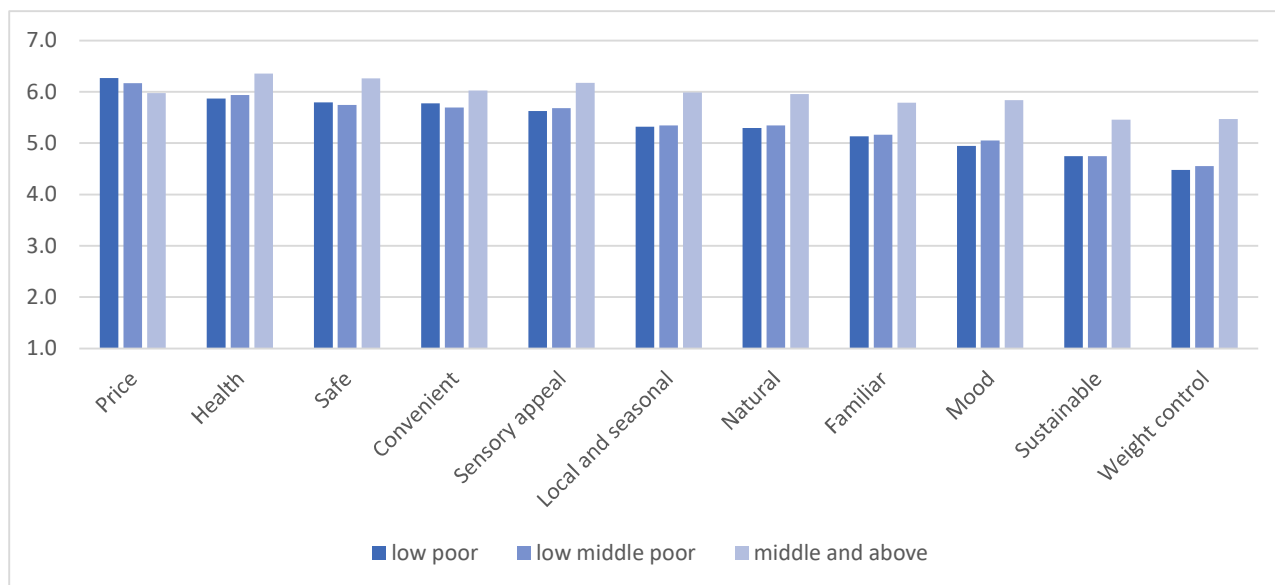


Figure 15. General food choices motives (average score on a scale from 1 (not important at all to 7 very important) for income group

Significant differences were found between the city corporations for all the motives. Health was considered most important in Gazipur CC followed by North Dhaka CC and Narayanganj CC (not different from each other) and least in South Dhaka CC. Safety was considered most important in Gazipur CC and North Dhaka CC (not different from each other) followed by Narayanganj CC and in the South Dhaka CC it was considered least important. Differences were however minor in size (see appendix C).



Results on consumer health and food safety perception

6 Results on consumer health and food safety perceptions

6.1 Highlights

- Consumers mentioned food contaminations, adulterations, and fraudulent practices as their main concerns; all food groups were reported to be affected by adulterations. Also, they reported food to be of bad quality and not fresh.

- For health, most perceptions were related to a healthy body, functioning of the body, strength and energy and nutritional content. Money is a problem, consumer with a low income feel that healthier and safer food are more expensive and not affordable for them.

- The source of food is also important, both for health and safety perceptions respondents mentioned home grown, local breeds, and local production to be better. The specific aspects that respondents related to food safety and to health differed between consumers. The figures 16 and 17 give an overview of all aspects.

- All consumers have food safety concerns but their reactions to the situation differ and seem to be related also to personal coping strategies: *submit* to the fact that there are no safe foods, *anger* about their weak position and the fraudulent sellers, *critically inspect* the foods they buy and the packaging, and also *consider the source* of production (including home grown, animal feed), *choice of safe foods* especially traditional Bengali foods such as lentils and local varieties.
- Also, the safety perceptions of out of home food was low and out of home food was also mentioned as one of the major perceived causes of suffering from diarrhoea.
- Vomiting and diarrhoea due to food contamination was reported more often by consumers from the lower income group.
- Consumer with higher income levels rated health and food safety as more important than those from the lower income groups and felt more confident that they could purchase, prepare and consume healthy and safe foods, also food safety and health were considered more important in their food choice.

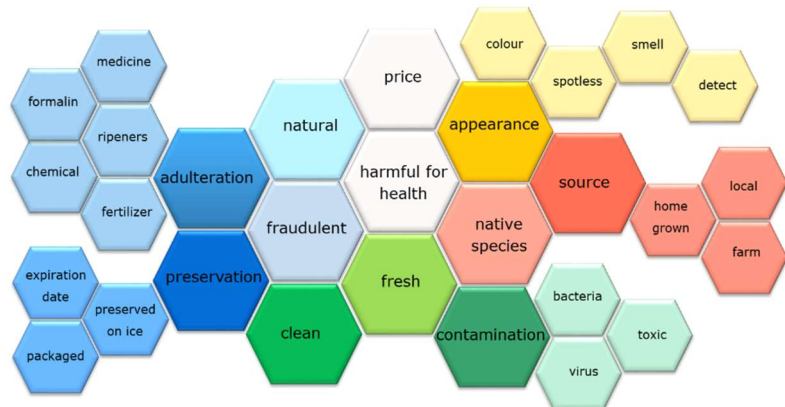


Figure 16. Aspects related to safety of food by consumers

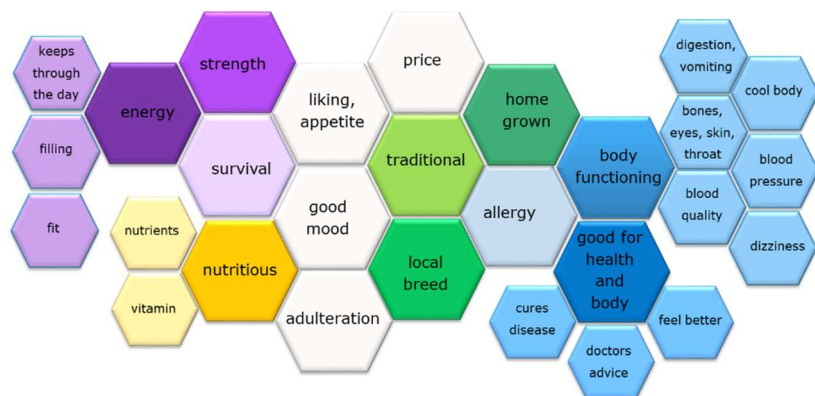


Figure 17. Aspects related to healthiness of food by consumers

6.2 Food contaminations

In 7% (151) of the cases, a member from the respondents' household suffered from diarrhoea in the month before the survey, and in 92% (1869) nobody suffered from diarrhoea, while 6 HHs (0.3%) could not report about diarrhoea infection. The probable causes of suffering from diarrhoea are shown in Figure 18. It was found that, overall, the respondents believe that the major cause of suffering from diarrhoea was contamination of food consumed outside the home (39%), followed by food contaminated during preparation at home (38%), food contaminated during storage (28%), water contaminated (24%), and food contaminated during production/ on the market (14%). About 30% of respondents report a blood pressure problem and 20% reports diabetes problems among their household members.

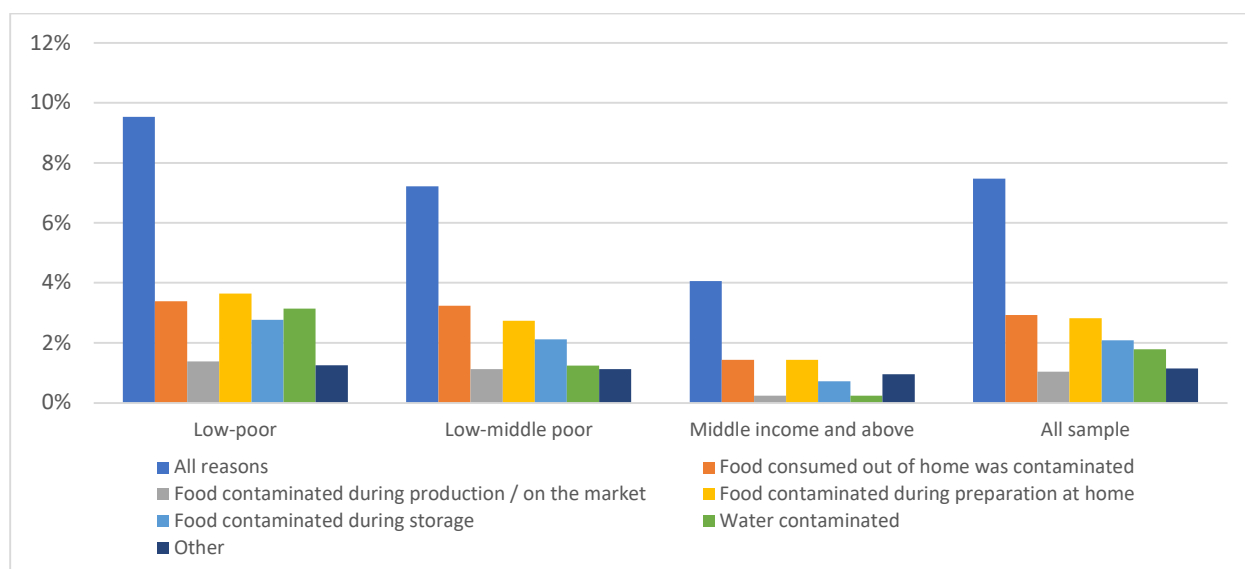


Figure 18: Percentage of households that a member of the household suffered from diarrhoea and/or vomiting due to food contamination over the past month, by reported reason.

Vomiting and diarrhoea due to food contamination, diabetes and blood pressure prevalence differ by the income group of households. Figure 18 reports the percentage of households where a member has suffered from and/or vomiting due to food contamination over the past month. The Figure shows that this percentage decreases with income, and the reasons differ by income groups. Food contamination during storage or water contaminations was more often reported as the reason for vomiting and diarrhoea by respondents from the low-poor group compared to middle income and above. The prevalence of diabetes and blood pressure problems increases with income (Figure 19). Over 20 percent of household's experience diabetes or blood pressure. Among middle income and above households this percentage increases to over 30 percent of the households.

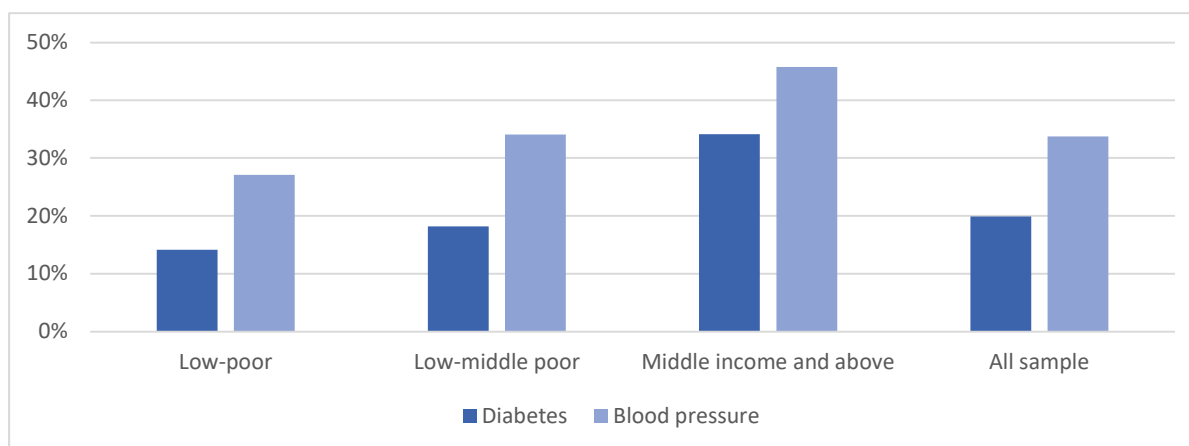


Figure 19: Fraction of households with members experiencing diabetes and blood pressure problems.

6.3 Consumers' health and safety motives and perceptions

6.3.1 Focus group discussion

6.3.1.1 Health related motives

Respondents were asked to rank foods from most to least healthy and explain the reasons behind their ranking, this exercise provided insight in aspects of food that they relate to health; the health-related food choice motives. Consumers described health in a **generic** way of **healthy and good for the body**, such as keeps my body well or is beneficial for health. Closely related to this is foods that actually make them better or **make them feel better**, cures disease, or that are advised by their doctor. **Functional aspects** of food were also mentioned "keep the body functioning" as well as specific beneficial or negative effects of food on eyes, bones, skin, throat, digestion, dizziness, vomiting, blood pressure, blood quality, and keeping the body cool. The **allergens** and **nutritious content** of food was also mentioned or more specifically vitamin content and nutrient content of foods. For some, this was related to **tradition** such as childhood or being Bengali "these are the foods for the Bengali people, and they contain more nutrition". Food was considered healthy when it provides **strength** and **energy**, when is it filling and keeps people fit and through the (working) day. For some, healthy food is a matter of survival "we cannot survive without eating rice" and are strongly related to money and price "If the income is good then the food is good as well". Sensory aspects such as a **good taste and liking** of a product are also mentioned in relation to health, as well as increasing the **appetite** and providing **good mood**. Finally, consumers mentioned aspects related to the production: **home grown**, and **local breeds** were considered healthier and **adulteration** for a having a negative impact on health. A more detailed description and examples of health motive related aspects is provided in Appendix F.

6.3.1.2 Food safety related motives and coping

Next, respondents were asked to rank foods from most to least safe to eat and explain the reasons behind their ranking. This provided insight in aspects of food that they relate to food safety. Consumers mentioned bad food quality, **food contaminations** and **adulterations** as their main concerns; all food groups were affected by adulterations. For some foods also, respondents explicitly mentioned that these could not be adulterated (for example rice, spinach) but this was not consistent, others mentioned adulterations for the same foods. Specific adulteration practices that were mentioned were the use of chemicals, medicine, formalin, fertilizer, and fruit ripeners but also indirect adulterations through animal feed. Respondents also mentioned **fraudulent** practices such as plastic rice, rubber egg, and soap mixed in milk. Contaminations that were reported were with bacteria, virus, and toxic. **Natural** food was seen as most safe: pure and without harmful things. **Freshness** was another important aspect of safe food. Respondents reported that some foods were of bad quality, rotten, etc. Related to this was the issue of food **preservation**, including packaging. The **appearance** of food was also mentioned but in different ways, while some said that it is not possible to see from the appearance of food if it is safe or not, other

reported a range of strategies to critically review the level of safety of the food such as (absence of) insects, colour, spots, smell etc. Finally, there was some overlap between the aspects mentioned in relation to health and in relation to safety: for both the **source** of food was important (home grown, local, local breeds) and the **price**. Better food was considered to be more expensive. A more detailed description and examples of safety motive related aspects is provided in Appendix F.

All consumers had food safety concerns but their reactions to the situation differs and seem to be related also to personal coping strategies: *submit* to the fact that there are no safe foods (within their budget) and that they are not knowledgeable, *anger* about their weak position and fraudulent sellers, *critically inspect* the foods they buy and the packaging, and also *consider the source* of production (including home grown, hybrid), sellers and feed and medication that has been used for animals, *choice of safe foods* especially traditional Bengali foods such as lentils and local varieties.

6.3.2 Survey

Both health and food safety motives were (somewhat) important for consumer with average values of health 5.52 (SD=1.17) that were higher than that of food safety 5.04 (SD=1.44) ($t=16.32, p<0.001$). Generally, consumers were pessimistic about the safety of foods, but they were also optimistic. Scores on pessimism (mean=5.35, SD=1.39) were higher than on optimism but the scores indicated on average agreement with both optimism and pessimism (mean=5.07, SD=1.66) ($t=5.51, p<0.001$). Optimism and pessimism scores were weakly but significantly correlated ($r = -0.10, p < 0.001$) this means that respondents with higher optimism scores have lower pessimism scores and the other way around. Cross tables showed that a large proportion of respondents scores high on both optimistic and pessimistic or low on both, also a reasonable proportion scores high on optimism and low on pessimism. In other words, consumers who have concerns about the safety of their food but at the same time they can still have a positive perception of the general level of food safety as well but on average those who were more optimistic score lower on pessimism. The confidence in the safety of food was positive and high for most food groups and somewhat lower but still on average positive for fruits and milk and fish. Out-of-home foods scored much lower on safety perceptions with average scores below the scale mid indicating a low level of trust. The different outlet types did not clearly differ from each other, but street foods scored slightly lower (figure 20). Self-efficacy scores were calculated for health and safety. Self-efficacy for healthy food was moderate, people felt they were somewhat able to acquire, prepare and consume healthy food, means were 5.21 (SD=1.31). For food safety, consumers scored on average 4.07 (SD=0.67) on self-efficacy which was lower than for health ($t=47.78, p<0.001$). This means that consumers felt less confident to acquire, prepare and consume safe compare to healthy food and that on average they felt neither positive nor negative about their ability to acquire, prepare and consume safe food.

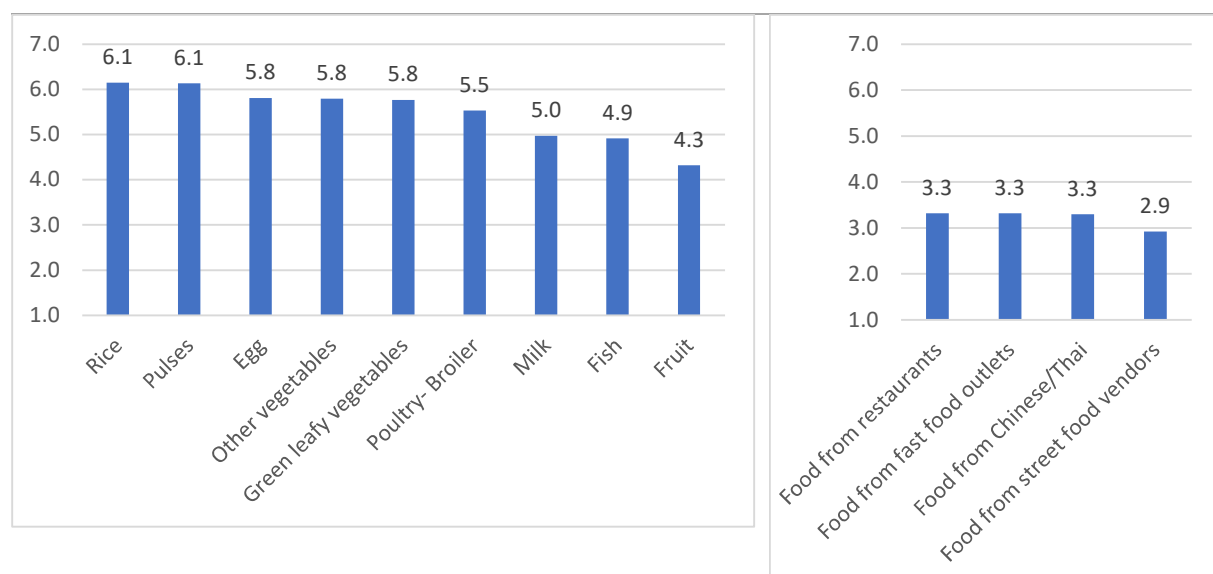


Figure 20. Confidence in the safety per food group (average score on a scale from 1 (not important) to 7 (very important)).

Differences between the income groups were also found on health ($F=45.06, p<0.0001$) and food safety motive ($F=25.20, p<0.0001$), self-efficacy for health ($F=31.96, p<0.0001$), self-efficacy for food safety ($F=101.62, p<0.0001$), and pessimism ($F=7.31, p=0.001$) but not for optimism. Food safety and health was considered more important in the food choice of the middle-and-above consumer compared to the lower income groups (that did not differ from each other). Self-efficacy increased with income level, the low-middle poor felt more confident that they could purchase, prepare and consume healthy and safe foods and the middle-and-above were more confident than the low-middle poor. For pessimism, the low-middle income group was less pessimistic than the other two groups, that did not differ from each other.

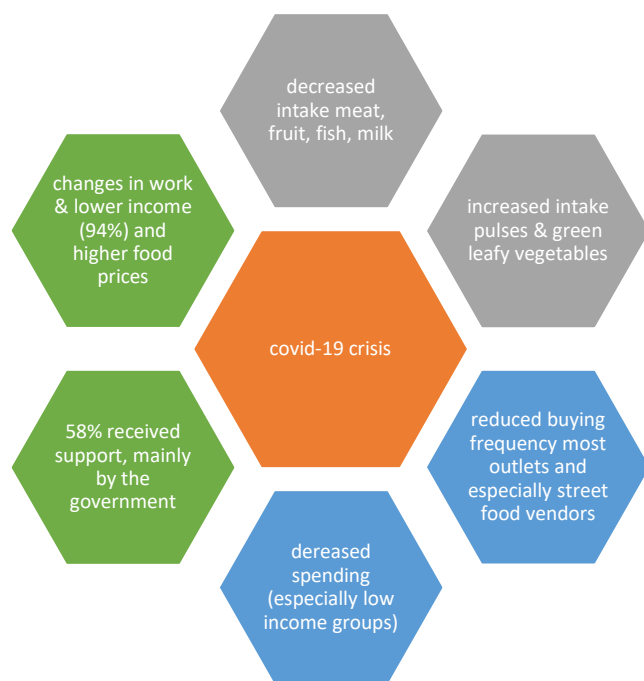
Differences between the city corporations were also found on health ($F=34.66, p<0.0001$) and food safety motive ($F=10.72, p<0.0001$), self-efficacy for health ($F=49.03, p<0.0001$), self-efficacy for food safety ($F=125.58, p<0.0001$), optimism ($F=52.48, p<0.0001$), and pessimism ($F=15.84, p<0.0001$). Health was considered more important in Gazipur CC compared to the other CCs while food safety was considered more important in North Dhaka CC and Narayanganj CC. Self-efficacy for health was higher in North Dhaka CC and Narayanganj CC while self-efficacy for food safety was higher in Narayanganj CC and Gazipur CC. Optimism about food safety was highest in Narayanganj CC followed by Gazipur CC and pessimism was highest in Gazipur CC (see appendix C).



Results on the influence of COVID-19 on food purchase, intake, and security

7 Results on the influence of COVID-19 on food purchase, intake and security

7.1 Highlights



- During the time of the data collection, August 2020, the COVID crisis influenced daily life and food purchase in several ways.

Figure 21. Impact of COVID-19 crisis.

- Households experience financial challenges since March 2020 mainly due to decreased income and the majority of the households coped with those challenges through government, family and friend, or NGO support.
- Food insecurity was very high

in our sample, especially in the lower income groups.

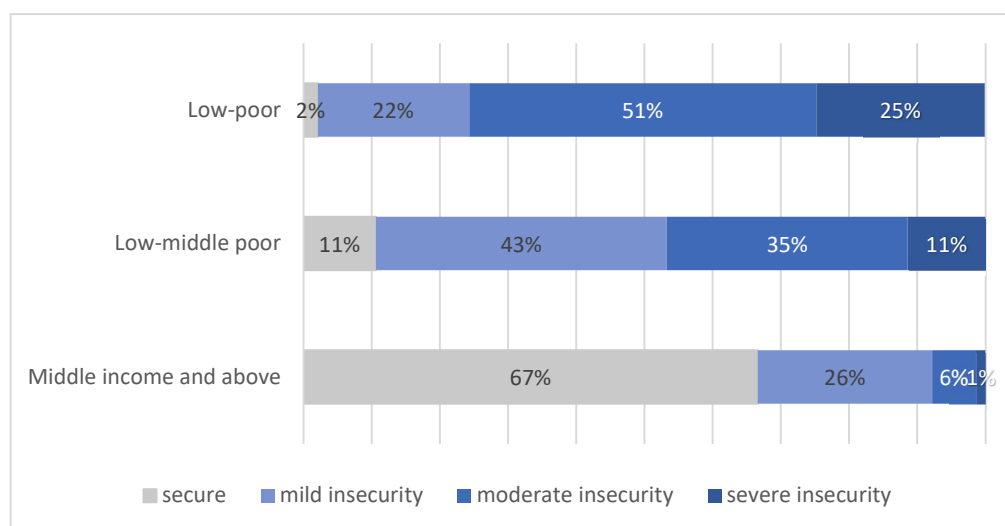


Figure 21. Percentage of respondents by level of food insecurity per income group

7.2 COVID-19 related behaviour and worries

Almost all respondents said they complied with social distancing and other COVID-19 prevention behaviours. A majority washed their hands more often since March 2020 (99.1%), avoided handshakes or physical greetings (88.5%). Also, avoiding groups with more than 10 people (87.6% all or most of the time), washing hands after being in public (95.6% all or most of the time), and wearing mask in public (94.1%) were common. Stock up more food than normal was reported by fewer people (20.7% yes)

whereas reducing the number of times to market or grocery shop was reported frequently as a reaction to the crisis (81.5% yes).

Almost all respondents had sufficient water (98.5% yes) and soap to wash their hands (94.6% yes). 32.9% indicated that since March 2020, one of their household members needed to make use of public transportation services (e.g. formal bus, informal bus, rideshare) and 53.5% of those said that they faced no difficulties while 37.8% said frequency of service was reduced, and 8.9% was not able to access it.

Worries related to the COVID-19 crisis were high on all domains, including health, economic impact, limitation of rights, and access to products (see figure 22).

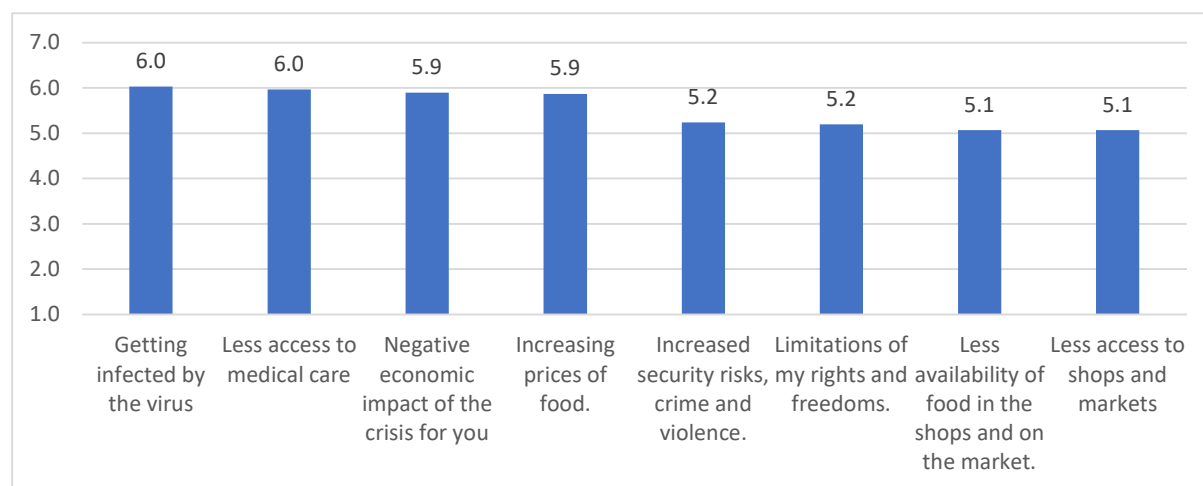


Figure 22. Worries related to COVID 19 (average score on a scale from 1 (not at all) to 7 (a lot))

7.3 Household purchases and food insecurity

COVID-19 affected household life in various ways in Bangladesh. Since March 2020, almost one-third of the respondents were unable to buy the main staple food in Bangladesh, rice (29.5% yes). 35% of the consumers noticed 'Increase in price', which was the highest percentage followed by 'Other' reasons which was 34%. 29% of consumers said that the shopkeepers had no access to cash and cannot pay with credit card. 27% experienced restrictions to go outside, 16% said that 'Local markets were not operating/closed', 7% of them had limited/no transportation, 4% said 'shops had ran out of stock, 3% could not afford it and 1% refused to answer which was the lowest percentage of all.

Since COVID-19, households less frequently ate fruit, meat products, and milk. Instead they have more frequently eaten pulses and green leafy vegetables. Figure 23 shows that the fraction of households that report a decreased in the frequency of eating fruits, eggs, chicken, other milk, and fish was higher than household that were middle income and above group. This implies that the COVID-19 has influenced the food intake of poor households more negatively than others. This might be due to limited storage available to poor households and because poor households could not afford buying food due to ongoing economic crisis.

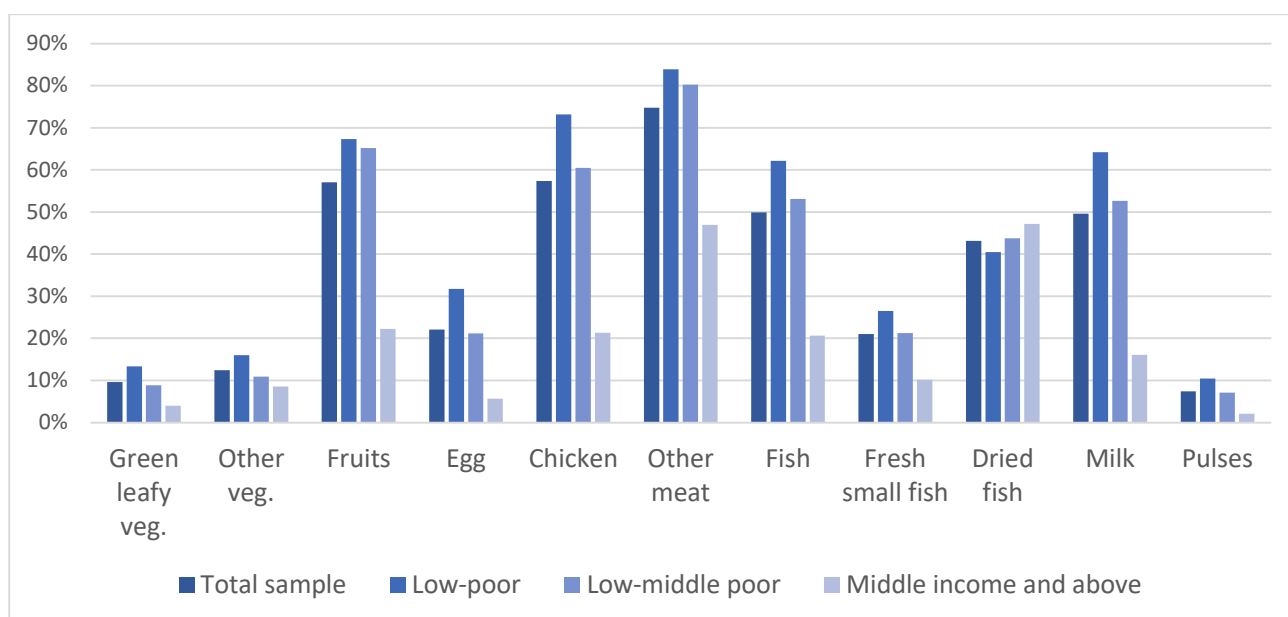


Figure 23: The percentage of households that eat less from food groups since March 2020-COVID-19, by income groups

Since March 2020, the majority of the households in our sample experienced some levels of food insecurity. The score of food insecurity was calculated by summing up the Yes answers to 8 questions, resulting in a score between 0 (no to all questions) and 8 (yes to all questions).⁸ 19.2% of the household had a score of 0 indicating that they were food secure, 30.9% suffered from mild food insecurity (scores 1-3), 36.1% from moderate food insecurity (scores 4-6) and 13.8% of the sample from severe food insecurity (scores 7 or 8). Food insecurity increased with decreasing income levels (Table 12).

Table 12: Food insecurity for the total sample and per income group

	Total sample (n=2027)	Low-poor (n=801)	Low-middle poor (n=804)	Middle income and above (n=422)
secure (score 0)	18.9%	2.1%	10.6%	66.6%
mild (score 1-3)	31.0%	22.2%	42.7%	25.6%
moderate (score 4-6)	35.5%	50.9%	35.3%	6.4%
severe (score 7 or 8)	14.6%	24.7%	11.4%	1.4%

In general, visits to food outlets had declined strongly since the start of the corona crisis in March 2020. Depending on the food outlet, 54 to 90 percent of the households indicate visiting less frequently (Table 13). Online markets were least affected by the corona crisis, as 27 percent of the households indicate buying from this outlet more frequently. However, interestingly, a small majority still indicated even visiting online markets less frequently. Households do not only visit the food outlets less frequently, but they also indicate spending less money. The changes in spending align with the changes in visits, which

⁸ Those eight questions were "Since March 2020, was there a time when, because of lack of money or other resources, you or your household members were worried you would not have enough food to eat/ were unable to eat healthy and nutritious food/ only a few kinds of foods/had to skip a meal/ate less than you thought you should/your household ran out of food/were hungry but did not eat/went without eating for a whole day?"

could potentially be a result of households having less income, and therefore also spending less on food items.

Table 13: Change in frequency of household visits to on different food outlets

	Visits		
	More	Similar	Less
Community wet market (n=1925)	6%	27%	66%
Temporary market-farmers market (n=148)	0%	28%	72%
Small neighbourhood grocery/general store (n=1593)	6%	27%	67%
Street vendor and Roadside stall (n=144)	3%	8%	90%
Specialist retail store-butcher, baker green grocery store (n=50)	0%	30%	70%
Mobile door-to-door food vendor (n=830)	4%	28%	68%
Supermarket (n=139)	4%	32%	63%
Online market (n=26)	27%	19%	54%
Other market (n=13)	0%	31%	69%

Table 14: Change in household spending on different food outlets

	Spending		
	More	Similar	Less
Community wet market (n=1925)	11%	21%	68%
Temporary market-farmers market (n=148)	6%	17%	77%
Small neighbourhood grocery/general store (n=1593)	11%	22%	67%
Street vendor and Roadside stall (n=144)	2%	6%	92%
Specialist retail store-butcher, baker green grocery store (n=50)	6%	24%	69%
Mobile door-to-door food vendor (n=830)	6%	21%	73%
Supermarket (n=139)	9%	35%	56%
Online market (n=26)	23%	19%	58%
Other market (n=13)	8%	38%	54%

Except for specialist retail stores, there were no statistically significant differences ($p = 0.05$) between income groups and the change in number of visits due to the corona crisis. For the spending, however, there were a couple of differences (Table 14). In general, spending decreased less for the higher income groups. Specifically, spending decreased less for the middle and above income groups for community wet markets, small neighbourhood groceries and mobile door-to-door food vendors compared to the low-poor income group, and for community wet markets and mall neighbourhood groceries also compared to the low-middle poor. Spending as well as visits to mobile door-to-door food vendors decreased more for the low-poor income group compared to the low-middle poor. See appendix B for a detailed overview of changes in frequency of visits and spending by socioeconomic group.

7.4 Money and food support

Households experience financial challenges since March 2020 mainly due to decreased income and the majority of the households coped with those challenges through government, family and friend, or NGO support. Most respondents (1630 out of 2027) indicated to have increased shortage of money or other resources due to the COVID-19 crisis. The most important reason for this shortage was changes in work or lower income (see Figure 24), also higher food prices was an important reason and to a lesser degree higher expenditures (such as for housing and health care), shortage of food, and transportation issues. From all respondents, 58.2% received money or food support since the start of the Covid-19 crisis.

Among those respondents, the majority (68.0%) received money or food from the government, 43.0% indicated they received money from individuals that are not friends of family such as local elite persons, and 26.5% from NGO's or private companies. A minority received money or food from family, friends, working place, religious institutes, or other sources (see Figure 25).

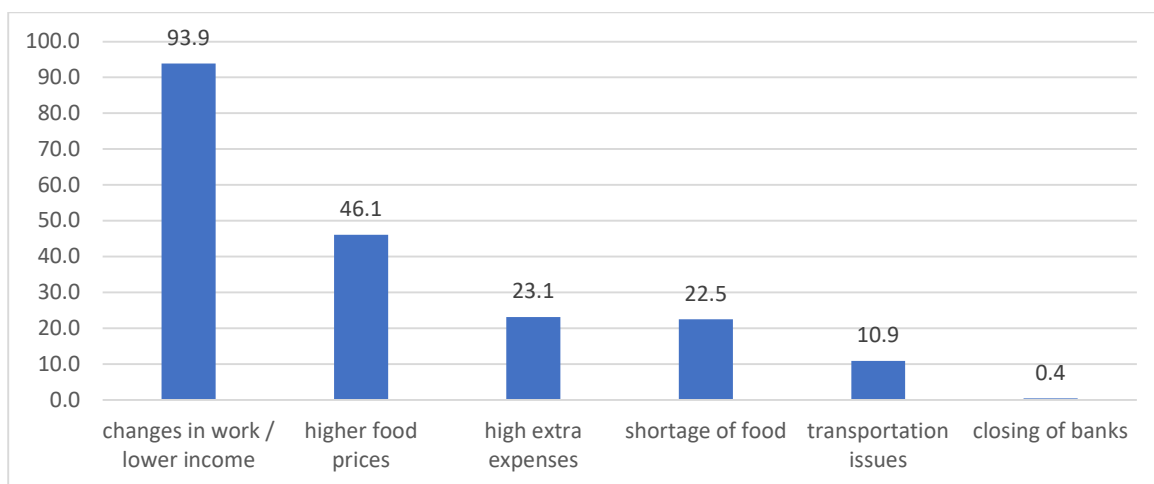


Figure 24. Percent of households by main reasons for increased shortage of money or other resources due to the Covid-19 crisis in percentages (n=1630, more than one answer allowed so percentages do not add up to 100)

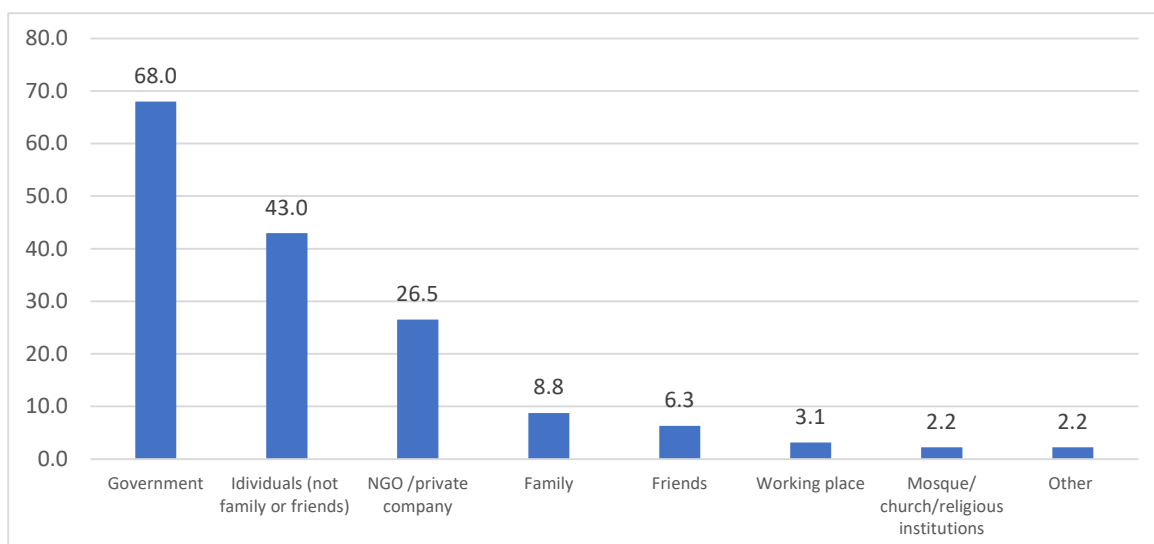


Figure 25. Sources of money and food support in percentages (n=1177 – more than one answer allowed so percentages do not add up to 100)



Results adolescents survey

8 Results adolescent survey

8.1 Highlights

- There were differences between adolescents in involvement with cooking and food purchase with a quarter being involved almost daily, while other are never involved or several times per week. Adolescents were more likely to be involved in food preparation or cooking than in the decision making process on what to buy and cook.
- All adolescents consumed products from the food group *staple foods* and *vegetables* and almost 9 out of 10 consumed products out of the *animal origin protein* group. Within the animal origin group fish and seafoods and eggs were consumed most frequently. Also, white roots/tubers, legumes, and dark green leafy vegetables were regularly consumed. Compared to adults, the intake of fruit was higher. Consumption of vitamin A rich fruits and vegetables was low (Figure 26).

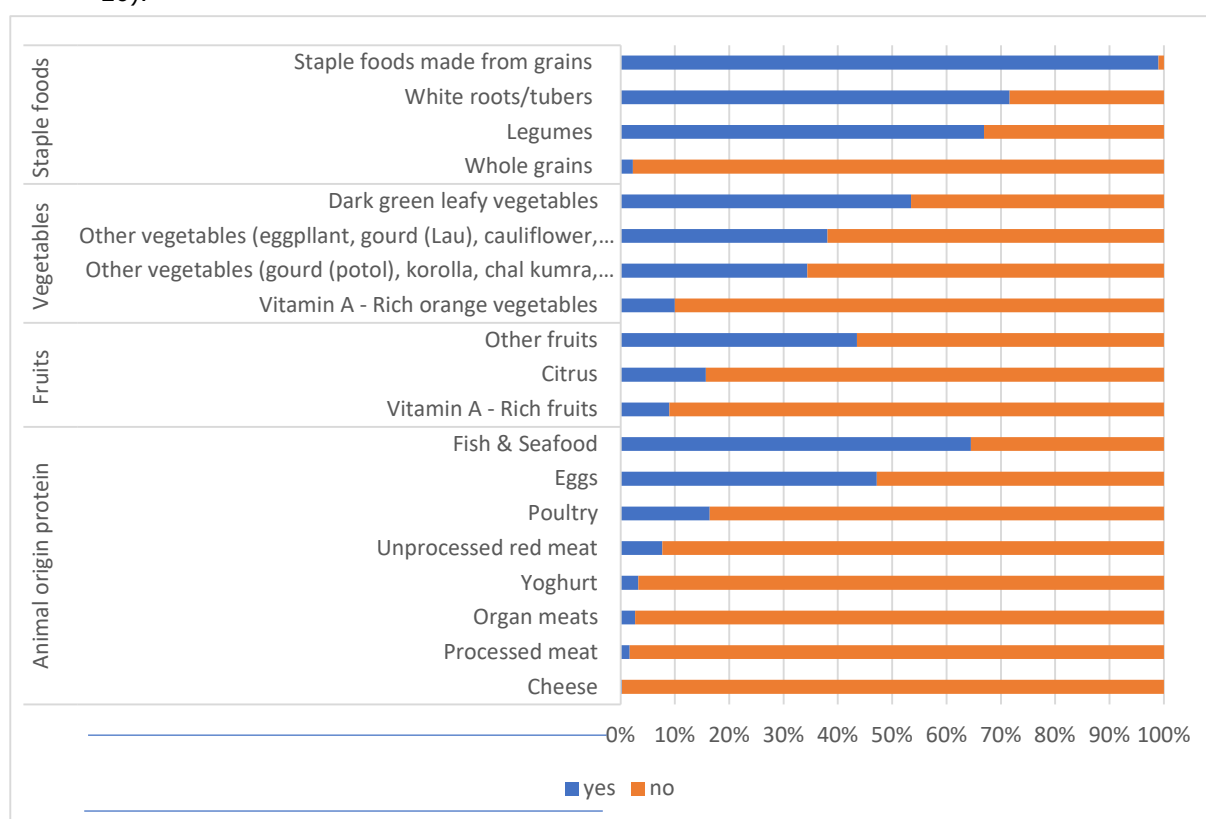


Figure 26: Consumption of mean food groups in the last 24 hours (Adolescents, N=299)

- Almost all adolescents, indicated to consume fish usually. Interesting is that when big and small fish were consumed in the past week, they were more likely to be consumed on more than one moment on that consumption day, this was not the case for dried fish. Adolescents were not a fan of dried fish in comparison with big and small fish.
- Popular outlets for adolescents when they were buying food for themselves were the small neighbourhood store followed by a formal medium-small sized restaurant, while the community wet market was by far the most popular place when they were buying food for their household (Figures 27 and 28).
- When buying food for themselves adolescents mainly buy products from the groups *food grains* and *miscellaneous*. Interesting is that they seem to have a preference for specific products at a specific outlet. For example they were more likely to buy chips at the small neighbourhood store,

puri, chola makha and parota at the formal medium-small sized restaurant and tea with sugar at the street vendor or road side stall.

- when buying food for their households adolescents seem to buy products from all food categories (vegetables, food grains and fish) that contribute to dishes.

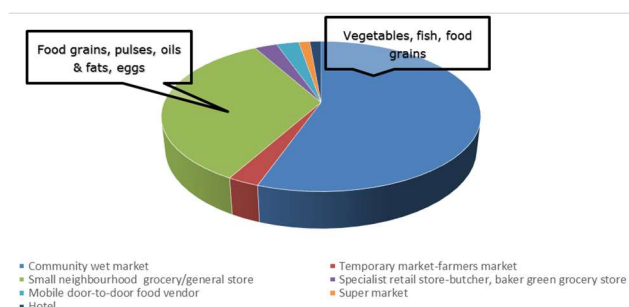


Figure 27. Number of adolescents buying items from specific food groups by food outlet for themselves in the last 30 days/month, for major food outlets⁹

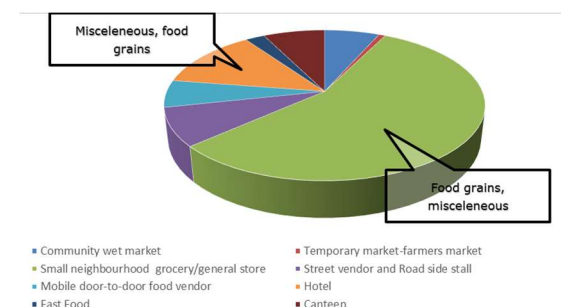


Figure 28. Number of adolescents buying items from specific food groups by food outlet for their household in the last 30 days/month, for major food outlets

- On food choice motives, adolescents scored quite similar to their parents, adolescents seem to perceive safe as more important than adults and health equally important. Adults seem to perceive price to be more important than adolescents. Similar to the adults, adolescents perceive rice and pulses to be most safe and milk, fish and fruits to be somewhat less safe in comparison with the other food products/categories. Foods consumed outside home were perceived as least safe. Adolescents also seemed to perceive plant based proteins and vegetables (both the leafy as the other vegetables) to be more healthy than animal based proteins.

8.2 Adolescents' food intake, food purchase and expenditures

8.2.1 Demographic characteristics

Table 15 presents the summary statistics of the socio-demographic characteristics of the 299 adolescents that participated in the adolescent study. As shown, slightly more girls than boys participated (51.8% vs. 48.2%), the age ranged from 15 to 19 years, with a mean of 17.28 years, 86.6% is unmarried and almost all adolescents live with their family (except 6 persons). The majority is a student (38.1%), while 28.8% earns money and 33.1% does not. The areas of residence within Dhaka metropolitan are equally distributed and slightly more than half of the sample belongs to a low middle poor household and the others to a low poor household.

Table 15: Socio-demographics of the study sample

Basic characteristics	N	%
Area of residence		
Dhaka North City Corporation	73	24.4
Dhaka South City Corporation	75	25.1
Narayanganj City Corporation	75	25.1
Gazipur City Corporation	76	25.4
Frequency age (range 15–19)		
Average (M, SD)	17.28	1.291
15 years	37	12.4
16 years	53	17.7
17 years	52	17.4

⁹The following outlets weren't included in this figure as none of the adolescents visit this specific outlet type in the last 30 days: Street vendor/road side stall, online market, restaurant, Fast Food, canteen and other markets.

	18 years	103	34.4
	19 years	54	18.1
Gender	Girls	155	51.8
	Boys	144	48.2
Socio economic class	Low Poor Household (1-10000)	141	47.2
	Low Middle Poor Household (10001-20000)	158	52.8
Current Occupation	Student	114	38.1
	Non-earning	99	33.1
Marital status	Earning	86	28.8
	Unmarried	259	86.6
Respondent live with	Married	40	13.4
	Family	293	98.0
	Relative	4	1.3
	Mess (student and work related dorms)	2	0.7

As shown in table 16 adolescent are more likely to be involved in food preparation or cooking than in the decision making process about the food that should be bought or what food should be cooked. On average the respondents take part in food preparation or cooking 2.8 times per week. It should be noted that there is also a high number of adolescents not involved in this process (n=104, 34.8%) and that the adolescents who are involved in this process are more likely to be involved on a daily basis (n=79, 26.4%). The other respondents are more likely to be involved multiple days per week (1-3 days). When looking at the decision making process. The participating adolescents are more likely to be involved in the decision about what food should be cooked at home than about what is bought. On average they are involved in this process 2.2 times per week. But just like the involvement in the preparation process 30.8% (n=92) takes never part in the decision process on what is prepared and 42.8% of the respondents is never involved in the decision making process on what food there should be bought. On average they were involved in the buying decision process around 1.9 times per week.

Table 16: Involvement in food decision making and food preparation

	Mean	SD
Take part in food preparing or cooking	2.738	2.854
Take part for decision making about what food to buy for home	1.21	1.877
Take part for decision making about what food to cook at home	1.661	2.185

Note: The scores are calculated on a weekly average. Meaning 0= on average not involved to 7 = on average daily involved.

8.2.2 Food intake frequencies

Food intake over the last 24 hours of several food groups was measured by asking whether the respondent consumed the food the day before the interview (yesterday/last 24 hours). Figure 29 provides an overview of the food groups that were consumed in the last 24 hours. All adolescents consumed products from the food groups staple foods and vegetables, almost all adolescents (89%) consumed products from the food group animal origin proteins, while around half of the study population consumed fruits, sweet or drinks. As shown the food category 'staple foods' were consumed most frequently, especially staple foods made from grains (e.g. rice, bread), followed by white roots/tubers. It seems that these staple foods are combined with some protein (both animal and/or plant sourced) and vegetables. Looking at the protein rich food group, 67% of the adolescents indicated they consumed legumes/pulses in the last 24 hours, whereas 46.8% of the adolescents consumed 2 or more products from the food group animal sourced proteins. Fish and seafood were the most frequently consumed animal-sourced protein products, followed by eggs. Looking at the vegetable food group in more detail, dark green leafy vegetables were most frequently consumed followed by other vegetables (e.g. cauliflower, eggplant, korolla, etc.). Slightly more than half of the respondents (53%) consumed fruits in the last 24 hours, most of them consumed fruit from one fruit category (40%). Fruit species like apples, bananas, guava etc. were consumed most frequently. The consumption of both vitamin A rich fruits and vegetables was low.

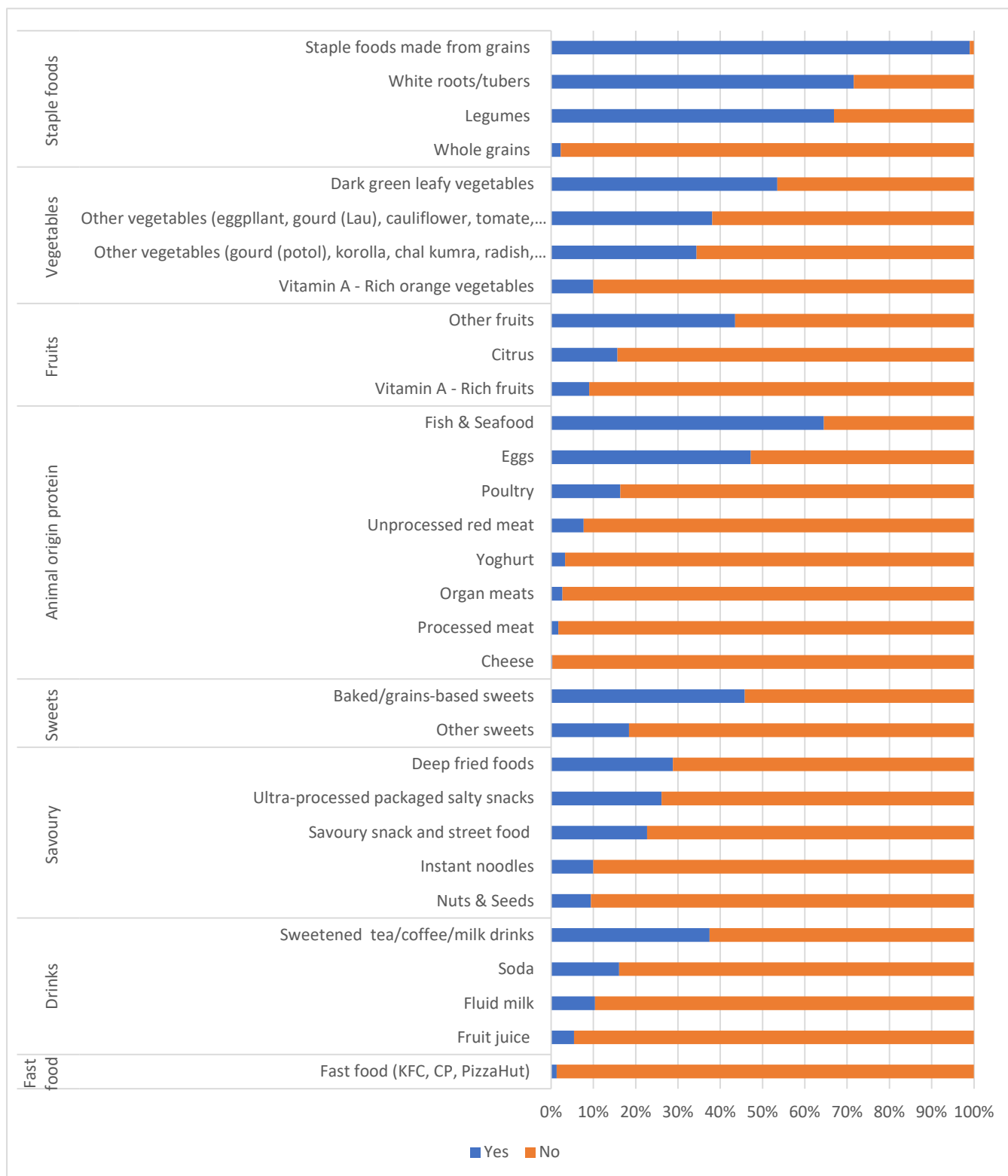


Figure 29: Consumption of different food groups in the last 24 hours (Adolescents, N=299)

8.2.2.1 Fish consumption

For fish, frequency of consumption was additionally asked. Almost all adolescents, except 1, indicated to consume fish usually (Table 17). While in the previous measure, 64.5% of the adolescents indicated that they consumed fish and/or seafood in the last 24 hours. It was found that the average consumption

frequency of fish is between 0.7 and 1.5 days per week depending on the fish type. As shown in the table below big fish seemed to be consumed most frequently throughout the week, while the average weekly consumption frequency of dried fish was the lowest. Dried fish are also consumed by a lower number of adolescents. Interesting is that when big and small fish are consumed, they are more likely to be consumed on two moments on that consumption day, this is not the case for dried fish.

Table 17: Fish consumption frequency

		<i>Big Fish (N=227)</i>	<i>Small fish (N=182)</i>	<i>Dried fish (N=111)</i>
<i>Weekly consumption average</i>	Mean	1.54	1.02	0.66
	SD	1.233	0.995	1.084
<i>Consumption frequency throughout the day per last consumption day</i>	1 time in the last day of consumption	26.8%	21.7%	52.3
	2 times in the last day of consumption	43.8%	37.8%	42.3
	3 times in last day of consumption	5.4%	1.3%	5.4

8.2.3 Food outlets

Adolescents purchases food for their selves and/or for their household, however latter was less common. All adolescents indicated that they visited a food outlet to buy food for themselves in the last month/30 days, whereas 18.7% of the adolescents (N=56) indicated that they also bought food for their household in the same period. Adolescent most commonly visited one food outlet type, some visited 2 or 3 food outlet types. Table 18 below shows the percentages of adolescents that visited different outlets for themselves or for their household. The small neighbourhood grocery or general store and community wet market are the two outlets that are most likely/frequently visited by adolescents. However, when buying food for themselves adolescents are also visiting formal medium-small sized restaurants (in Bangladesh also named "hotels"), street vendor/roadside stalls or canteens.

Table 18: Percentage of adolescents visiting different outlets for themselves or for their household in the last month/30 days.

	<i>Adolescents visiting food outlets for themselves (N=299)</i>	<i>Adolescents visiting food outlets for their household (N=56)</i>
<i>Community wet market</i>	6%	73%
<i>Temporary market-farmers market</i>	1%	4%
<i>Small neighbourhood grocery/general store</i>	48%	45%
<i>Specialist retail store-butcher, baker green grocery store</i>	0%	4%
<i>Street vendor and Roadside stall</i>	7%	0%
<i>Mobile door-to-door food vendor</i>	5%	4%
<i>Supermarket</i>	0%	2%
<i>Online market/E-Commerce</i>	0%	0%
<i>Restaurant</i>	0%	0%
<i>Formal medium-small sized restaurants</i>	11%	2%
<i>Fast food</i>	2%	0%
<i>Canteen</i>	6%	0%
<i>Other market</i>	0%	0%

Table 19 and 20 reports the percentage of adolescents that visited a food outlet type in the 30 days prior to the data collection and bought a food product from specific food groups. The type of food that adolescent buy depends for whom they are buying for themselves or their household. When buying food for themselves they mainly buy miscellaneous foods (e.g. chips, singara, samosa, puri, jhalmuri, tea with sugar, etc.) at the different outlet stores. However, small neighbourhood groceries, street food vendors and formal medium-small sized restaurants adolescents also like to buy food grain products (e.g. biscuits, cake, parota, bonroti, etc.). It is interesting that for these two food groups adolescents have

specific products that they like to buy at each of these food outlet types (see also figure 27). This all doesn't apply for the community wet market. Here adolescents seem to buy food categories that contribute to meals and dishes, e.g. vegetables and fish were here mainly bought. This was the case for all adolescents and was not related to being girl or boy or married or unmarried. When adolescents are buying foods for their household, they mainly buy vegetables at all the different outlet types. However, at the market they are also likely to buy fish and at the small neighbourhood grocery they are more likely to buy food grains, oils and fats and eggs (see figure 28). Interesting is that adolescents mainly buy onions or potatoes at the small neighbourhood store while at the market a larger variety of vegetable species are bought.

Table 19: Percentage of adolescents buying items from specific food groups¹⁰ by food outlet for themselves in the last 30 days/month, for major food outlets.

	Community wet market (N=17)	Temporary market-farmers market (N=2)	Small neighbourhood grocery/general store (N=144)	Street vendor and Road side stall (N=21)	Mobile door-to-door food vendor (N=15)	Formal medium-sized restaurant (N=33)	Fast Food (N=6)	Canteen (N=19)
Food grains	23.5	0	80.6	57.1	6.7	66.7	33.3	36.8
Pulses	11.8	0	5.6	0	0	0	0	0
Fish	41.2	50	0.7	0	6.7	0	0	5.3
Eggs	23.5	0	6.9	0	0	9.1	0	0
Meat	0	0	0	0	0	0	0	0
Vegetables	88.2	100	9.7	0	26.7	0	0	5.3
Milk and dairy	0	0	2.1	0	0	0	0	0
Oils & fats	0	0	5.6	0	0	0	0	0
Fruits	0	0	1.4	4.8	0	3	0	5.3
Spices	0	0	0.7	0	0	0	0	0
Miscellaneous	11.8	0	63.2	90.5	73.3	69.7	83.3	73.7

Note: The following outlets weren't included in this table as none of the adolescents visit this specific outlet type in the last 30 days: Specialist retail store, supermarket, online market, restaurant and other markets.

¹⁰ Food grains = barley, Beaten rice, Biscuits, Bread/Bonroti, Cake, Flour, maize, millet, Pop rice, Puffed rice, Rice – Coarse, Rice – Fine, Rice – Medium, Semolina/ Suji, sorghum, Vermicelli/Wheat (Atta), Flat bread (Ruti), Parota, Cooked Rice, Khichuri, Bread, Buns, biriani, tehari, polao.
Pulses = Bengal gram, Black gram, Chickling-Vetch (mug), Green gram (boot), Lentil (musur), Mashkalai, Other (specify), Pea gram (khesari), Red gram, soybean, Pulse based any cooked dish
Fish = Baila, Boal/Air croaker, Dried fish, Eel fish, giant sea perch, Hilsa koi, Magur/Shing. Mala-kachi/Chala-chapila/Khalsha
Other small fishes (with tangra) Pangash Puti/Big Puti/Telapia/Nilotica Rhui/catla / Mrigel/ Kali baush rohu, sea fish
Shoal/Gajar/Taki Shrimp Silver carp/Grass carp/ Mirror carp tuna, walking catfish Other specify Fish based any cooked dish
Eggs = Duck egg, Farm hen egg, Local hen egg, Egg boil, Egg fry, Egg based any other cooked dishes
Meat = Beef, Beef organ meat, Broiler, Buffalo, Duck, Hen organ meat, Local hen, Mutton, Sheep, Sonali, Other specify, Chicken based any cooked curry, Beef/Mutton curry, Other organ meats
Vegetables = All types of leafy veg. (Spinach/ Amarantha/ Basil), Arum/Ol-kachu/Kachur-mukhi, Balsam apple, Bean/Lobey, Brinjal, carrot, Cauliflower/Cabbage, chilli, Green banana/ Green papaya, Ladies' finger, onion, Perbol, (Patal), Potato, Radish, Snake gourd/ Ribbed gourd, Tomato, Water gourd, White gourd/ Pumpkin, Cucumber, Other specify
Milk & Dairy = Casein (ponir)/ Butter, Curd, Liquid milk (cow), Liquid milk (goat), Milk drinks, Powder milk
Oils and Fats = Dalda/ Vanashpati, Ghee, Palm oil, Soybean oil (open), Soybean oil (packed)
Fruits = jujube, apple, Apple asian pear, Bedana, Black berry, breadfruit, carambola, coconut, emblic, Grape, Guava, Jack fruit, jambolan, Leeches, Mango, Melon/Bangi, monkey-jack, Orange, palmyra palm, persimmon, Pineapple
Ripe banana, Ripe papaya, Safeda, Watermelon, wood apple, coconut,
Spices = spearmint leaves, chili, condiments and herbs, coriander,, indian pennywort, Other specify
Miscellaneous = chips, chanchur, singara, samosa, puri, alo chop, Beguni, Jhalmuri, Chotpoti, fuchka, Chola makha, Chola boot, Ghoogni, Candies /chocolates/Logence, potato fries, chicken fry, burger, Sandwich, Hotdog, Pastry cake, Sweets, Jilapi, Coke/7-up/Sprite/Mojo/energy drink, Tea with sugar, Cofee with sugar, Other,Specify

Table 20: Percentage of adolescents buying items from specific food groups by food outlet for their household in the last 30 days/month, for major food outlets

HOUSEHOLD	Community wet market (N=41)	Temporary market-farmers market (N=2)	Small neighbourhood grocery/general store (N=25)	Specialist retail store-butcher, baker green grocery store (N=2)	Mobile door-to-door food vendor (N=2)	Supermarket (N=1)	Formal medium-small sized restaurant (N=1)
Food grains	17.1	0	80	0	0	100	100
Pulses	7.3	0	80	0	0	0	0
Fish	56.1	50	0	0	0	0	0
Eggs	9.8	0	40	0	0	0	0
Meat	4.9	0	0	0	0	0	0
Vegetables	92.7	100	32	100	100	0	0
Milk and dairy	0	0	0	0	0	0	0
Oils & fats	4.9	0	52	0	0	100	0
Fruits	0	0	0	0	0	0	0
Spices	0	0	4	0	0	0	0
Miscellaneous	2.4	0	12	0	0	0	100

Adolescents seemed to visit specific food outlets more frequently for buying foods for themselves than for their household (Table 21). The most popular outlets, formal medium-small sized restaurant, small neighbourhood groceries and street vendors are visited more than two days per week, whereas the canteen is visited three days per week. The most frequently consumed food from street food vendors was tea with sugar and from the formal medium-small sized restaurant is was parota, a type of flat bread. On average adolescents buy food for their households between one to two days per week, this doesn't differ across the most visited food outlets.

Table 21: Frequency of visiting different food outlets (in days per week) for adolescents visiting a specific food outlet for themselves or for their household

	Number of adolescents visiting food outlets for themselves	Mean (SD)	Number of adolescents visiting food outlets for their household	Mean (SD)
Community wet market	17	2.16 (2.07)	41	1.56 (1.25)
Temporary market-farmers market	2	1.00 (0.00)	2	1.50 (0.71)
Small neighbourhood grocery/general store	144	2.26 (1.49)	25	1.79 (1.41)
Specialist retail store (e.g. butcher, baker green grocery store)	0	-	2	1.50 (0.71)
Street vendor and Roadside stall	21	2.87 (1.99)	0	-
Mobile door-to-door food vendor	15	1.56 (0.77)	2	1.00 (0.00)
Supermarket	0	-	1	0.25 (0.00)
Online market/E-Commerce	0	-	0	-
Restaurant	0	-	0	-
Formal medium-small sized restaurant	33	2.65 (1.83)	1	0.75
Fast food	6	0.79 (0.64)	0	-
Canteen	19	3.00 (2.25)	0	-
Other market	0	-	0	-

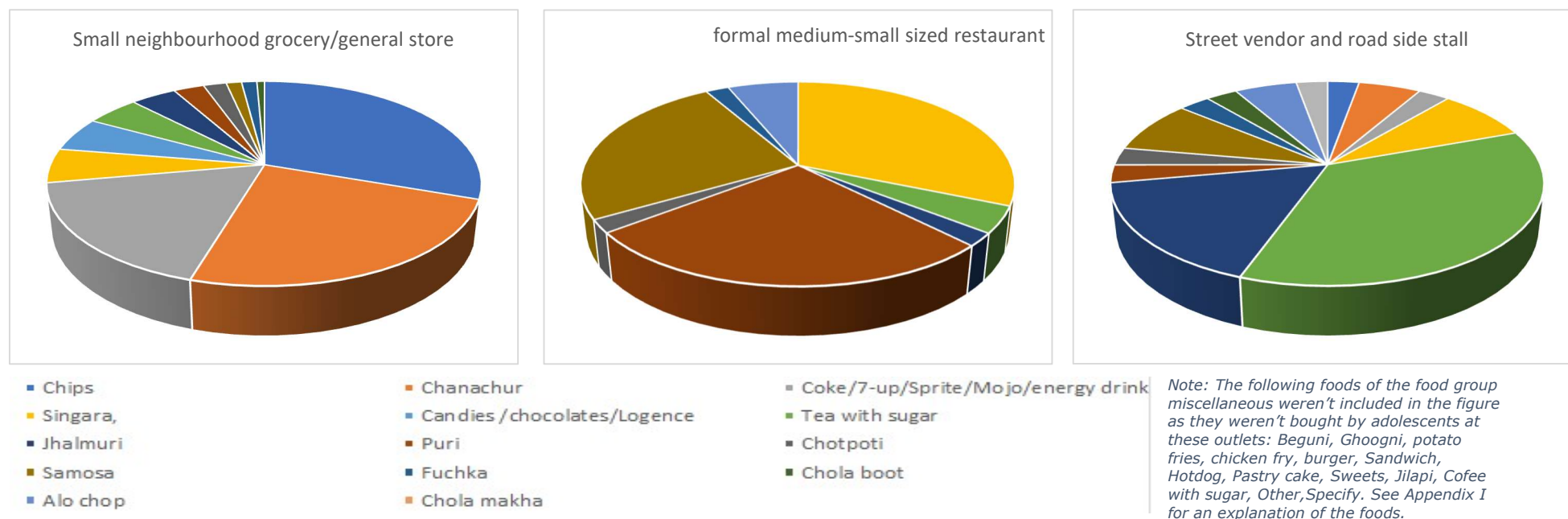
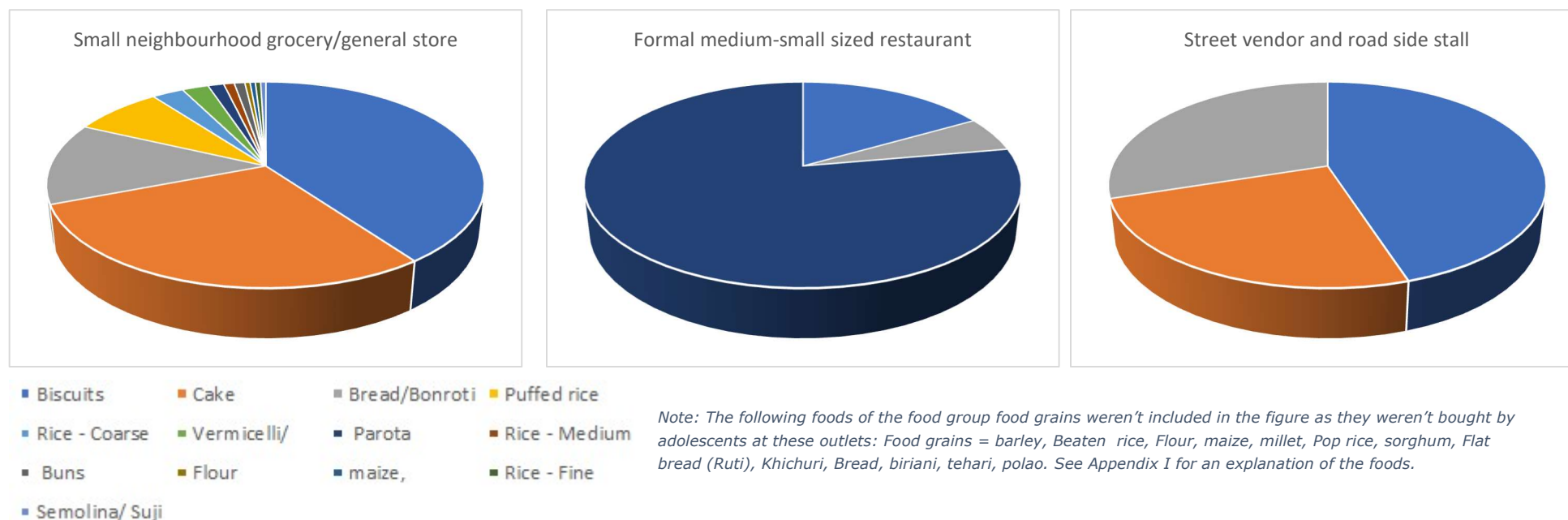


Figure 30: Number of adolescents buying items from the specific food groups "Miscellaneous" by three of the most visited outlet for themselves in the last 30 days/month, for major food outlets



Note: The following foods of the food group food grains weren't included in the figure as they weren't bought by adolescents at these outlets: Food grains = barley, Beaten rice, Flour, maize, millet, Pop rice, sorghum, Flat bread (Ruti), Khichuri, Bread, biriani, tehari, polao. See Appendix I for an explanation of the foods.

Figure 31: Number of adolescents buying items from the specific food groups "Food Grains " by three of the most visited outlet for themselves in the last 30 days/month, for major food outlets

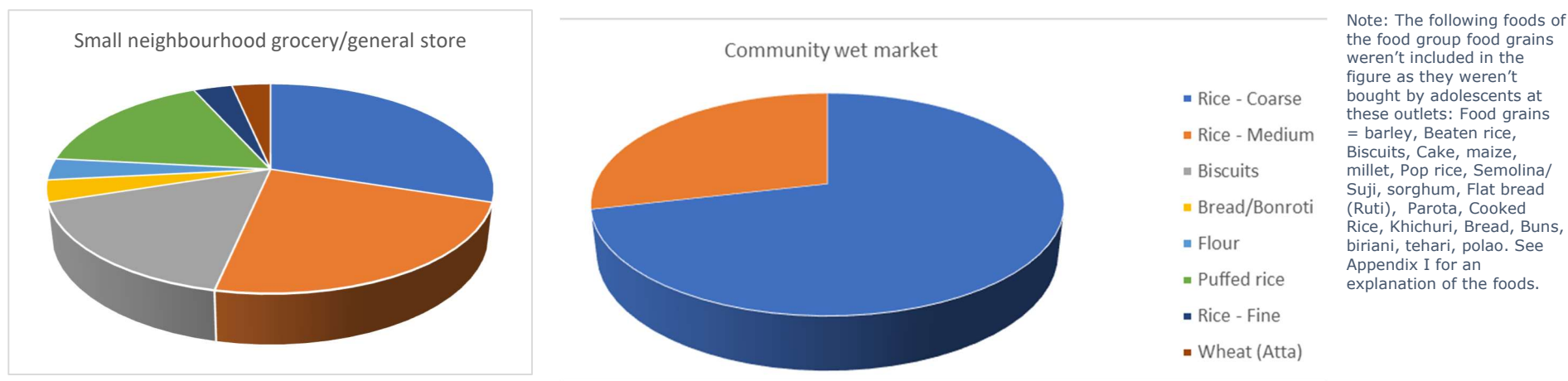


Figure 32: Number of adolescents buying items from the specific food groups "Food Grains " for their household at two of the most visited outlets in the last 30 days/month, for major food outlets



Figure 33: Number of adolescents buying items from the specific food groups "Fish" for their household at two of the most visited outlets in the last 30 days/month at the community wet market

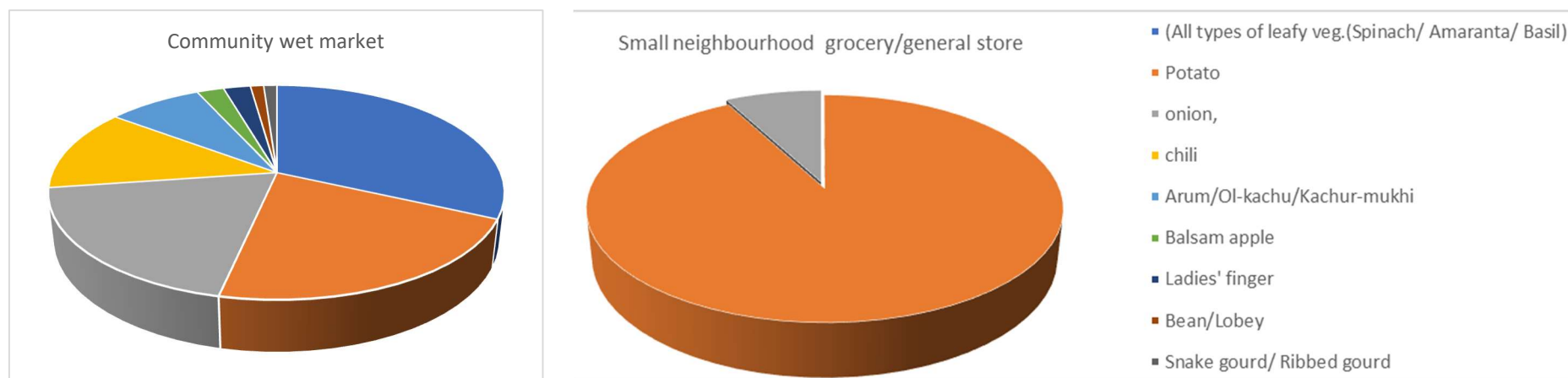


Figure 34: Number of adolescents buying items from the specific food groups "Vegetables" for their household at two of the most visited outlets in the last 30 days/month, for major food outlets

Note: The following foods of the food "vegetables" weren't included in the figure as they weren't bought by adolescents at these outlets: Brinjal, carrot, Cauliflower/Cabbage, Green banana/ Green papaya, Perbol, (Patal), Radish, Tomato, Water gourd, White gourd/ Pumpkin, Cucumber, Other specify

The distance to the different food outlets ranged between 4 and 17 minutes (see table 22). Canteens and community wet markets tended to be the furthest away from home, whereas mobile door-to-door food vendors were the closest to home, followed by small neighbourhood grocery stores.

Table 22: Distance to the different food outlets from their house in minutes for adolescents visiting a specific food outlet for themselves

	<i>Number of adolescents visiting food outlets for themselves</i>	<i>Mean (SD)</i>
Community wet market	17	15 (6.42)
Temporary market-farmers market	2	10 (7.07)
Small neighbourhood grocery/general store	144	6 (10.52)
Specialist retail store (e.g. butcher, baker green grocery store)	0	-
Street vendor and Roadside stall	21	12 (9.52)
Mobile door-to-door food vendor	15	4 (2.95)
Supermarket	0	-
Online market/E-Commerce	0	-
Restaurant	0	-
Formal medium-small sized restaurant	33	9 (11.18)
Fast food	6	11 (9.63)
Canteen	19	17 (12.99)
Other market	0	-

The food that was bought by the adolescents at the various food outlets is most likely to be consumed outside the home, this doesn't apply for the food that is bought at the small neighbourhood grocery and community wet market (see table 23). Foods were most likely to be consumed with others, including friends, family or siblings. Foods that were bought at street vendors or at a formal medium-small sized restaurant were in comparison with the other food outlets more likely to be consumed alone. 63% of the adolescents indicated that they don't have other places where they eat any food without paying any costs.

*Table 23: Eating environment of adolescents who visited the major food outlet for themselves**

	<i>Number of adolescents visiting food outlets for themselves</i>	<i>Ate at home</i>	<i>Ate outside home</i>	<i>Ate alone</i>	<i>Ate with friends</i>	<i>Ate with family</i>	<i>Ate with siblings</i>
Community wet market	17	-	100%	-	-	100%	35.3%
Temporary market-farmers market	2	50%	50%	50%	-	50%	50%
Small neighbourhood grocery/general store	144	31.3%	68.8%	29.9%	12.5%	45.1%	34.7%
Street vendor and Roadside stall	21	90.5%	9.5%	76.2%	28.3%	4.8%	-
Mobile door-to-door food vendor	15	53.3%	46.7%	26.7%	26.7%	40%	13.3%
Formal medium-small sized restaurant	33	81.8%	16.7%	57.6%	24.2%	9.1%	12.1%
Fast food	6	83.3%	16.7%	16.7%	66.7%	-	16.7%
Canteen	19	78.9%	21.1%	31.6%	52.6%	15.8%	10.5%

* The total of percentages does not add up to 100 because adolescents could answer multiple answers.

8.3 Results on adolescent motives

8.3.1 General food choice motives

Adolescents were also asked about their main reasons for selecting and/or eating food. Their main reasons were safe, health, sensory appeal, price, convenience, local and/or seasonal and mood. Environmental friendliness (environmental and weight control) were perceived to be least important. Adolescents and adults perceive most of the motives as important, there is not a lot of variety. Both perceive the motives sustainability and weight control as least important. However, adolescents seem to perceive safe as more important than adults. Adults seem to perceive price to be more important than adolescents.

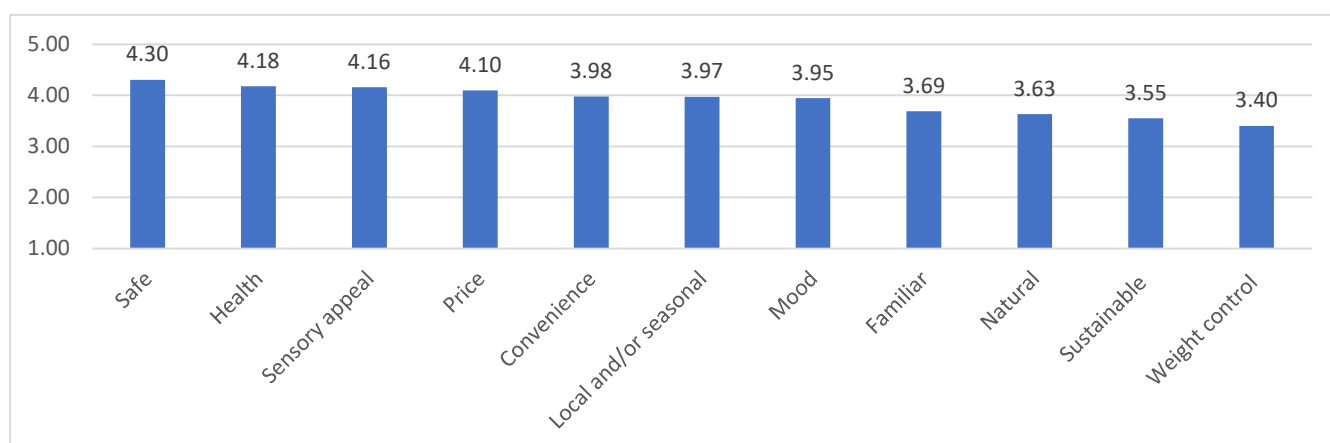


Figure 35: General food choice motives (average score on a scale from 1 (not important at all) to 5 (very important))

8.4 Results on adolescents' health and safety perceptions

8.4.1 Adolescents' health and safety motives and perceptions

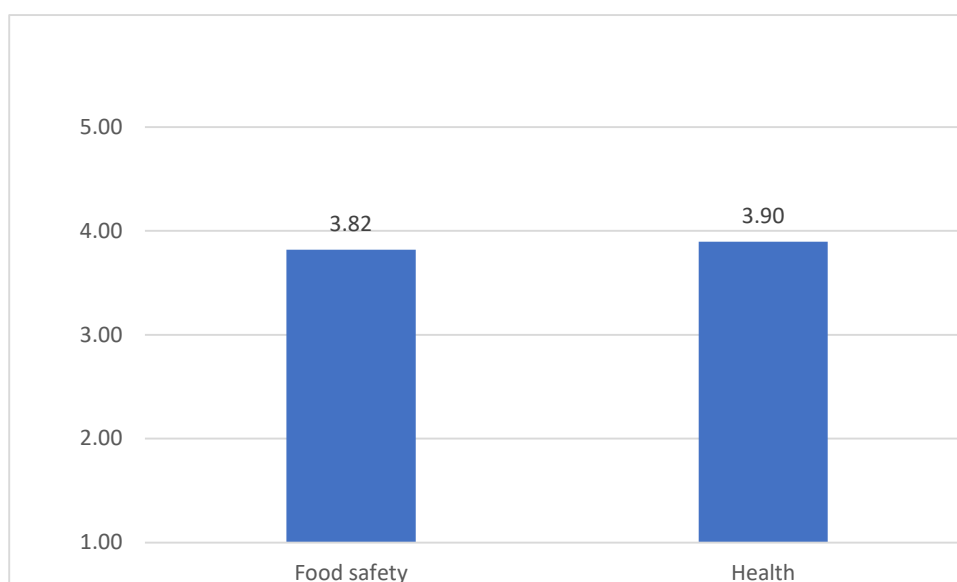


Figure 36: General food choice motives (average score on a scale from 1 (not important at all) to 5 (very important))

For adolescents Food safety and Health motives were important. Health motives ($M=3.90$, $SD=0.876$) were considered to be slightly more important than food safety motives ($M=3.82$, $SD=1.036$). Next,

adolescents were slightly more pessimistic about the food safety related issues ($M=3.76$, $SD=0.995$) than optimistic ($M=3.69$, $SD=1.079$)

8.4.2 Adolescents' self-efficacy and perceptions of health and healthy safe food consumption

Adolescents perceived rice and pulses to be most healthy and safe and milk, fish and fruits to be least healthy and safe in comparison with the other food products/categories. Foods consumed outside home are perceived to be not that healthy and safe (Figures 37 and 38). Adolescents seem to perceive plant based proteins and vegetables (both the leafy as the other vegetables) to be more healthy and safe than animal based proteins. Fruit consumers have somewhat confidence in the healthiness of fruits ($M=3.64$, $SD=1.012$) and have somewhat confidence in the safety of fruits ($M=3.51$, $SD=0.932$). Non-fruit consumers have health ($M=3.66$) Safe (3.47). The adolescents' beliefs in their own ability to acquire, prepare and consume healthy and safe foods were calculated. These self-efficacy scores were high (self-efficacy healthy eating: $m=3.45$, $SD=1.041$, and self-efficacy food safety: $M=4.26$, $SD=0.630$).

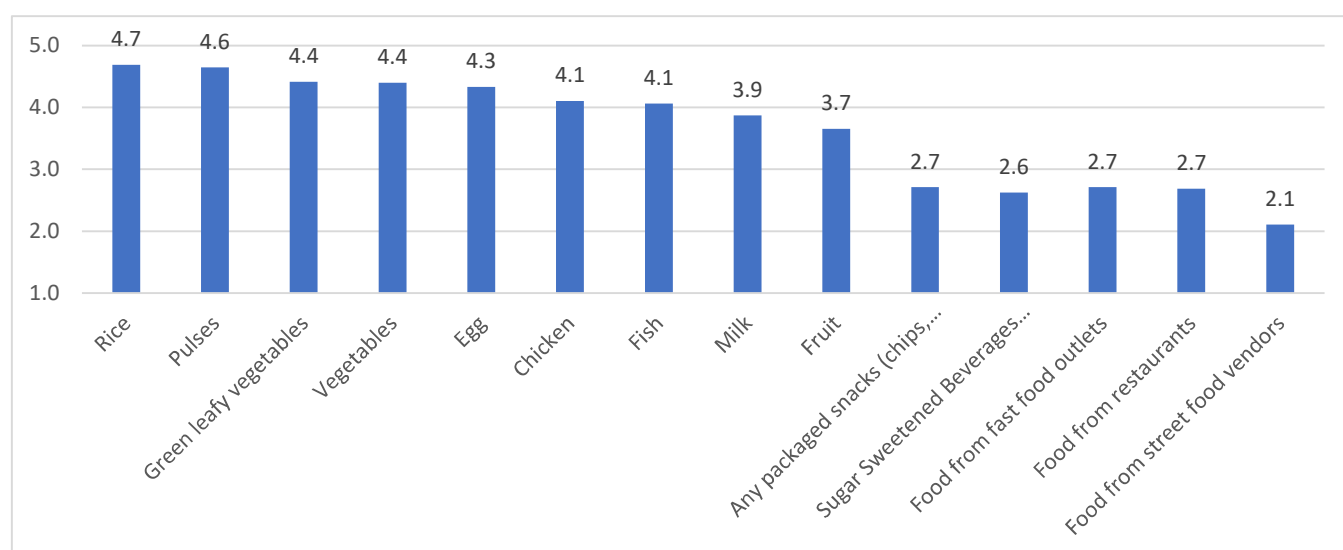


Figure 37: Confidence in the healthiness per food group (average score on a scale from 1 (No confidence at all) to 5 (Complete confidence))

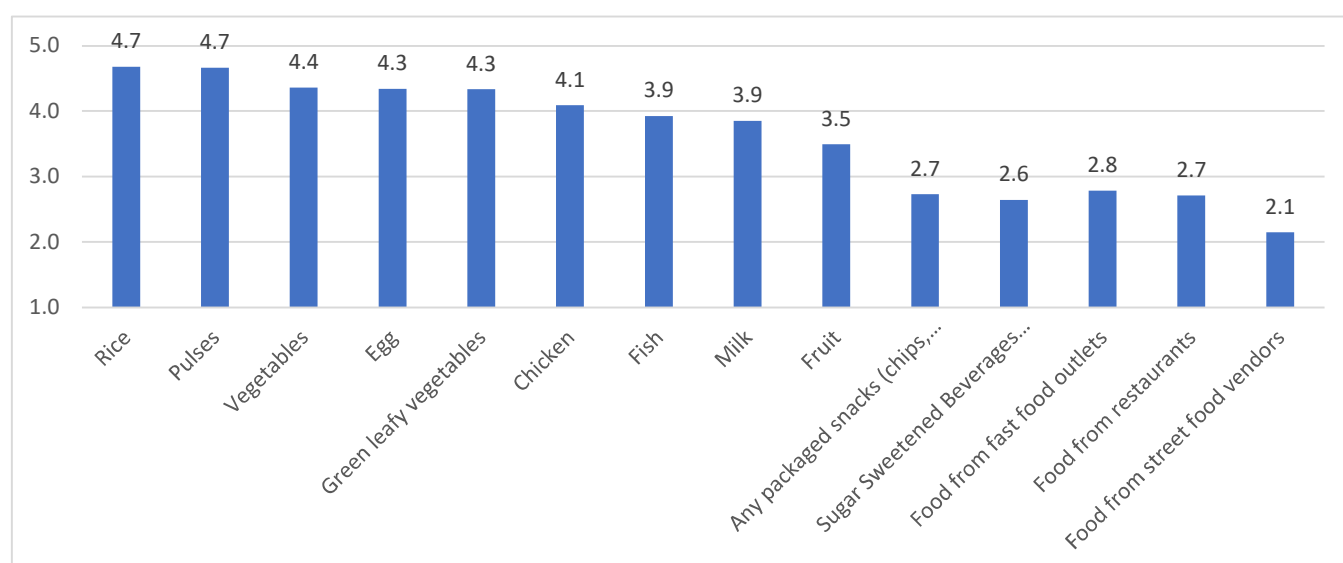


Figure 38: Confidence in the safety per food group (average score on a scale from 1 (No confidence at all) to 5 (Complete confidence))

8.5 Influence of COVID-19 on adolescents' food purchase, food intake and security

8.5.1 COVID-19 related behaviour and worries

Almost all adolescents said that they complied with social distancing and other COVID-19 prevention behaviours. All adolescents, except 1, washed their hands with soap more often than they used to do, avoided handshakes or physical greetings (94.3%). Also, avoiding groups with more than 10 people (81.6% all or most of the time), washing hands after being in public (93.7% all or most of the time), and wearing mask in public (95%) were common. All adolescents, except 1, had sufficient water and soap to wash their hands (96%). 48.2% of the adolescents were attending school before schools were closed due to COVID-19. 42% engaged any education or learning activities in the last week (September or October 2020). The majority of these adolescents did this by doing self-study (38.5%). Worries related to the COVID-19 crisis were high on almost all domains, including health, economic impact, limitation of rights, and access to products (see figure 39 below).

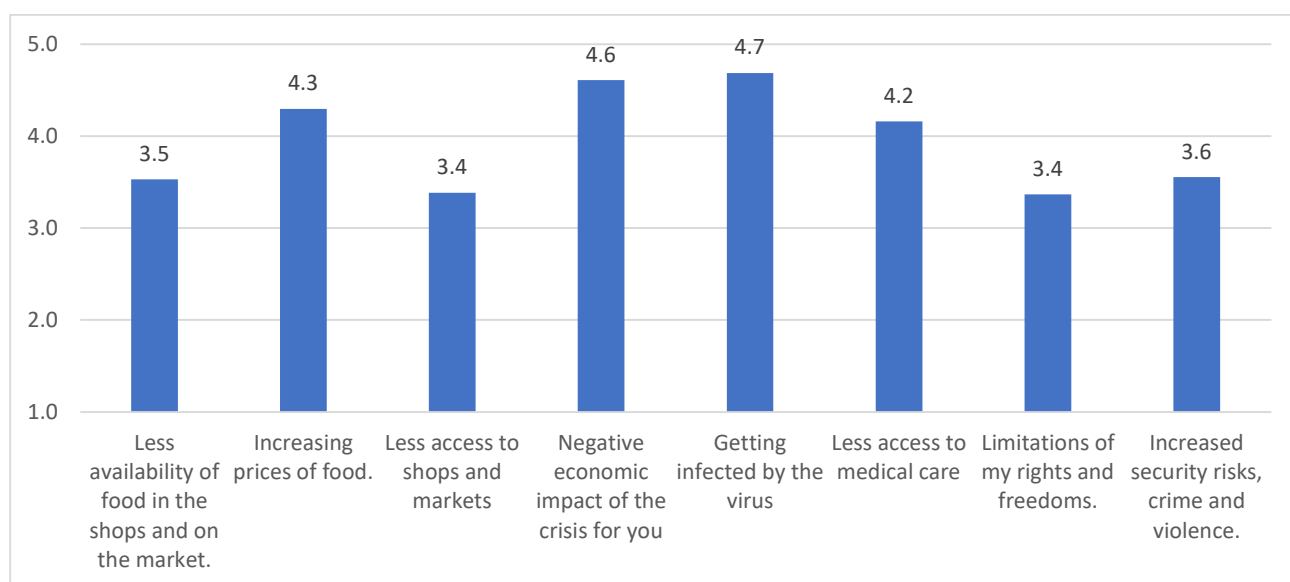


Figure 39. Worries related to COVID 19 (average score on a scale from 1 (not at all) to 5 (a lot))

8.5.2 Adolescents' purchases and food insecurity

Influence of COVID-19 on food group intake

Since the start of the Corona crisis in March 2020 adolescents indicated that the consumption of most of the food groups within their households have declined strongly (Table 24). The consumption of animal origin protein products, such as chicken, other meat, fresh and dried fish declined strongly, together with the consumption of packaged snacks, sugar sweetened beverages and fruits. More than half of the adolescents indicated that they consume pulses and vegetables on the same frequency as before the start of the pandemic. Interesting is the consumption of eggs, 41% of the adolescents indicated to consume eggs on the same frequency level, while 44.5% indicated to consume eggs less frequently. The (high) confidence in the safety and healthiness of pulses and vegetables might explain the fairly limited influence of COVID-19 on their intake.

Table 24. The influence of COVID-19 on food group consumption on household level indicated by adolescents (N=299) in percentage.

	More	Similar	Less	I don't eat it
Pulses	26.8	56.2	16.4	0.7
Green leafy vegetables	17.7	44.1	36.8	1.3
Other vegetables	11.7	58.9	29.1	0.3
Fruits	3.7	14.7	79.3	2.3
Egg	12.0	41.1	44.5	2.3
Chicken	7.0	19.1	73.2	0.7
Other meat	1.3	8.7	87.0	3.0
Fresh large fish	4.0	26.1	68.9	1.0
Fresh small fish	8.4	38.1	50.5	3.0
Dried fish	4.7	35.8	50.5	9.0
Milk	3.0	14.7	75.6	6.7
Any packaged snacks	3.3	17.1	76.9	2.7
Sugar sweetened beverages	2.7	11.0	81.9	4.3

Next to the intake of food groups the frequency of visiting the food outlets has strongly declined (Table 25). Depending on the food outlet, 33.3% to 100% of the adolescents indicated to visit the food outlets for themselves less often since the start of the COVID-19 pandemic in March 2020.

Table 25: Influence of COVID-19 pandemic on visiting frequency of adolescents for buying foods for themselves

	Number of adolescents visiting food outlets for themselves	More	Similar	Less
Community wet market	17	-	11.8%	88.2%
Temporary market-farmers market	2	2.1%	-	100%
Small neighbourhood grocery/general store	144	-	25%	72.9%
Specialist retail store (e.g. butcher, baker green grocery store)	0	9.5%	-	-
Street vendor and Roadside stall	21	6.7%	57.1%	33.3%
Mobile door-to-door food vendor	15	-	40%	53.3%
Formal medium-small sized restaurant	33	-	21.2%	78.8%
Fast food	6	-	50%	50%
Canteen	19	-	15.8%	84.2%

Note: The following outlets weren't included in this table as none of the adolescents visit this specific outlet type in the last 30 days: Specialist retail store, supermarket, online market, restaurant and other markets.

Since March 2020, the majority of the adolescents or their household members experienced some levels of food insecurity (Table 26). The food insecurity score was calculated in the same way as the one in the adult study. 7.4% of the adolescents had a score of 0, indicating that they were food secure, 31.9% suffered from mild food insecurity, 37.4% from moderate food insecurity and 23.3% from severe food insecurity. Most adolescents indicated that they consumed only a few kinds of foods (a less diverse food intake) (N=244, 81.6%), that they were unable to eat healthy and nutritious foods (N=233, 77.9%) and worried if they had not enough food to eat (N=213, 71.2%).

Table 26: Food insecurity for the total sample

	Total sample (n=270)
secure (score 0)	7.4%
mild (score 1-3)	31.9%
moderate (score 4-6)	37.4%
severe (score 7 or 8)	23.3%



Reflection on outcomes and recommendations

9 Reflection on outcomes and recommendations

The aim of this chapter is to summarize findings and identify entry points for the design of interventions that aims to influence food choices of these specific product groups by creating consumer awareness of urban residents living in DMA.

9.1 Main outcomes

9.1.1 Health and food safety are major issues to consumers and food insecurity is high but consumers deal with it in different ways.

- Health and food safety were two of the major drivers for consumers' food choices. For consumers, health is mostly about nutrients and about providing energy.
- Consumers with low income levels were strongly restricted by money in their choice for food and food outlets. For some, food is an issue of survival, they do not have much choice and food must provide energy. Food insecurity is very high.
- Consumers mentioned bad food quality and food contaminations and adulterations as their main concerns; this was addressed for all food groups.
- All consumers experience food safety concerns, but their reactions to the situation differ: 1. *submit* to the fact that there are no safe foods (within their budget) and that they are not knowledgeable about it, 2. *critically inspect* the foods and packaging they buy, 3. *consider the source* of production (including homegrown, hybrid), who sold it and animals' feed and medication, and 4. *choice of safe foods* especially traditional Bengali foods such as lentils and local varieties.
- Health perception is expressed in different ways from more general like feeling fit to more specific like the right nutrients and functional effects such as giving energy and filling. Overall traditional Bengali food is perceived as healthy.
- Especially out of home food was perceived as less safe. Of the different food groups fruits were considered less safe.
- Consumers do mention both positive and negative associations with food safety which is represented in an optimistic and pessimistic perception (of food safety) at the same time.

9.1.2 Wet markets are important for all consumers and all products

- Wet markets are the main source for all food groups and all income groups. Mobile door to door was also important, especially for vegetables, and small neighbourhood stores especially for dry goods, vegetables, and eggs.
- The choice for an outlet mainly depends on price and proximity. Poor consumers are also driven by moment of the day; they can only buy food at the end of a working day when they have money and pay lower prices.
- Additional to proximity and price, consumers go to wet markets because of availability of large variety. At any time of the day they can buy various fresh food items from various retailers/sellers at the wet market. Grocery stores are frequented especially for their proximity, convenience, opportunity to buy small quantities and buy on loan. For roadside stalls, buying small amounts and freshness were key factors in addition to their convenient location.

9.1.3 All income groups have a low intake of green leafy vegetables and poor consumer also for protein rich foods and fruits.

- The frequency of intake for protein rich foods and fruit was much lower for the lower income group compared to other income groups. This was also strongly affected by the COVID crisis, due to the crisis the intake of these foods was decreased and low income households were more

affected than the higher incomes. Interestingly, adolescents consumed more fruit compared to adults.

- Green leafy vegetable intake frequency was lower compared to other vegetables for all income groups and so was intake of Vitamin A rich fruits and vegetables. This results is in line with earlier studies that report nutrient deficiencies in Bangladesh.
- Poor households more often eat dried fish compared to others. The frequency of eating those was not affected much by COVID crisis. However, the opposite was found for big fish, (those were eaten less often by low income consumer groups).

9.2 Strengths and limitations of the study

A major strength of the study is the large sample, combining research methods, both quantitative and qualitative. For the focus group discussion and the survey, we aimed to include low income groups and based on the assets and food insecurity scores show that we have successfully reached the urban poor, an income group that is not always easy to include. At the same time, results on income and assets are subject to socio-desirable answers. This can go in two directions: respondents can be ashamed of their poor situation resulting in a positive bias or be hopeful that they will get something if they tell the interviewer they are really poor, resulting in a negative bias. Due to the COVID-19 crisis situation at that time, data collection was done via telephone instead of face to face interviews which makes it also harder to interact with the respondent. In addition, due to the COVID-19 crisis, school were closed which probably affected the eating behaviour of adolescents.

9.3 Recommended interventions to improve access to safe and nutritious foods

This study provides insights that can help shape food environments and the value chains, below we propose some interventions.

9.3.1 Supply chain interventions for the urban poor

9.3.1.1 In short

Price and freshness were major motive in food choice for the urban poor and can be improved by food chain interventions. By focussing on foods that are cheap and most commonly eaten by the urban poor, the highest impact can be achieved.

9.3.1.2 Results in the report

The Dhaka consumer study provides insights into consumers' important motives and differences between consumer groups (see paragraph 5.2). The consumers often mentioned price and freshness as main motivators of their food choice and price was more important for the lower income groups compared to the higher ones. For some consumers, food choice was perceived as survival and they bought what they could get and could afford. At the same time food safety concern about all food groups, including vegetables, fish, meat, dairy, and fruit were reported by the consumers (see paragraph 6.2). This report provides insights in what foods were eaten (paragraph 4.2) and bought (paragraph 4.4) at food group level, in appendix G we added a more detailed description of the foods purchased by the low-income groups. Intake was not questioned in detail so these data are only available at food group level but provide insight in for example, that fish was eaten more often than meat and small fish more often than larger fish (see 4.2 for adults and 8.1.2 for adolescents).

9.3.1.3 Intervention strategy

Determine the most preferred cheap food products (e.g., animal sourced foods, fruit and vegetable, pulses) and focus on improving the value chains of those product (e.g. changing delivery time, shorten the chain, store in better way).

9.3.1.4 Additional suggestions

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9.3.2 Fresh products in neighbourhood stores

9.3.2.1 In short

Neighbourhood stores were the second most frequented outlet for food purchase but most often for dry goods, except some egg and vegetables. This outlet has however, clear advantages over the main outlet (wet markets), especially the proximity, the known seller and possibility to buy on loan. Increasing the availability of fresh products in neighbourhood stores has a great potential to improve the overall intake of energy dense new products such as vegetables, fruits and animal sourced foods.

9.3.2.2 Results in the report

The Dhaka consumer study provides insights into consumer buying frequencies from different outlets, the food bought at these outlets (paragraph 4.4) and the amount of money spend (4.3). People do buy products from mobile vendors or neighbourhood grocery stores, and the insights from this study show their reasons to buy from these outlets (see paragraph 5.1). Street vendors are used for emergency buying since they have availability, but neighbourhood grocery stores are preferred as a nearby outlet (known seller, products on loan, available during the whole day). Although neighbourhood stores have clear advantages over the wet market, they are used for non-fresh products only while fresh products are generally not sold at these places.

9.3.2.3 Intervention strategy

Improve access to fresh foods (animal source protein food, fruits, and vegetables) at places more proximate and more convenient than wet markets without losing freshness (and not too much increasing price). Work with grocery stores and possibly also mobile vendors to improve the fresh food quality such as access to cold storage and better linkages with the fresh food market. Training the stores and vendors on daily supply chain management.

9.3.2.4 Additional suggestions

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9.3.3 Tailor wet markets to the urban poor

9.3.3.1 In short

An important focus in the food environment is to improve wet markets, the main outlets for all food and all consumer groups. Since urban poor have different wishes and buying motives than the higher income groups, wet markets that are near their residential areas could be tailored more to their wishes. For urban poor: safety, timing and the ability to buy cheap are key issues.

9.3.3.2 Results in the report

The wet markets are the most important food retailer for all income groups, see paragraph 4.4. It was also the main outlet for nutrient-dense fresh products such as animal-based foods, vegetables, and fruits. The Dhaka consumer study provides insights in the main food purchase motives of the urban poor (paragraph 5.2): low price, survival, providing energy, sensory pleasure, health, and food safety. As well as the main reasons to go to the open market: proximity to home, freshness, ability to bargain on price, competitive prices, and ability to buy small quantities (paragraph 5.1). Wet markets are obviously very important for the urban poor. There are however also some restraints. One restraint is the variation between markets. Consumers report that some wet markets are more hygienic and have better quality than other; but those better markets are far from their residence and/ or expensive (paragraph 5.1). Another issue is the lack of cool storage at home. Therefore, it is a necessity to buy often and buy small quantities. The lower-income groups do grocery shopping frequently (see paragraph 4.4) and do not have access to the refrigerator or other cold storage (paragraph 4.1). Also, the retailers that they purchase from do not have good functioning cold storage either. This is important since the urban poor buy vegetables often at the end of the day: when they have their cash from daily earnings when the prices go down on the market, and when they come home after work. At the same time, quality goes down for fresh products during the day.

9.3.3.3 Intervention strategy

Wet markets near the residential areas of the low-income groups in Dhaka can be improved in several ways:

- increasing quality and hygiene without compromising on price
- increasing shelf-life fresh products by looking for cheaper cold storage options on wet markets and/or community storage opportunities.

This can be done by developing plans to improve food safety in wet markets (e.g. cold storage, general hygiene). Special attention should be paid to keeping a good quality at the end of the day when many urban poor do their shopping. Perhaps evening markets are sometimes a solution or smart (cold) storage to keep products fresh.

9.3.3.4 Additional suggestions

- Combine with chain intervention described in 9.3.1 selling basic food items at low price
- Keep in mind that wet markets are a very diverse group. They differ in terms of physical characteristics (hygiene, newness), their offer, prices, opening hours, retail versus wholesale, etc. Some insights into this diversity are provided in paragraph 5.1.1.
- Innovate in electricity (e.g. solar based)

9.4 Recommended consumer behaviour interventions

9.4.1 Consumer awareness campaigns on the point of purchase

9.4.1.1 In short

The Dhaka consumer study provides detailed insights in consumer perceptions of health and safety. Not all consumers have the same ideas about what health and safety is so when designing a consumer campaign aiming to change consumer choice towards safe and nutritious food. This is very valuable information to nudge consumers on health and food safety. With this information, it is possible to align the information in the campaign with the words and expressions that consumer use as well as with issues that they consider important. Besides, the Dhaka consumer study provides insights in how consumers deal with safety threats. Their different coping strategies. Also, this information can be used better to tailor the intervention to consumers groups and their perceptions.

In addition, this report provides insights into why consumers go to certain outlets, their motives for buying from wet markets, neighbourhood stores, supermarkets, etc.

9.4.1.2 Results in the report

Detailed motives of consumers on safe and nutritious foods are identified and described in paragraph 6.2. The coping strategies of consumers to deal with safety threats are also described in this paragraph: *submit* to the fact that there are no safe foods, *anger* about their weak position and the fraudulent sellers, *critically inspect* the foods they buy and the packaging, and also *consider the source* of production (including home grown, animal feed), *choice of safe foods* especially traditional Bengali foods such as lentils and local varieties. The main food outlets for specific foods are described in paragraph 4.4. and motives to go specific outlets are described in paragraph 5.1.

9.4.1.3 Intervention strategy tailored at consumer motives and strategies

The first recommendation is to tailor campaigns to consumers'

- Food choices motives (health, safety, energy, strength, price)
- Outlet related motives: proximity, price (credit), freshness, and availability
- Food safety knowledge and worries
- Consider the different coping strategies with safety and target the different groups

Secondly, the consumer awareness campaigns could be designed and implemented at the point of sale such as posters in wet markets. In that case, the intervention can also be tailored to the motives consumer have to go to that outlet. Wet markets seem the most obvious place since this is the main outlet for fresh products (see paragraph 4.4. for more detail), but eggs and vegetables are also bought

from neighbourhood stores, and vegetables from mobile vendors. For wet markets, freshness, price, and quantity and diversity in offer and availability are the main motives (see paragraph 5.1 for more details) and the intervention can use this to strengthen the campaign.

Focus campaign on increasing access and safety on the urban poor:

- Protein sources that are important to the poor: pulses and small and dried fish
- Outlets important for the urban poor: wet markets near their residential area, neighbourhood stores, and (for vegetables) mobile door-to-door food vendors

9.4.1.4 Additional suggestions

- Campaign on healthy food choices could also be communicated through popular media (e.g., through soap operas) instead of at outlets, but this report does not provide information to support which media.
- Instead of aiming the campaign at the urban poor, it can also be targeted at higher income groups assuming that urban poor and middle income follows.
- Use local dishes contributing to nutritionally adequate and safe diets and learn from the positive deviants: consumers who manage to prepare a nutritionally good and safe meal with limited resources
- When promoting healthy, nutritious fresh foods such as milk, fish, etc., be aware of safety concerns for some of these foods and acknowledge them.

9.4.2 Dialogue on wrong safety perceptions with consumers and chain actors

9.4.2.1 In short

Although it was not the study's purpose to identify consumer knowledge on food safety, during the discussion on food safety perceptions, it became obvious that consumers have some wrong safety perceptions. This suggests that a dialogue is needed between consumer and knowledgeable persons to....

9.4.2.2 Results in the report

The Dhaka consumer study did not systematically map wrong food safety perceptions, but some were observed:

- About the food source: broiler chicken vs. local chicken, many consumers believe that local species of animals, vegetables, and pulses are healthier than the foreign ones. Some of them wrongly believe that all foreign ones are adulterated or (also incorrectly) believe that all local ones are safe (e.g. that for broiler chicken no antibiotics are used)
- There is a great fear for chemicals and formalin, such as fruit consumption fears due to chemicals (ripeners and formalin). Many consumers do not seem to be aware of the regulations and improvements made in Dhaka in the past years.
- Some consumer believes that certain foods cannot be adulterated, for example, an egg because it is close. Still, even green leafy vegetables were sometimes mentioned as food that cannot be adulterated or contaminated.

9.4.2.3 Intervention strategy

Dialogue with product specific value chain actors on food safety issues. Learn the real threats and communicate them with the actors to correct the wrong food safety perceptions.

9.4.2.4 Additional suggestions

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9.5 Recommended additional interventions for the vulnerable poor

9.5.1 In short

Consumer campaigns and improving the food availability by chain interventions and market interventions might not be enough to provide the urban poor with adequate levels of nutrient dense foods. Therefore, also other interventions and policy measures should be considered.

9.5.2 Results in the report

The results of the Dhaka consumer study show the vulnerability of the urban poor. Intake data show that the low-income group consume much less of some of the nutrient dense foods: egg, milk, fruit, chicken, and other meat was less than half as frequent by the lowest income groups compared to middle incomes and above (paragraph 4.2). In focus group discussion, their low income and focus on food for survival and providing enough energy to get through the day we mentioned as main issues (paragraph 5.2). Also, the sample had high percentages of food insecurity (paragraph 7.2), reported an increased vulnerability due to the COVID-19 crisis (paragraph 7.1) and received monetary and food support (paragraph 7.3).

9.5.3 Intervention strategy

To provide the urban poor with an adequate diet more interventions are needed, including policy interventions, such as:

- School milk and fruit program for free distribution of nutritious food.
- Urban gardening for fruits and vegetable growing and do it yourself kits to produce own protein-rich feed for poultry and fish.
- Subsidy for poor consumers towards fruit, vegetable, and protein rich food (pulses and small and dried fish) consumption.
- Creation of discount counters in the wet market to present products close to expiry dates.

9.5.4 Additional suggestions

Products near expiration date are often sold to consumers with lower incomes and also at wet markets in slum areas. By facilitation this, products could reach consumers quicker and at better quality.

9.6 Implication for future research

This studied added to the current scientific research in several ways and provided directions for future research. Firstly, together with the NaDhaLi study this study provides insights in the consumption frequencies and buying patterns of (poor) urban Bangladeshi. Especially the availability of data at the city level, the low income group of respondents, and the distinctions per outlet is an addition to current literature. It does, however, provide only eating and buying frequencies so future studies could also include volumes of food bought and portions of food eaten. This can of data is much more intensive to collect since for consumers it is hard to estimate these portion sizes.

Second, for the theoretic model of this study, we used several models that have been developed in high income countries and have not extensively been tested in low-income countries. Interestingly, some of the concepts from these models were not confirmed in our study. For example instead of showing illusion of control or optimism bias consumers were actually very concerned about food safety, they did not report a high self-efficacy for food safety and self-efficacy for food safety was lower than self-efficacy for health. Much of the discussion in our focus groups was on safety of purchased foods, future studies could explore this aspects of trust in own ability to consume safe foods more in relation to the home environment and home practices. We also saw that although people have worries, this does not mean they are only pessimistic. We included both optimism and pessimism about safety in our study and both scored high, which is similar to findings of studies in other countries. In the focus groups discussion

mostly aspects related to negatively perceived food safety were explored and future studies could explore also the more positive aspects.

Related to knowledge, we found that consumer sometimes reported that they felt not knowledgeable about food safety, they emphasize that they have had very little education and others (vendors) can make use of them. Also, in the discussion sometimes consumers had incorrect ideas about safety and how to judge it. For some consumers it seems that they would benefit from food safety education which could be tested in future intervention studies.

Finally, consumers reported that due to the COVID-19 crisis the intake of several nutrient rich foods was decreased and low income households were more affected than the higher incomes. The diet seemed to have shifted to cheaper but less nutritious foods. This is in line with previous studies showing an increased food insecurity due to COVID-19 among the vulnerable poor and increased food prices. Future studies could test the long term effects of this dietary shift.

Other methodological issues:

- Safety perceptions were also specific to the context: food, place, environment, users (e.g. for children or for themselves), etc.
- In the food choice questionnaire, food safety is not one of the motives that is included. The results of this study clearly show the importance of food safety for urban Bangladesh in specific and possibly also for other low-income countries. Items were developed to measure the importance of food safety in consumers food choice but further testing and validation is needed.
- Motive scores on the one item version were higher than on the multiple item version for both adults and adolescents and for both health and safety motives. The one item version is more suitable to compare groups whereas the multi-item version is better to use if you want to know the absolute score.



Literature

Literature

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Appendices

Appendix A. Example of questions in the Kobo toolbox

* E03.3 গড়ে প্রতিবার আপনি নিজের জন্য কাঁচা বাজার -থেকে কত টাকার পণ্য কিনেন?

» » » E03.4 to 6

* E03.4 আপনি নিজের জন্য কাঁচা বাজার থেকে সাধারণত কোন কোন দ্রব্য কিনেন ?
(বাজারে সর্বোচ্চ 4)

none selected

* ☐ অড়হর ডাল/Red Gram

☐ ডাল সহ রান্না করা খাবার/Pulse based any cooked dish

☐ বাইলা মাছ/Baila

☐ বোয়াল / আইড় মাছ/Boal/Air

☐ কোড়াল মাছ/Croaker

* E03.6 আপনার বাড় থেকে এই এলাকার স্থানীয় কাচাবাজার যেতে কত মিনিট সময় লাগে?

Figure 40. Example of questions in the Kobo toolbox

Appendix B. Differences between socioeconomic groups

Food purchase

Table 27: change in frequency of household visits to different food outlets by socioeconomic group

	low-poor				Low-middle poor				Middle and above			
	N	More	Similar	Less	N	More	Similar	Less	N	More	Similar	Less
Community wet market	746	6%	25%	62%	770	5%	27%	64%	409	9%	25%	62%
Temporary market-farmers market	54	0%	2%	5%	65	0%	3%	5%	29	0%	1%	6%
Small neighbourhood grocery/general store	647	4%	22%	55%	619	5%	19%	53%	327	4%	24%	49%
Street vendor and Roadside stall	0	0%	0%	0%	13	0%	0%	1%	37	0%	3%	5%
Specialist retail store-butcher, baker green grocery store	64	0%	1%	7%	69	0%	1%	8%	11	0%	0%	2%
Mobile door-to-door food vendor	343	1%	10%	31%	349	2%	13%	28%	138	1%	11%	21%
Supermarket	0	0%	0%	0%	4	0%	0%	0%	135	1%	10%	20%
Online market	0	0%	0%	0%	0%	0%	0%	0%	26	2%	1%	3%
Other market	6	0%	0%	1%	4	0%	0%	0%	3	0%	0%	0%

Table 28: change in frequency of household spending on different food outlets by socioeconomic group

	low-poor				Low-middle poor				Middle and above			
	N	More	Similar	Less	N	More	Similar	Less	N	More	Similar	Less
Community wet market	738	9%	17%	66%	759	9%	19%	66%	404	15%	26%	54%
Temporary market-farmers market	54	0%	1%	5%	60	1%	1%	5%	29	0%	1%	6%
Small neighbourhood grocery/general store	639	7%	16%	57%	615	9%	15%	52%	327	9%	26%	42%
Street vendor and Roadside stall	0	0%	0%	0%	13	0%	0%	1%	36	1%	2%	5%
Specialist retail store-butcher, baker green grocery store	64	0%	0%	7%	69	0%	0%	8%	11	0%	0%	2%
Mobile door-to-door food vendor	341	2%	7%	34%	343	3%	10%	29%	136	2%	8%	22%
Supermarket	0	0%	0%	0%	4	0%	0%	0%	135	3%	12%	18%
Online market	0	0%	0%	0%	0%	0%	0%	0%	26	1%	1%	4%
Other market	6	0%	0%	0%	4	0%	0%	0%	3	0%	0%	0%

The comparison of items bought from the two major food outlets for different socioeconomic groups needs to be interpreted with caution. The table below only shows the results for respondents that have indicated having visited the market within the last month. The respondents were asked to list one or two items that they most commonly buy from each market, so differences in the table below may indicate differences in buying patterns, but they may also indicate differences in food consumption. For example,

meat appears to be more often bought from community wet markets by higher socioeconomic groups, but since meat is more often consumed by higher socioeconomic group, it is likely that this is the reason behind the differing patterns in purchases.

Table 29: comparison of items bought from the two major food outlets for different socioeconomic groups

	Community wet market				Small neighbourhood grocery/general store			
	Mean total (n=1927)	Mean low-poor (n=745)	Mean low-middle-poor (n=772)	Mean middle and above (n=410)	Mean total (n=1595)	Mean low-poor (n=648)	Mean low-middle-poor (n=619)	Mean middle and above (n=328)
<i>Food grains</i>	31%	32%	32%	25%	89%	88%	88%	91%
<i>Pulses</i>	11%	12%	13%	5%	64%	64%	63%	63%
<i>Fish</i>	75%	70%	77%	78%	1%	2%	2%	0%
<i>Eggs</i>	7%	6%	9%	7%	35%	35%	35%	38%
<i>Meat</i>	26%	15%	28%	43%	1%	1%	2%	1%
<i>Vegetables</i>	79%	85%	80%	69%	27%	30%	28%	19%
<i>Milk and dairy</i>	0%	0%	0%	0%	4%	2%	4%	6%
<i>Oil & fats</i>	10%	13%	9%	9%	64%	67%	67%	55%
<i>Fruits</i>	1%	1%	1%	1%	0%	0%	0%	1%
<i>Spices</i>	10%	11%	11%	9%	22%	24%	23%	19%

Motives

We found very similar patterns between in the income groups in their motives to buy from certain outlets, only minor differences were found and especially for the highest income groups, the supermarkets, and the less mentioned motives the results can be somewhat distorted by the smaller sample sizes. Buying products on loan from supermarkets was important to a larger share of the respondents in the low income group and ability to choose products themselves in supermarkets was important to a larger share of respondents in the middle-low income group and a smaller share of respondents in the middle-high income group. A clean outlet and Hala'l/kosher products were more important for the middle-high income group for supermarkets. For this group, the ability to buy on loan from grocery stores was less important, also the ability to buy small quantities from wet markets and supermarkets was important to a smaller percentage of the middle-high income group compared to the other income groups.

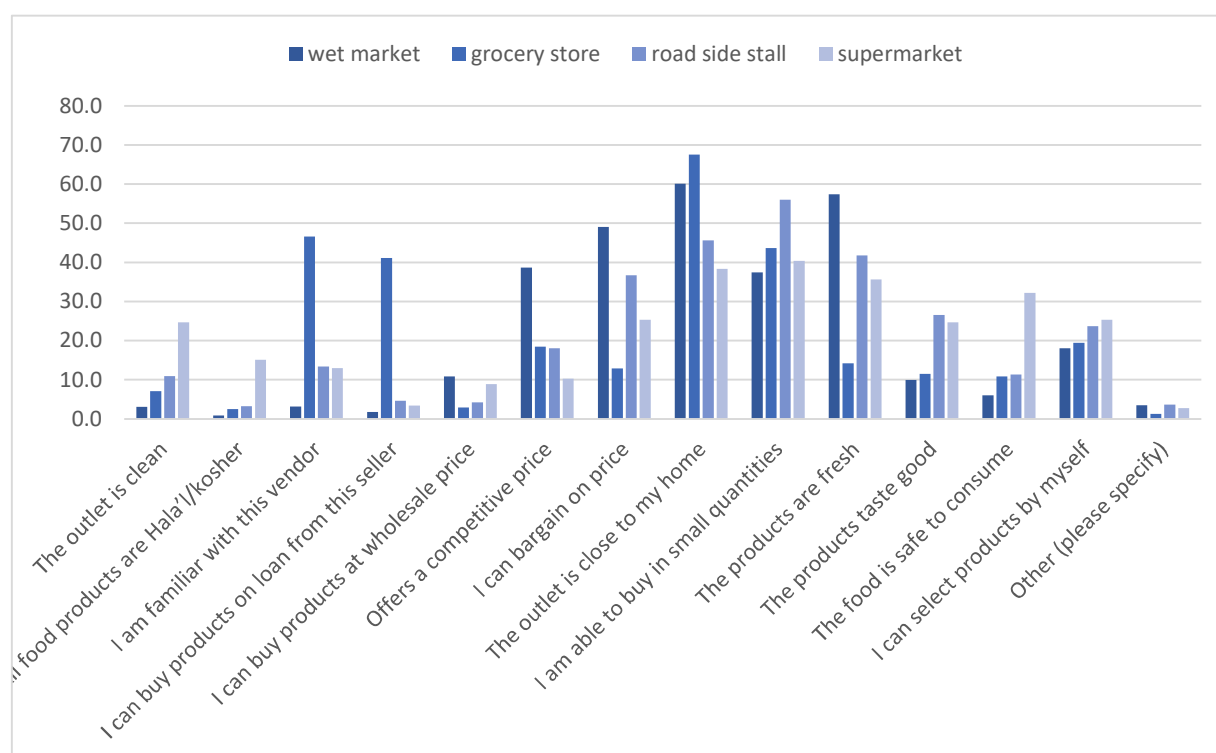
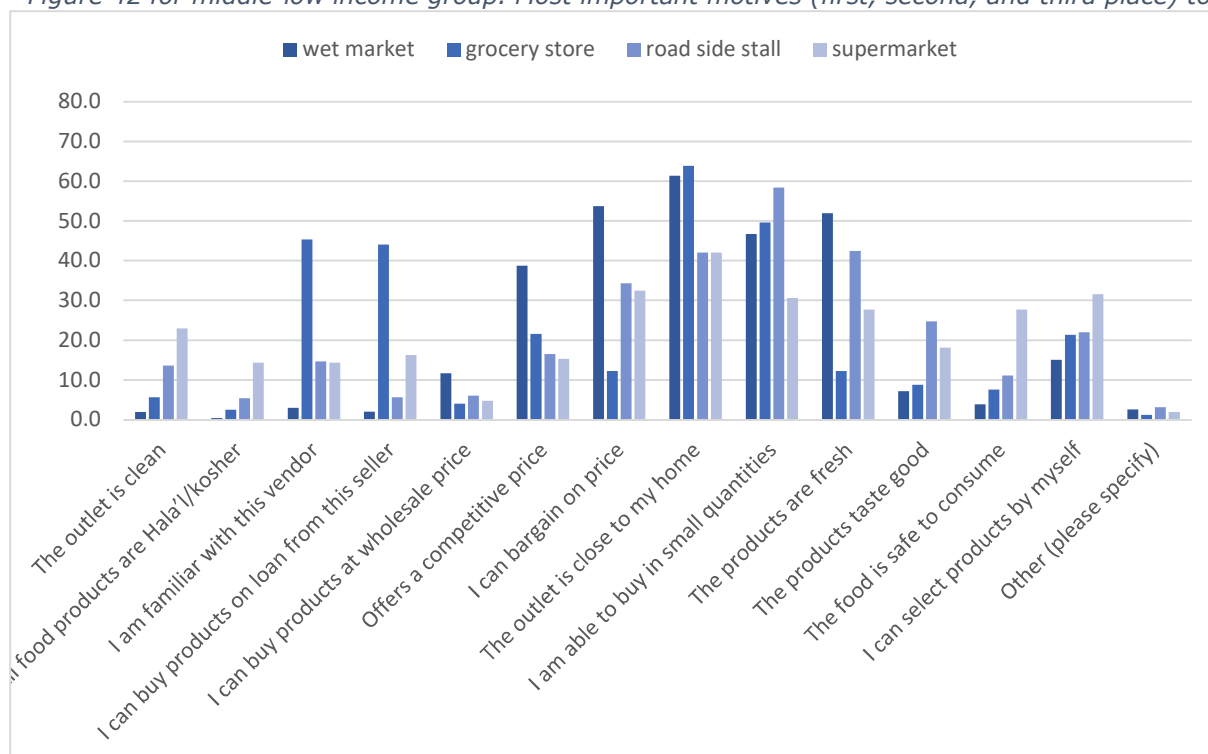


Figure 41 for low income group. Most important motives (first, second, and third place) to buy from an outlet (respondents that mentioned this motive as percentage of total sample that buys from this outlet) per outlet type. Note to the Figure: respondents who never buy from this outlet were excluded resulting in n= 778 for wet markets, 726 for grocery stores, 478 for roadside stalls, and 105 for supermarkets)

Figure 42 for middle-low income group. Most important motives (first, second, and third place) to



buy from an outlet (respondents that mentioned this motive as percentage of total sample that buys from this outlet) per outlet type. Note to the Figure: respondents who never buy from this outlet were excluded resulting in n= 781 for wet markets, 720 for grocery stores, 493 for roadside stalls, and 146 for supermarkets)

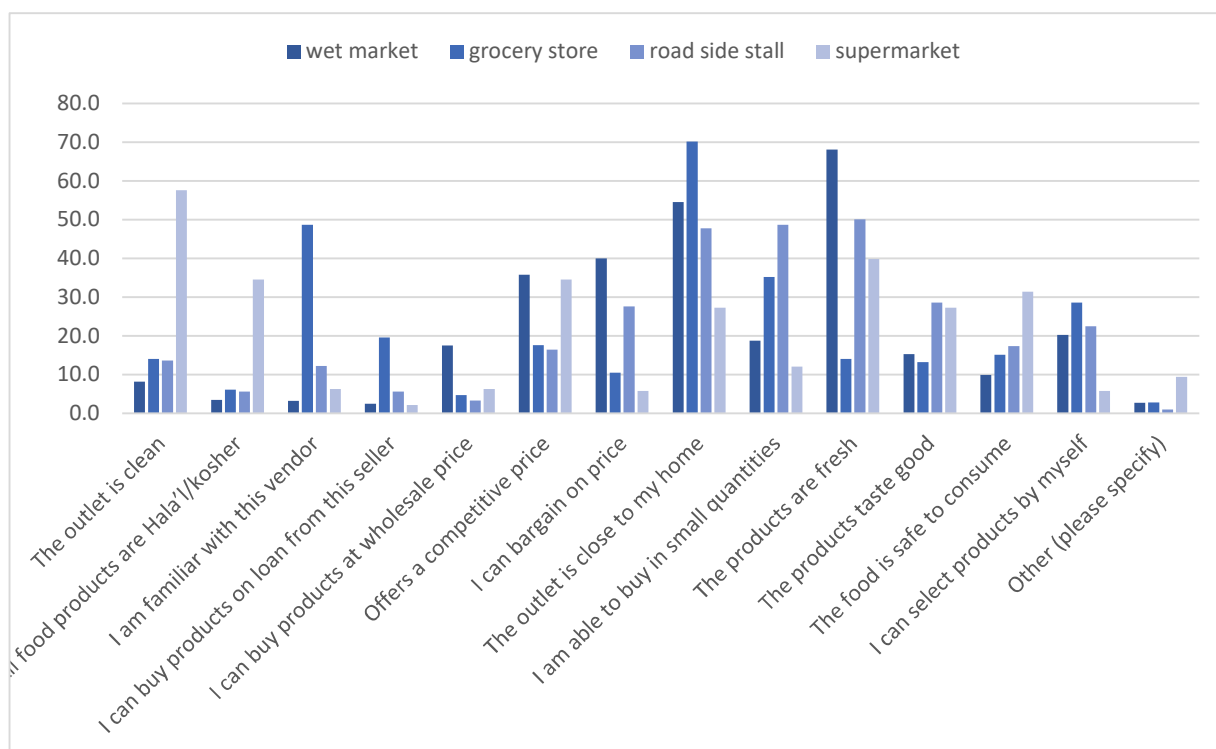


Figure 43 for middle-to-high income group. Most important motives (first, second, and third place) to buy from an outlet (respondents that mentioned this motive as percentage of total sample that buys from this outlet) per outlet type.

Note to the Figure: respondents who never buy from this outlet were excluded resulting in n= 405 for wet markets, 364 for grocery stores, 214 for roadside stalls, and 191 for supermarkets)

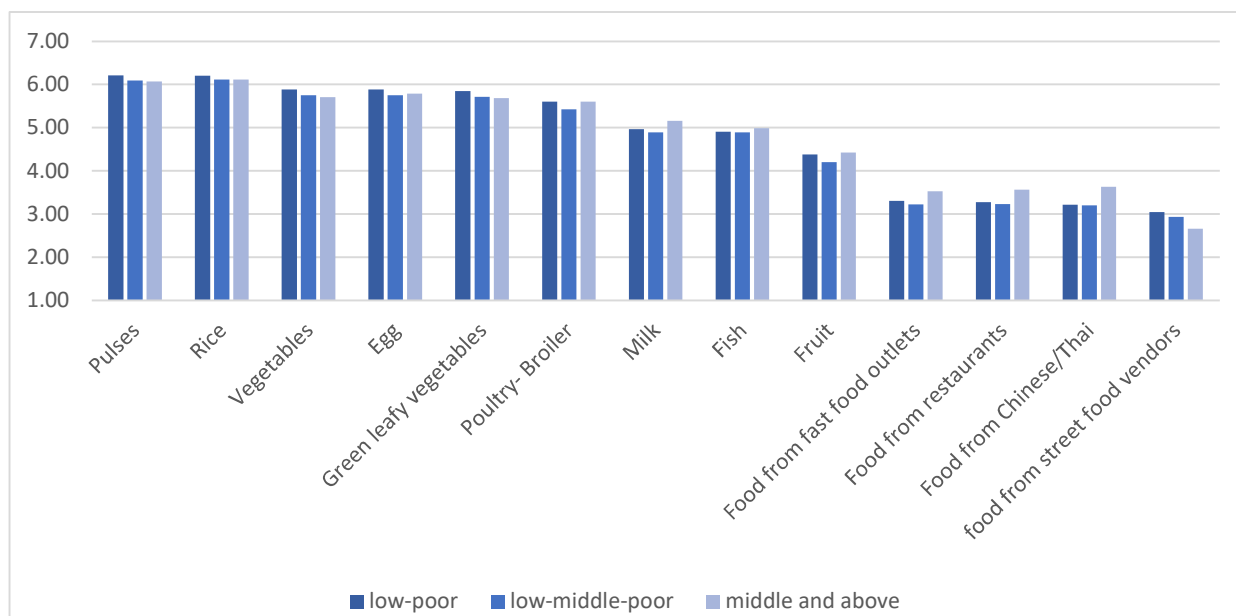


Figure 44 Trust in safety of different food groups, per income group

Table 30: Mean scores on health and food safety related motives per income group

	Mean total (n=2027)	Mean low-poor (n=801)	Mean low-middle- poor (n=804)	Mean middle and above (n=422)
Self-efficacy health	5.2	5.0	5.2	5.6
Self-efficacy safety	4.1	3.9	4.0	4.4
Optimism about food safety	5.1	5.2	5.0	5.0
Pessimism about food safety	5.4	5.4	5.2	5.5
Food safety motive score	5.0	4.9	5.0	5.5
Health motive score	5.5	5.4	5.4	6.0

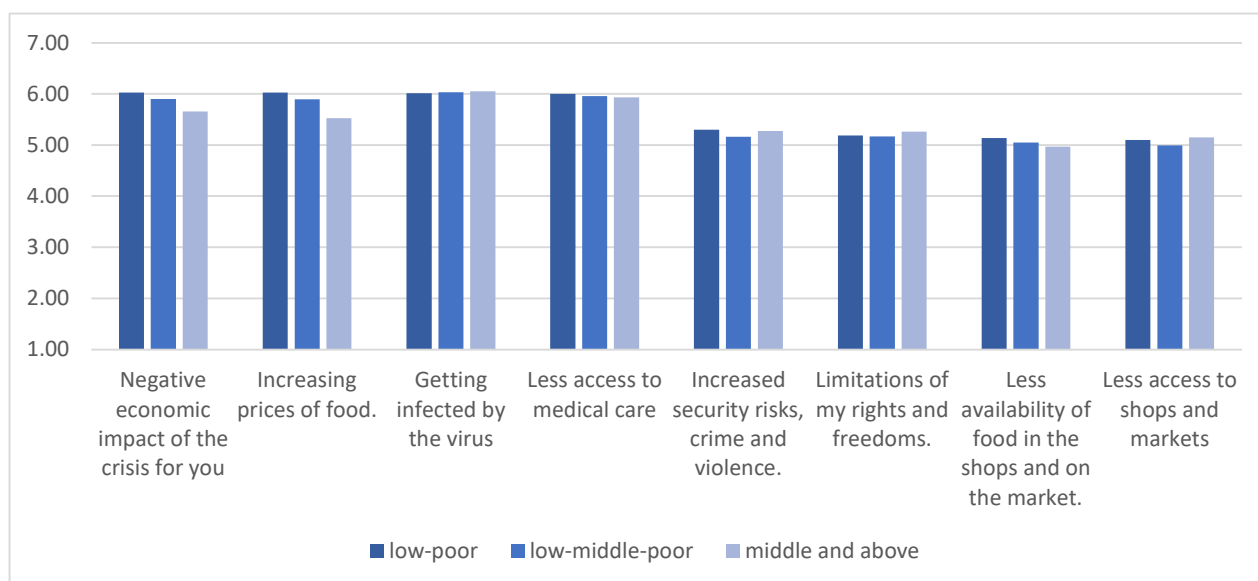


Figure 45 COVID-19 related worries per income group

Appendix C. Differences between city corporations

Purchase

Table 31: Percentage of households visiting different food outlets, by city corporation¹

	DNCC (n=513)	DSCC (n=507)	GCC (n=509)	NCC (n=498)
Community wet market	97%	93%	98%	92%
Temporary market-farmers market	9%	9%	3%	7%
Small neighbourhood grocery/general store	86%	89%	71%	69%
Street vendor and Roadside stall	16%	6%	3%	3%
Specialist retail store-butcher, baker green grocery store	2%	5%	0%	3%
Mobile door-to-door food vendor	56%	44%	32%	32%
Supermarket	14%	6%	6%	2%
Online market/E-Commerce	2%	2%	0%	0%
Other market	0%	2%	0%	0%

¹City Corporations: North Dhaka (DNCC), South Dhaka (DSCC), Gazipur (GCC), and Narayanganj (NCC)

Table 32: Frequency of visiting different food outlets (in days per month) for households visiting a specific food outlet, by city corporation¹

	N DNCC	Mean DNCC	N DSCC	Mean DSCC	N GCC	Mean GCC	N NCC	Mean NCC
Community wet market	500	14.47	472	14.94	498	13.49	457	13.19
Temporary market-farmers market	48	11.11	47	14.36	17	18.48	37	13.29
Small neighbourhood grocery/general store	441	9.87	449	10.44	360	11.35	345	10.46
Street vendor and Roadside stall	84	11.00	31	10.43	17	10.38	13	13.05
Specialist retail store-butcher, baker green grocery store	11	5.32	24	2.25	0	0.00	15	4.39
Mobile door-to-door food vendor	286	10.08	222	14.81	163	7.45	161	13.58
Supermarket	70	3.75	31	4.69	28	3.12	11	3.96
Online market/E-Commerce	11	2.77	12	2.58	1	2.50	1	0.10
Other market	1	2.50	8	6.23	2	10.88	2	3.42

¹City Corporations: North Dhaka (DNCC), South Dhaka (DSCC), Gazipur (GCC), and Narayanganj (NCC)

Table 33: Average monthly expenditures per food outlet, by city corporation¹

	DNCC (n=513)	DSCC (n=507)	GCC (n=509)	NCC (n=498)
Community wet market	4593	6120	14198	5744
Temporary market-farmers market	176	293	110	243
Small neighbourhood grocery/general store	3153	3592	3055	2472
Street vendor and Roadside stall	59	45	42	30
Specialist retail store-butcher, baker green grocery store	121	163	0	165
Mobile door-to-door food vendor	496	691	334	557
Supermarket	1202	1329	676	234
Online market/E-Commerce	69	291	3	3

Other market	1	27	8	12
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¹City Corporations: North Dhaka (NDCC), South Dhaka (SDCC), Gazipur (GCC), and Narayanganj (NCC)

Table 34: distance to different food outlets in minutes (by city corporation¹)

	N DNCC	Mean DNCC	N SDCC	Mean SDCC	N GCC	Mean GCC	N NCC	Mean NCC
Community wet market	502	8	470	11	482	14	460	11
Temporary market-farmers market	48	9	47	10	17	8	37	9
Small neighbourhood grocery/general store	444	6	447	5	360	6	343	5
Street vendor and Roadside stall	83	8	30	7	17	7	13	7
Specialist retail store-butcher, baker green grocery store	11	13	24	12	0	0	15	17
Mobile door-to-door food vendor	279	6	223	4	163	2	162	4
Supermarket	69	15	30	11	28	17	11	21
Other market	1	5	8	8	2	3	2	10

¹City Corporations: North Dhaka (NDCC), South Dhaka (SDCC), Gazipur (GCC), and Narayanganj (NCC)

Table 35: Percentage of respondents involved in home gardening by city corporation¹

	DNCC	SDCC	GCC	NCC
Home gardening	3.9%	2.2%	46.8%	8.4%
Started selling (median)	2017	2017	2009	2016
Consumed home-grown foods	3.5%	2.2%	46.2%	7.4%
Sold home grown foods	0.6%	0.2%	18.7%	2.8%

¹City Corporations: North Dhaka (NDCC), South Dhaka (SDCC), Gazipur (GCC), and Narayanganj (NCC)

Table 36: Percentage of households by the location that they most frequently eat outside home, according to city corporation¹

	DNCC (n=513)	SDCC (n=507)	GCC (n=509)	NCC (n=498)
Formal Restaurant (bigger places for high class)	10.7%	11.2%	2.9%	4.4%
Formal Restaurant (medium and small sized)	27.7%	38.3%	26.5%	45.2%
Small neighbourhood grocery store general store (mudi doka/departmental store)	2.9%	9.9%	42.0%	15.7%
Fast food outlets and kiosk	3.5%	2.8%	6.3%	2.2%
Work or school canteen	0.2%	1.0%	2.9%	0.4%
Street vendor and roadside stall (Van/stall: chotpoti /fuchka stall with few chairs/without chairs, tong doka)	31.4%	4.7%	10.2%	5.0%
Mobile door-to-door food vendor (feriwala/Jhurite kore rastai bikri-moving)	0.6%	0.0%	0.0%	0.0%
Supermarket	1.0%	0.8%	0.2%	0.2%
Other	0.2%	0.2%	0.0%	0.0%

¹City Corporations: North Dhaka (NDCC), South Dhaka (SDCC), Gazipur (GCC), and Narayanganj (NCC)

Motives

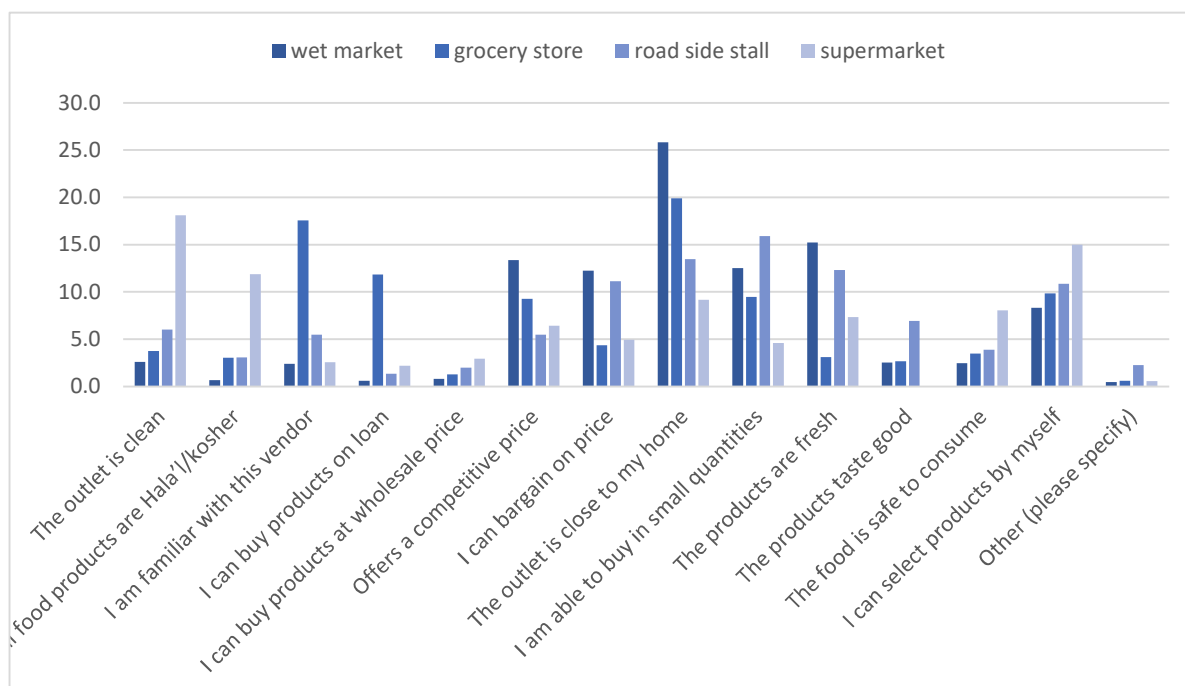


Figure 46 for North Dhaka CC. Most important motives (first, second, and third place) to buy from an outlet (respondents that mentioned this motive as percentage of total sample that buys from this outlet) per outlet type.

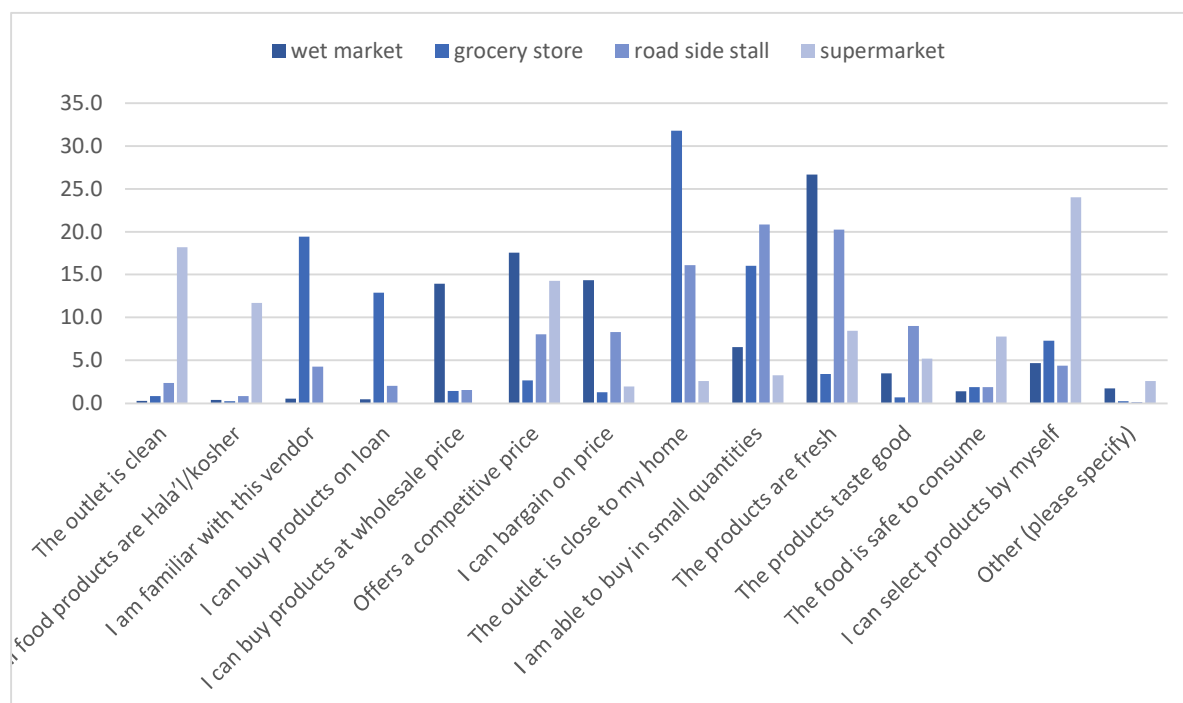


Figure 47 South Dhaka CC. Most important motives (first, second, and third place) to buy from an outlet (respondents that mentioned this motive as percentage of total sample that buys from this outlet) per outlet type.

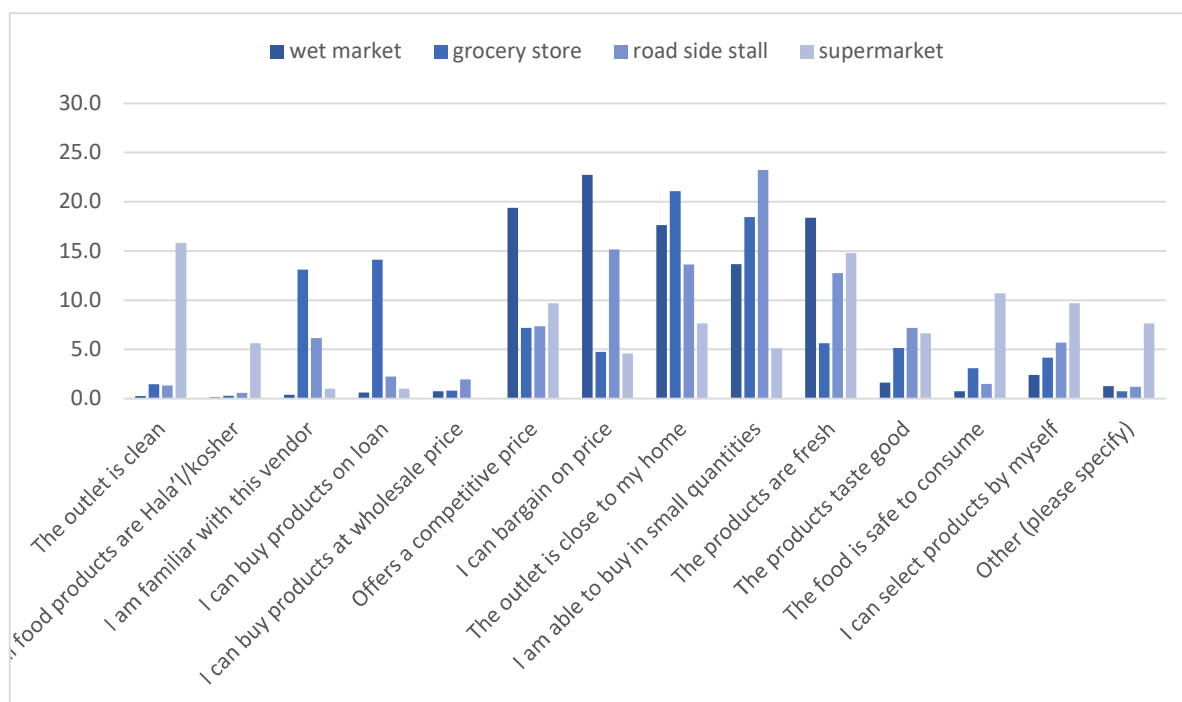


Figure 48 for GCC. Most important motives (first, second, and third place) to buy from an outlet (respondents that mentioned this motive as percentage of total sample that buys from this outlet) per outlet type.

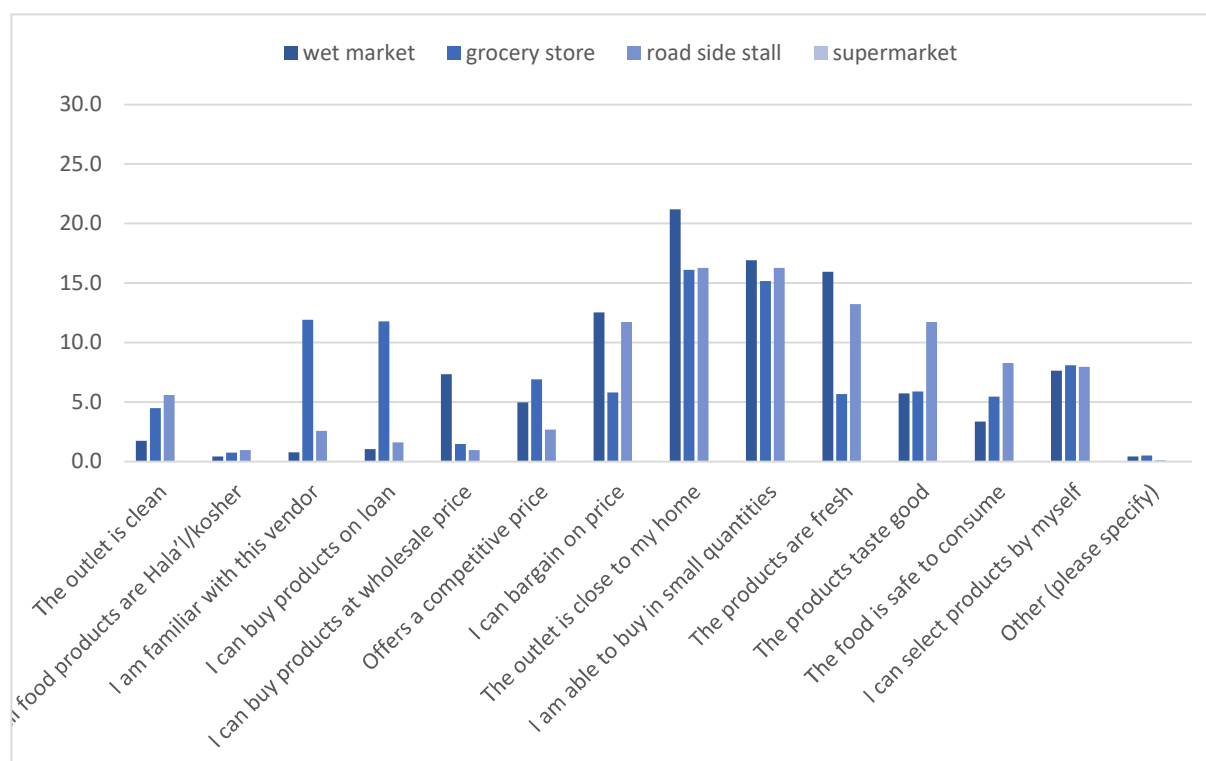


Figure 49 for Narayanganj CC. Most important motives (first, second, and third place) to buy from an outlet (respondents that mentioned this motive as percentage of total sample that buys from this outlet) per outlet type.

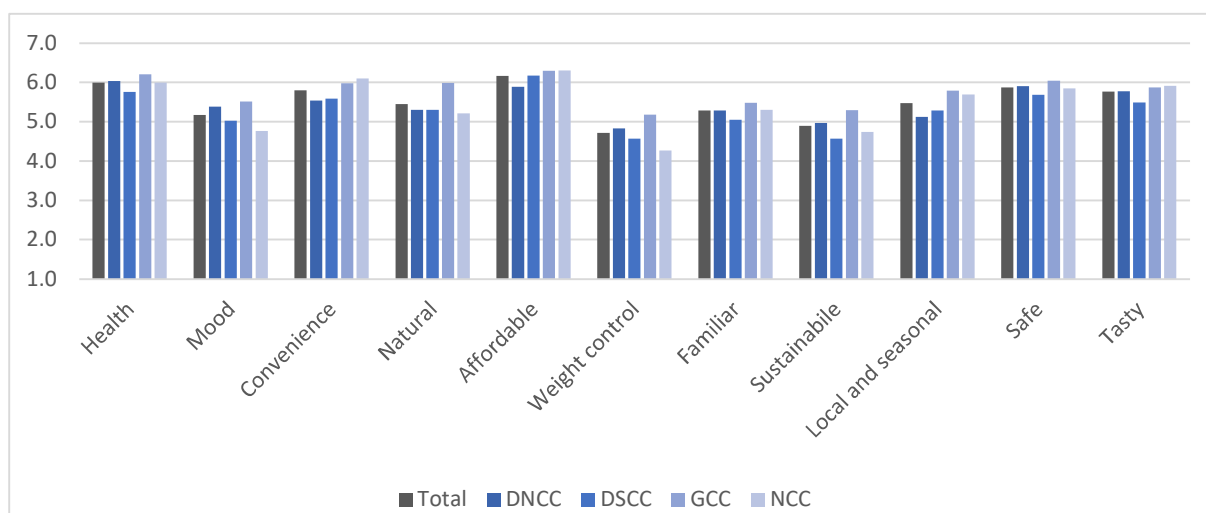


Figure 50. Food choice motives per City corporation

Table 37: Percentage of respondents who have a family member suffering from health issues per city corporation¹

	DNCC	DSCC	GCC	NCC
Diarrhoea and/or vomiting due to food contamination in the past month	6.8%	11.8%	5.3%	5.8%
Diabetes	11.3%	19.3%	22.6%	26.5%
High blood pressure problem	25.7%	35.7%	30.1%	43.8%

Note to the table: 4 respondents (all in North Dhaka CC) answered "don't know" to the question on diarrhoea

¹City Corporations: North Dhaka (NDCC), South Dhaka (SDCC), Gazipur (GCC), and Narayanganj (NCC)

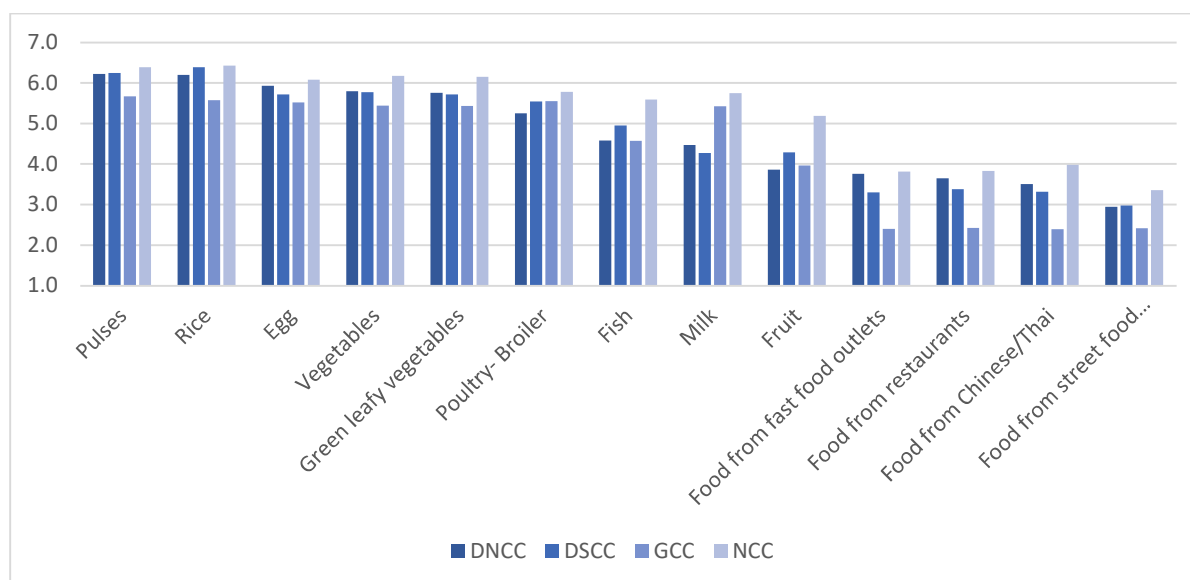


Figure 51 Trust in safety of different food groups, per city corporation

Table 38: Mean scores on health and food safety related motives per city corporations¹

	Mean DNCC	Mean DSCC	Mean GCC	Mean NCC
Self-efficacy health	5.4	4.9	4.9	5.7
Self-efficacy safety	3.8	3.8	4.3	4.4
Optimism about food safety	4.8	4.6	5.1	5.8
Pessimism about food safety	5.4	5.0	5.6	5.4
Food safety motive score	5.3	4.9	4.9	5.1
Health safety motive score	5.4	5.4	6.0	5.3

¹City Corporations: North Dhaka (NDCC), South Dhaka (SDCC), Gazipur (GCC), and Narayanganj (NCC)

COVID-19 worries and food insecurity by city corporation

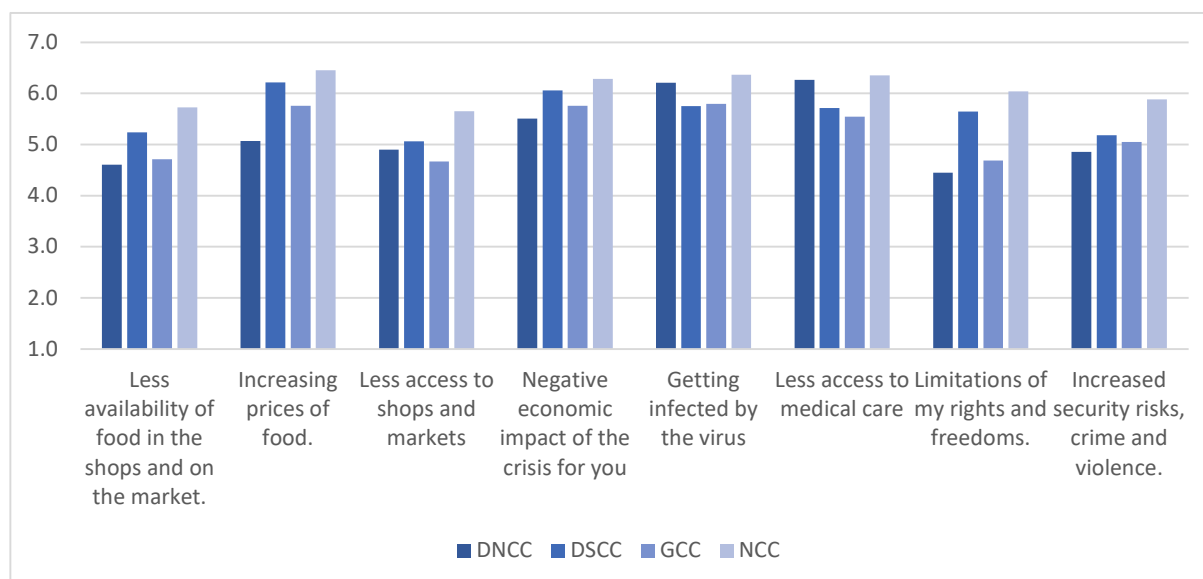


Figure 52 COVID-19 related worries per city corporation¹

¹City Corporations: North Dhaka (NDCC), South Dhaka (SDCC), Gazipur (GCC), and Narayanganj (NCC)

Table 39: Food insecurity for the total sample and per city corporation¹ (in percentages)

	Total sample (n=2027)	DNCC	DSCC	GCC	NCC
secure (score 0)	18.9%	16.4%	12.4%	30.6%	16.1%
mild (score 1-3)	31.0%	32.0%	28.2%	43.2%	20.5%
moderate (score 4-6)	35.5%	41.7%	35.7%	21.4%	43.2%
severe (score 7 or 8)	14.6%	9.9%	23.7%	4.7%	20.3%

¹City Corporations: North Dhaka (NDCC), South Dhaka (SDCC), Gazipur (GCC), and Narayanganj (NCC)

Appendix D. Motives to buy from specific location

Table 40: Availability of **vegetables**

Type of outlet	Name of the markets	Motives to buy here	examples
Kitchen market	Boter bazar, Mazar Bazar, Atipara bazar, Masterbari bazar and Abdullahpur bazar, Battala Bazar, Sadek Khan Arat, Rayer Bazar, Fulpar Bazar, Namar Bazar, tongi bazaar, Laxmi Narayan cotton mill area market; Narayanganj city market Chowdhury bazar and bou bazar, Chittagong road market, village market, Julkuri bazaar Nailondarpara Pashchimpara bazaar, Depot. Market in Kalir Bazar, Maucha Bazaar and Bou Bazar/Rishipra market etc	<ul style="list-style-type: none"> – Nearest markets (especially important for women) – Fresh food items – Nearest wholesale market – Price is (a little) lower compared to other markets – Safety: can buy foods through proper checking – Time of the day – Comes from agricultural land directly 	"We, the women purchase for our family and it is very close to us", "Those who are service holder and get time in the evening then they buy vegetables from rail line bou bazar"
Rickshaw van vendors	Street vendors	<ul style="list-style-type: none"> – Convenient location on the way – Low price – "On emergency period" 	On the way back from work to home, "We get foods at low price from rickshaw van vendors."
Wholesale market			
Market	Shonirakhra, Kajla Jatrabari, Shonapara Mridhabari bazaar, Bou bazaar Shyampur bazaar Matobbor bazaar	<ul style="list-style-type: none"> – Price, sold at low price – Nearby our house – Good but expensive 	"these markets are for poor people"
Road side market / vendor	Road side open market carried by vans	<ul style="list-style-type: none"> – Road side – Fresh vegetables from crop field directly 	
Roadside temporary shop	Individual vendor		When they get the chance they buy here
Super market		<ul style="list-style-type: none"> – It is clean 	

Table 41: Availability of **fruit**

Type of outlet	Name of the markets	Motives to buy here	examples
Kitchen market	Atipara market, Abdullahpur market House building market, Azampur kitchen market,	<ul style="list-style-type: none"> – Suitable for purchasing fruit 	"Whatever place they get suitable for purchasing fruit then we buy it from that place.", "It is easily

	Masterpara market and Mazar market, Bou bazar, Battala Bazar, Sadek Khan Arot, Rayer Bazar wet market, Joydepur bazar, Konabari, Kashimpur, Namabazar, Tanbazar and Harunbazar, SataishChowrasta bazaar, Sharippur Bazar, Town Bazar, Gazipur bazar, Konabari, Chowdhury Bari market, Mahalla'r bazar, 2no. gate bazar market, Bou Bazar, Dipor bazar, Maiccha bazar; Kalir bazar and Nitaiganj Bazar, Bou bazaar, Pooler bazaar, Chittagong road market, JalkuriBiswa Road Bazar, Shonir Akhra, Rayer bazaar	<ul style="list-style-type: none"> - All commodities are available here, can buy what they need - Nearest market – close to local communities - Familiar - Able to bargain - Able to buy the quantity needed - Convenient - Lower price - Opportunity to buy (far from residence) - Emergency buy - Ability to bargain - Fresh 	available if you have a small amount of money. The shopkeeper gives as much as we want.”; “there is the availability of vehicles almost all the time, a lot can be found there”, “This is the nearest market to buy fruits”
<i>Rickshaw van vendors</i>	Street vendors, individual vendors, “hawkers”	<ul style="list-style-type: none"> - Convenient location on the way - Occasionally buy from there - Usually don't buy here since they sell at higher price - Able to buy the quantity needed 	On the way back from work to home; buy there when busy
<i>Wholesale market</i>	Kaoran' bazar	<ul style="list-style-type: none"> - It is a little cheaper 	
<i>Road side market</i>	Abdullahpur	<ul style="list-style-type: none"> - Convenient location (near market) - Good quality - Not high price 	On the way back to our home from market
<i>Roadside temporary shop</i>	Individual vendor	<ul style="list-style-type: none"> - Buy there when they get the chance 	“we buy fruit from roadside shops”
<i>Retail</i>	Kathal-bagan' bazar, BangshalMor	<ul style="list-style-type: none"> - Convenient place - Nearby - Know the owner 	‘The place is next to the house’
<i>Fruit shop</i>	Banani	<ul style="list-style-type: none"> - opportunity 	“When our husbands go outsides then they purchase fruits from Banani sometimes”
<i>Retail/ wholesale</i>	Railgate, Alu bazaar Pakistani maat	<ul style="list-style-type: none"> - cheap price - neat and clean 	“There are many shops. So we can buy fruits at a cheap price”

Table 42: Availability of **fish**

Type of outlet	Name of the markets	Motives to buy here	examples
<i>Kitchen market</i>	Bou Bazar, Battala Bazar, Sadek Khan Arot, Rayer Bazar wet market, borobazar, no 1 big market, no 5 small market, Joydepur bazar, Konabari, Kashimpur,	<ul style="list-style-type: none"> - Availability of all commodities - Convenience: Nearest market, close to local communities (their house) - Familiar markets 	“In the Small market, price is low and they can buy small quantity”, “It is our nearest market and we can buy fish quickly from this place.”

<i>Rickshaw van vendors</i>	Namabazar, Tanbazar and Harunbazar, Sataish Chowrasta bazaar, Sharippur Bazar, Town Bazar, Gazipur bazar, Shakhasshor bazar, Konabari bazar, Laxmi Narayan cotton mill market, Mahalla'r bazar, Bou Bazar, Dipor bazar, Maiccha bazar and Kalir bazar, Bou bazaar, Pooler bazaar, Chittagong road market, Jalkuri Bazaar, Boikor Bazaar, 2 no. Bazaar Chairman office Bazaar "hawker" / individual vendor	<ul style="list-style-type: none"> - Lower price - Ability to buy quantity needed - Opportunity to buy (far from their residence) - Prices are higher on daily bazaar but lower on a weekly market - Ability to bargain - Fresh, good quality 	
		<ul style="list-style-type: none"> - Occasional purchases - Nearer - Fresh - Convenient - They sell at higher prices - Ability to buy quantity needed 	"Sometimes they buy from these shops when they are busy"
<i>Wholesale market</i>	Abdullahpur and Tongi Bazar, karwan' bazar	<ul style="list-style-type: none"> - availability of everything - high amount / abundant availability - variety of fishes - nearest markets - lowest price 	"It has a wholesale market, so fishes are less in price in this bazar"
<i>Road side market</i>		-	
<i>Roadside temporary shop Market</i>	Individual vendor	- Buy there when we get the chance	
	Atipara market and mohila market, Beneji bazaar, Khilgaon bazaar, Shajahanpur bazar and Khilgao rail gate market Rajarabagh bazar	<ul style="list-style-type: none"> - Neat and clean - Familiar with the vendor - Sometimes able to get on credit - Comparatively cheap price - Next to our residence - On way back to our home 	<p>"The market is newly built market and it keeps neat and clean", "we get familiar with each other through purchasing from them for a long time"</p> <p>"Sometimes on the way back to our home after the end of the office we buy fish and fruits from Rajarabagh bazar since we get them at cheap price."</p>
<i>Retail market</i>	kathal-bagan' bazar, Dolphinerboli, Sukrabad bazaar, West rajabazar, Jallar Bazaar, Ananda bazaar, Naya bazaar Thatari bazaar	<ul style="list-style-type: none"> - Lower price - Fresh and alive fish available - Good fishes available 	"Fishes are expensive in 'kathal-bagan' bazar"
<i>Farm</i>	Model farm	- fresh	
<i>Street vendors</i>	Vendors who sell door to door	- occasional buying	"On emergency period they buy fish from street vendors but these fishes are not of good quality"

Table 43: Availability of **poultry**

<i>Type of outlet</i>	<i>Name of the markets</i>	<i>Motives to buy here</i>	<i>examples</i>
<i>Kitchen market</i>	Battala Bazar, Sadek Khan Arat, Rayer Bazar, Fulpar Bazar, Namar Bazar, also from van and nearer shop, bou bazar, tongi bazaar, Mridhabari bazar, ShonirAkhra Bazar, DarbarDhalir Bazar, joydepur bazar, Konabari, Kashimpur, Namabazar, Tanbazar and Harunbazar, Laxmi-Narayan and Chowdhury market, Bou bazaar, Chittagong road market, Julkuri bazaar, Nailondarpara bazaar	<ul style="list-style-type: none"> – Nearest market (especially for women), time convenient – Wholesale market – Fresh food items – Lower price – Price is a little lower compared to other markets – Familiar markets 	"We don't get enough time to go to other markets."
<i>Rickshaw van vendors</i>		–	
<i>Wholesale market</i>		–	
<i>Road side market</i>		–	
<i>Roadside temporary shop</i>	Individual vendor	–	When they get the chance they buy here
<i>Retail</i>	Jatrabari bazaar, bou bazaar	– Availability	"chicken is always available here"
<i>Retail/ wholesale</i>	Shyampur bazaar, Matobbor bazaar	–	
<i>??</i>	Nearby stall	–	
<i>Chicken shop</i>	Chicken shop in the colony	–	

Appendix E. Food choice motives

Table 44: Positive and negative aspects of food choice motives

Positive aspects	Negative aspects	Specific examples
Food safety		
Fresh		Freshly caught fish, check expiry date, straight out from the field, morning market is fresh, no night market is good
Living / lively		living fish, fresh and lively,
Neat and clean food		Clean it after brining it home, packed food
Less contaminated		Free of germs, vegetables infected with insects are less contaminated, those food which are not fresh are most likely less contaminated with formalin, natural fish
Look good		check the products thoroughly, looks good and fresh, green and fresh, checking the colour, "I can tell the food is good just by seeing it."
Organic		Fresh from natural sources
Shelf life		We keep the small fish alive, dry fish is much better
Source		vegetables from surrounding rural villages, foods from good companies, fish from the pond at the village, vegetables comes to the market in a van looks fresh, fish from fisheries farm nearby, fishes from the river (are free from adulteration; hilsa fish), grown in the locality, bought from a particular shop
From a known place		home grown, purchase it from a known person, from our known seller
Local, native variety	Hybrid variety	hybrid variety fish is not good, local/native chicken, local or Indian cow, milk from native cow, milk (hybrid cows), hybrid fish is adulterated, medicine used is used and it causes disease
	Not fresh / spoiled	Rotten food, decaying food, dry vegetables, food that is kept to long, some fishes are preserved for 15 to 20 days, old, stale, spoiled, dead and rotten fish, wasted and rotten things mixed with them, soft and rotten, "We eat all food. But eating of non-fresh and rotten food upset stomach and causes diarrhoea. So everybody wants to have good food.", The dry fish that is given salt in it are not preserved properly, the food gets rotten in hot weather, we don't have fridge, , soft fish "I touch the fish; if it is soft then I do not buy that", "We are not able to buy the fresh fish in the morning, we have to wait till 11.30 to buy fishes by that time already fished got little spoiled"
	Contaminated - adulteration	food containing formalin / insecticide / medicine / chemical fertilizers / poison, coloured food, sprayed with insecticide to make it look more fresh, fruits ripened using chemical, using colour so that it seems ripe, oranges are sweetened by giving medicine, more fertilizer used, "milk is not pure since vitamins are used for cows", contaminated foods become rotten because of medicine, no (good) colour when we cook it (amaranth), turmeric is adulterated with colour, fish are adulterated with colour, "If it looks stale that means they have added medicines to it"
	Source (origin)	culture fish (pangash fish), warehouse vegetables, fishery fish
	Contaminated - other	Food having fly, infected with insects, spotted food, fly around the fish means it is rotten
	Dirty	foods shouldn't be kept open, contain dust, hair from anyone's head, frequented by fly, dirty food, washed with dirty water, not clean
	Ice added	
	Looks good but is not, fraudulent	looks beautiful but take at home it is found spoiled and stale, looks fresh but at home it becomes rotten (fish), rotten vegetables inside of a bundle, plastic egg,

Sensory	Cannot be detected	We can't understand which food has formalin. For fish, the flies don't or less seat on it, <i>"It is not possible to buy foods by knowing the inside condition"</i>
	Knowledge	<i>"We are illiterate we don't understand everything"</i> , spinach does not contain formalin that is not true
	Frozen fish	Frozen fish has formalin added an is from places far away
	Tasty	tastes good, taste good together, taste good with spices / onion / oil, tasteful, pleasant to eat, tasty, tasty to eat,
Good looking		Carefully observe when buying, buy foods that look good, tasteful to eat when it looks good, beautiful to sell "I buy the cheap ones. If it looks good to me, I buy it. I don't buy at high prices."
	Liking	Purchased when I wished, what I like, feels good to eat
Fresh		Fresh food taste better, eat right after cooking, food bought from market and then cooked immediately tastes good
	Ripe	I check green or ripe
	Not tasty, less taste	Not tasty, lost appetite for the food, "Brother, if it tasted good to eat fruits before and now it doesn't feel good -they gives formalin.", not preferred choice, dead fish is less tasteful, fish that is less fresh has less taste, not tasteful when someone is ill, foods are not as tasty as before, does not bring pleasure, lose interest/taste
	Monotonous	
	Cultivated tastes less	No taste in cultivated fish
	Not tasty due to adulteration	Even after cooking that will not taste good (medicine added)
Price	Dry	Tilapia and pangasius fish have no juice in them. There is no fun.
	Reasonable price	
	Within our budget	Buy fish according to my financial capacity, very often small fish
	Higher income / price	Small pulse has better taste, the big one is bit less expensive <i>"If the income is good then the food is good as well, our income is less so whatever we get we bring it and we eat it."</i> <i>"What I could buy with fifty takas is good."</i>
	Expensive	Costly, less income, we cannot afford to buy them, high price, fresh fish cost much higher
	Buying capacity	Financial constraints, lack of buying capacity, <i>"we don't think about the food we take. Sometimes, even knowing that the food is not good, we have to take it because of money."</i>
Health		
Provides energy		Provides energy to the body,
	Filling	Fulfil my stomach
Good for health		
	Vitamin	It has vitamin, with more vitamin, contain vitamin and daily needed items, only fresh vegetables contain vitamin
Nutritious food		
	Source	<i>"Fish from the river contains more vitamins",</i>
Contain protein	Makes you sick	The body becomes ill. Suffer from diarrhoea (related to formalin in fish)
	allergies	I get allergies (egg)
	Gastric	We have to take medicine to get relief from gastric
Availability		
Readily available		
	All foods are contaminated Only poor quality	There are no foods in the market that are good. <i>"All foods are adulterated, we have to find out which is with less chemical and formalin, whatever product we purchase, we think it mixed with chemical", "all foods are adulterated", "there are no contamination/ toxic free foods" "the food which is less good, we buy them at a lower price. I can't find any good things in the market, so I have to buy the less expensive food."</i> <i>"I try to buy</i>

		<i>the good one, when I buy paying money. Still we cannot avoid adulterated food."</i>
Convenience		
	Time to check foods	<i>"When I'm in a hurry I can't observe carefully while buying any item."</i>
Negotiation / behaviour of the vendor		
<i>Sell at good price</i>		Seller behave well to regular customers, sell at less price when customers behave well
	misbehaviour of vendors	Shopkeeper loses temper and behave rough when bargaining, threaten to not give it later when customer wants to check other prices
Other		
<i>Eating meat and fish Source</i>		If I can eat with fish and meat, then the food is good
	Source	Chicken and fish are cultivated from farms instead of poultries. Milk that comes from the cow which eats grass is good

Appendix F. Focus group discussion outputs on aspects of health and food safety motives

Table 45: Health related aspects mentioned by respondents

Aspects of health	Examples
Good for health / body	<ul style="list-style-type: none"> • Healthy (food), good for health, essential for good health, keeps the body well / good / healthy, keeps my health well / better, affects the body, health remains good, gives benefit to the body, is good to eat, much health benefits / beneficial for health, causes disease, affect the human body, does not work good for health
Feel well / better	<ul style="list-style-type: none"> • Feel better after drinking, makes you feel better, makes me feel healthier, feel well after eating, good to eat
Cures disease	<ul style="list-style-type: none"> • Cures a lot of disease
Doctors' advice	<ul style="list-style-type: none"> • Doctors say it is good for health, doctors' advice
Diabetes	<ul style="list-style-type: none"> • Cure for diabetes, have to take food as per my doctor's advice, don't eat it because of diabetes
Children	<ul style="list-style-type: none"> • Milk, egg is good for children
Functioning	<ul style="list-style-type: none"> • Keeps the body functioning
Cool body	<ul style="list-style-type: none"> • Keeps the body cool (and balanced), keeps stomach (functioning) cool / cold, keeps body in normal temperature
Eyes	<ul style="list-style-type: none"> • Good for eyes / eyesight, increase eye vision, improves vision, power of/ to eyes
Bones	<ul style="list-style-type: none"> • Makes the bone strong
Skin	<ul style="list-style-type: none"> • Keeps our skin good
Throat	<ul style="list-style-type: none"> • Clears my throat
Digestion	<ul style="list-style-type: none"> • (helps) good digestion and defecation, good for stomach, gastric problems, causes gastric, cannot digest it, good for digestion
Vomiting	<ul style="list-style-type: none"> • Results in vomiting
Dizziness	<ul style="list-style-type: none"> • Lowers dizziness, feel sick and dizziness if I don't eat rice
Blood pressure	<ul style="list-style-type: none"> • Increase blood pressure, controls blood pressure, is good for people with low blood pressure
Body pressure	<ul style="list-style-type: none"> • Reduce pressure in the body, is good for reducing pressure
Blood (quality)	<ul style="list-style-type: none"> • Increases blood, provides blood to the body, causes blood in the body, keeps the blood good in the body, clears blood, keeps the blood clean / good, purifies blood, helps to reduce cholesterol from blood
Nutritious	<ul style="list-style-type: none"> • Nutritious food, very nutritious • Does not contain much nutrition, has nothing, less nutritious
Vitamin	<ul style="list-style-type: none"> • Contain (much) / carrier of vitamin, vitamin based, vitamin C, vitamin D, Vitamin A and B • Does not contain vitamin, contain/ has less vitamin
Nutrients	<ul style="list-style-type: none"> • High in nutrients, calcium, cholesterol, protein, iron, iodine, essential for good health
Allergies	<ul style="list-style-type: none"> • Allergic to the food • Causes allergies
Energy	<ul style="list-style-type: none"> • Gives (more) energy to /in the body, provides / contains / increases / brings energy, contain calories, meets up hunger, gives energy to work/ "we have to eat rice for energy"
Strength	<ul style="list-style-type: none"> • Give strength, get strength from, would be weak / removes weakness, increases the strength in the body, if we don't eat ... we have to lay down on the bed
Fit	<ul style="list-style-type: none"> • Body will be fit
Able to work	<ul style="list-style-type: none"> • The body will not be good, you will not be able to work properly, I can move well the entire time, I can work 8 hours, "If I eat toast biscuit instead of rice then you will not be able to do work"
Filling	<ul style="list-style-type: none"> • Fills up / fulfils our stomach, meets up hunger, stomach gets full, to meet our hunger, fills our stomach
Survival	<ul style="list-style-type: none"> • Cannot survive without (rice), are needed always by all "we cannot survive without eating rice"

Price	<ul style="list-style-type: none"> Poverty, (very) expensive, cheaper, costs less, costly, optional or occasional, (most times) can't afford it, beyond my purchase capacity, <i>"If the income is good then the food is good as well, our income is less so whatever we get we bring it and we eat it"</i>
Liking	<ul style="list-style-type: none"> Favourite food, I like those, children like them, I don't like these foods much, <i>"there is no other food like rice", "I like rice and fish all time."</i>
Sensory	<ul style="list-style-type: none"> Pleasure and good to eat, taste good (in combination with other food), brings taste, tasty, good to taste, tasteful doesn't taste good, don't like the smell, distasteful
Appetite	<ul style="list-style-type: none"> Increases our taste for food
Regular consumption / Need for it, ritual	<ul style="list-style-type: none"> If I can eat it regularly then it is good for health, become sick if I don't have rice, we have to / must eat it, is first priority, <i>"we can't but eating rice", "My body would not stay well if I do not eat"</i>,
Good mood, feels good	<ul style="list-style-type: none"> Full filled stomach makes us happy, brings taste to you and you feel good, feels good to eat, brings pleasure
Adulteration	<ul style="list-style-type: none"> Plastic egg, <i>"fish eats contaminated food and this food is harmful for our health"</i>, certain food is adulterated with formalin and are not healthy, contaminated with medicine, injections in meat, fattened with medicine, formalin free
Traditional	<ul style="list-style-type: none"> Since our boyhood we are used to eat good foods, these are the foods for the Bengali people and they contain more nutrition, are food of the Bengalis, We are habituated to it, traditional food of Bengali people, we are habituated with it
Religion	<ul style="list-style-type: none"> We are Hindu and never eat beef
Availability	<ul style="list-style-type: none"> Seasonality of availability, can't eat them all the time, can buy this food all the time, is available all time, not available (in the market)
Practical use	<ul style="list-style-type: none"> I don't take it regularly, I eat it once a week, we always eat rice, it is a must for cooking curry (onion), other food are eaten with it, cannot be cooked without, I don't eat it frequently, can eat it with
Local breed	<ul style="list-style-type: none"> Preference for broiler and farming chicken over hybrid chicken, <i>"I don't eat chicken which are grown in firms."</i>
Home grown	<ul style="list-style-type: none"> How can you understand that bottle gourd contain vitamin? -> it is grown by us

Table 46: Food safety related aspects mentioned by respondents

Aspects of food safety	Examples
Safe	<ul style="list-style-type: none"> Is safe, safest foods, less safe and cause disease, safe means that is does not do harm to the body / stomach, no problem with, good and safe, less secured for the human health
harmful for health	<ul style="list-style-type: none"> it makes people sick, causes disease, is harmful
Contamination, adulteration	<ul style="list-style-type: none"> Less contaminated, free from / no adulteration, cannot be adulterated (e.g. rice, spinach), not / less adulterated, nothing mixed with, to some extend adulterated, no harmful things mixed with it, adulterated milk gets burnt at the bottom, chicken is induced by electricity to lay eggs
Toxic	<ul style="list-style-type: none"> No poison, contain toxicity
Chemical adulteration	<ul style="list-style-type: none"> (Not) adulterated / contaminated / mixed with chemical, does not contain chemicals, soda into red spinach, preserved with chemical
Medicine adulteration	<ul style="list-style-type: none"> Ripened with medicine, injected medicine in animals, fattened with medicine (chicken, cow), made bigger with medicine (bottle gourd), <i>"chicken grown up in 40 days", "cows are fattened by injecting medicine, so beef is harmful for body"</i>
Fertilizer adulteration (also positive)	<ul style="list-style-type: none"> No pesticides, fertilizer Adulterated / contaminated / adulterated with fertilizer, fertilizer is used "rice is safe, fertilizer is used to produce rice"
Formalin adulteration	<ul style="list-style-type: none"> Contain less formalin, formalin free, Preserved with formalin, food that cannot be contaminated with formalin (rice, lentil, amaranth, bottle gourd), formalin is applied to milk for preservation, feed applied with formalin
Fraudulent	<ul style="list-style-type: none"> Eggs produced from rubber, water mixed with milk, milk is adulterated with soap powder / washing powder, rice mixed with stones, <i>"Rice processor keep those soaked for two days and then it is broken in the machines, they sometimes even apply medicines to them"</i>
Bacteria	<ul style="list-style-type: none"> Contains bacteria
Fresh	<ul style="list-style-type: none"> Fresh and safe to eat, collected fresh from the firms, kept in ice for a long time, rotten, not fresh, stale, <i>"Rotten or not fresh eggs are adulterated"</i>

Clean	<ul style="list-style-type: none"> Clean, we wash it properly before cooking, place is not clean / cleaned, dirty place,
Insects	<ul style="list-style-type: none"> Not / without infected by insects
Spotless	<ul style="list-style-type: none"> Spotless, <i>"the leaf of the vegetable become black spot by excessive use of fertilizer"</i>
Colour	<ul style="list-style-type: none"> More reddish (amaranth)
Virus	<ul style="list-style-type: none"> A lot of virus in, it is infected with virus
Native species / no hybrid	<ul style="list-style-type: none"> Local variety is safe / less adulterated, milk from native species of cows is safe, hybrid, bottle gourd hybrids, onion hybrid, egg from broiler chicken, <i>"Those amaranth which are taller are hybrid (grown with fertilizer) and which are less tall are deshi/local (not grown with fertilizer)"</i>
Flattened rice	<ul style="list-style-type: none"> Rice of different qualities
Farm products / village	<ul style="list-style-type: none"> Collected from trees, can be collected from field, <i>"cows reared in farms are not good"</i>, from the village, from culture, can grow in open areas like ponds, rivers, etc., farmed fish (the feed is bad)
Natural	<ul style="list-style-type: none"> Pure, it is natural, grown natural, no harmful things mixed in it, gift from Allah, natural fish without farming activities,
Home grown	<ul style="list-style-type: none"> Grow your own, get it from our cows and ducks, grow it in our village houses, chicken in our own house, we cultivate it
Local	<ul style="list-style-type: none"> buy local ones (people from surrounding areas bring it to our market), cows slaughtered here, local variety of mango (from the trees), from abroad is not safe
Packaged	<ul style="list-style-type: none"> More possibility to mix formalin in packaged lentils Packaged food are safest, packaged food is good it is fresh
Feed	<ul style="list-style-type: none"> Tilapia fish eats dirty feed, cultured in ponds by feeding different foods, they provide poultry food to the tilapias, adulterated eggs because chicken are given formalin through poultry food, not fed with good food, fed with forbidden foods, feed old smelly feeds, food is harmful.
Expiration date	<ul style="list-style-type: none"> We buy it by checking date
Preserved with ice	<ul style="list-style-type: none"> <i>"fish is preserved with ice"</i>
Familiarity	<ul style="list-style-type: none"> Familiarity with the sellers
Looks good / checked	<ul style="list-style-type: none"> Looks good, check it, see by myself, check colour, <i>"we can easily find it whether it is good or less by taking a look on it"</i>
Unable to detect	<ul style="list-style-type: none"> We cannot understand as rice is contaminated or not
All is adulterated	<ul style="list-style-type: none"> Adulteration is common practice, <i>"I don't think it's completely poison-free"</i>
Education	<ul style="list-style-type: none"> We do not understand, we are not educated, <i>"As we have no education the sellers give us over dated food and thus, they cheat us."</i>
Sensory	<ul style="list-style-type: none"> Tastes good (with), like it, texture, does not taste food, unpleasant smell, it has smell, <i>"If the cooked rice becomes soft hen we think that the rice is good"</i>
Health	<ul style="list-style-type: none"> Good for health: Keeps the body well, keeps the body cool, contains vitamin, gives a lot of cholesterol, causes cancer Contain disease and allergy, causes / creates / generates allergy, protects from diarrhoea or similar disease, keeps stomach cool, bring disease,
Price	<ul style="list-style-type: none"> High price, those at high price are of better quality, <i>"Amaranth worth Tk.40 is good"</i>
Practical	<ul style="list-style-type: none"> We use it in curry, it has thorns
Availability	<ul style="list-style-type: none"> We keep it available in the Jaishtha month <i>"If I have it (banana) with a bad mind then it will create harm to us."</i> <i>"Seeing the condition of chicken, I no longer like to eat it."</i>

Appendix G. Main purchased products at community wet markets for the lower income groups

Be aware that consumers picked the food they buy most often from wet markets, percentages thus only include the most commonly bought foods and cannot be interpreted as purchase frequencies

Table 47: Main purchased products at community wet markets for the lower income groups (low poor and low-middle poor combined)

Food grains:		Vegetables:		Oil & Fats:		Fruits:		Spices	
<i>barley,</i>	0.1%	(All types of leafy veg.(Spinach/ Amaranta/ Basil)	66.7%	Dalda/ Vanashpati	0.0%	jujube,	0.0%	spearmint leaves	0.0%
<i>Beaten rice</i>	0.0%	Arum/Ol-kachu/Kachur-mukhi	4.3%	Ghee	0.1%	apple	0.0%	chili,	4.9%
<i>Biscuits</i>	1.2%	Balsam apple	5.9%	Palm oil	0.2%	Apple	0.0%	condiments and herbs:	4.5%
<i>Bread/Bonroti</i>	0.5%	Bean/Lobey	0.7%	Soybean oil (open)	8.9%	asian pear,	0.0%	coriander,	1.8%
<i>Cake</i>	0.1%	Brinjal	7.2%	Soybean oil (packed)	1.5%	Bedana	0.0%	indian pennyworf,	0.0%
<i>Flour</i>	0.5%	carrot,	0.3%			Black berry	0.0%		
<i>Maize</i>	0.0%	Cauliflower/Cabbage	0.3%			breadfruit,	0.0%		
<i>millet</i>	0.0%	chili	16.8%			carambola,	0.0%		
<i>Pop rice</i>	0.1%	Green banana/ Green papaya	4.1%			coconut	0.0%		
<i>Puffed rice</i>	0.1%	Ladies' finger	2.3%			emblic,	0.0%		
<i>Rice - Coarse</i>	16.0%	onion,	20.8%			Grape	0.0%		
<i>Rice - Fine</i>	4.7%	Perbol (Patal)	1.1%			Guava	0.3%		
<i>Rice - Medium</i>	9.7%	Potato	22.8%			Jack fruit	0.0%		
<i>semolina,</i>	0.1%	Radish	0.3%			jambolan,	0.0%		

<i>sorghum</i>	0.1%	Snake gourd/ Ribbed gourd	0.9%	Leeches	0.0%
<i>Vermicelli/Suji</i>	0%	Tomato	0.1%	Mango	0.1%
<i>Wheat (Atta)</i>	2.5%	Water gourd	1.4%	Melon/Bangi	0.0%
<i>Other</i>	0.1%	White gourd/ Pumpkin	1.7%	monkey-jack,	0.0%
				Orange	0.0%
				Other (specify)	0.0%
				Other (specify)	0.0%
				Palm	0.0%
				palmyra palm	0.0%
				persimmon,	0.0%
				Pineapple	0.0%
				Ripe banana	0.1%
				Ripe papaya	0.2%
				Safeda	0.0%
				Watermelon	0.0%
				wood apple, coconut,	0.0%

Table 47 – continued- Main purchased products at community wet markets for the lower income groups (low poor and low-middle poor combined)

Pulses :	Fish:		Eggs:		Meat:		Milk & Dairy:		
Bengal gram	0.1%	Baila	0.1%	Duck egg	0.1%	Beef	0.5%	Casein (ponir) / Butter	0.0%
Black gram	0.0%	Boal/Air	0.2%	Farm hen egg	7.1%	Beef organ meat	0.0%	Curd	0.0%
Chickling-Vetch (mug)	0.5%	croaker,	0.1%	Local hen egg	0.5%	Broiler	19.0%	Liquid milk (cow)	0.1%
Green gram (boot)	0.1%	Dried fish	3.4%			Buffalo	0.0%	Liquid milk (goat)	0.0%
Lentil (musur)	11.6%	Eel fish	0.0%			Duck	0.0%	Milk drinks	0.1%
Mashkalai	0.1%	giant sea perch,	0.0%			Hen organ meat	0.0%	Powder milk	0.1%
Pea gram (kheshari)	0.5%	Hilsa	3.3%			Local hen	0.5%	Other specify	
Red gram	0.0%	koi	1.1%			Mutton	0.0%		
		Magur/Shing	0.5%			Sheep	0.0%		
		Mala-kachi/Chala-chapila/Khalsha	40.2%			Sonali	1.6%		
		Pangash	15.1%						
		Puti/Big Puti/Telapia/Nilotic a	25.7%						
		Katla / Mrigel/ Kali baush	2.9%						
		Rohu / rui	4.5%						
		sea fish	2.4%						
		Shoal/Gajar/Taki	0.5%						
		Shrimp	3.9%						
		Silver carp/Grass carp/ Miror carp	6.3%						
		tuna,	0.0%						
		walking catfish	0.1%						

Note: percentage of the respondents buying from this outlet (wet markets). This includes community wet markets only not farmers markets

Appendix H. Differences between male and female respondents

Most questions were asked at household level. For example, "Over the past week, how much did your household spend to purchase (uncooked) food for family from retailers?". These data are therefore less relevant to test for differences between male and female respondents. This also includes intake data "How often does your household usually eat" and food insecurity. Questions that are asked about the individual are listed below.

Purchase

Table 48: Average amount spent (BDT) the last time respondents visited an outlet for men and women separately

		N	Mean	Std. Deviation
Community wet market	Men	1053	742.11	1190.444
	Women	872	774.89	1348.321
Temporary market-farmers market	Men	84	328.15	459.586
	Women	61	305.33	655.565
Small neighborhood grocery/general store	Men	865	791.42	1554.521
	Women	723	871.74	1743.824
Specialist retail store-butcher, baker green grocery store	Men	29	1532.76	1304.886
	Women	21	1428.57	1110.920
Street vendor and Roadside stall	Men	90	59.11	65.530
	Women	51	67.06	61.799
Mobile door-to-door food vendor	Men	432	117.66	94.574
	Women	390	125.14	191.437
Supermarket	Men	76	2751.18	2405.527
	Women	64	3378.91	3564.405

Note to the table: no significant differences found between groups. Notice that men and women both purchase from all the different outlets.

Table 49: Average time (minutes) to get from home to different outlet for men and women separately

		N	Mean	Std. Deviation
Community wet market	Male	1049	10.40	6.202
	Female	865	11.72	7.207
Temporary market-farmers market	Male	85	9.84	6.548
	Female	64	8.72	5.669
Small neighborhood grocery/general store	Male	865	5.52	4.965
	Female	715	5.58	4.849
Specialist retail store-butcher, baker green grocery store	Male	29	15.10	9.589
	Female	21	12.48	7.872
Street vendor and Roadside stall	Male	90	7.93	4.778
	Female	51	7.86	6.630
Mobile door-to-door food vendor	Male	431	4.56	4.113
	Female	390	3.92	4.182
Supermarket	Male	74	14.85	9.129
	Female	63	15.11	10.182

Note to the table: significant differences found between groups for community wet markets. For women, it takes longer to get to this outlet compared to men.

Motives

Table 50: Average scores on food choice motives for men and women separately

Motive	Men	Women
<i>Is healthy</i>	5.98	6.02
<i>Is way of monitoring my mood (e.g. a good feeling or coping with stress)</i>	5.10	5.26
<i>Is convenient (in buying and preparing)</i>	5.78	5.82
<i>Is natural</i>	5.45	5.45
<i>Is affordable</i>	6.17	6.16
<i>Helps me control my weight</i>	4.68	4.76
<i>Is familiar</i>	5.29	5.27
<i>Is produced in a way that is not harming the environment</i>	4.89	4.90
<i>Is local and / or seasonal</i>	5.48	5.46
<i>Is safe</i>	5.90	5.84
<i>Is tasty (taste, smell, and appearance)</i>	5.80	5.71

Note to the table: the sample size was 1098 male and 929 female respondents. Significant differences (t-test) were found only for "mood". Compared to men, mood was more important in the food choice of women.

Table 51: Average scores on health and safety related aspects for men and women separately

	Men	women
<i>Self-efficacy health</i>	5.2	5.2
<i>Self-efficacy safety</i>	4.0	4.1
<i>Food safety</i>	5.1	5.0
<i>Health</i>	5.5	5.5
<i>Optimism about food safety</i>	5.1	5.1
<i>Pessimism about food safety</i>	5.3	5.4

Note to the table: sample size was 1098 male and 929 female respondents. Significant differences (t-test) were found for "self-efficacy safety". Women were more confident than men that they were able to purchase, prepared and consume a safe meal; the difference in score was very small.

Table 52: Average scores on confidence in the safety of food groups for men and women separately

Food	Men	Women
<i>Fruit</i>	4.25	4.40
<i>Green leafy vegetables</i>	5.77	5.75
<i>Vegetables</i>	5.82	5.76
<i>Fish</i>	4.88	4.97
<i>Egg</i>	5.76	5.87
<i>Poultry- Broiler</i>	5.45	5.62
<i>Milk</i>	4.87	5.09
<i>Pulses</i>	6.11	6.16
<i>Rice</i>	6.15	6.15
<i>Food from street food vendors</i>	2.95	2.88
<i>Food from restaurants</i>	3.34	3.28
<i>Food from fast food outlets</i>	3.35	3.27
<i>Food from Chinese/Thai</i>	3.30	3.29

Note to the table: sample size was 1098 male and 929 female respondents. Significant differences (t-test) were found for poultry and milk. Compared to men, women were more confident about the safety of these foods.

Appendix I. Explanation of Bangladeshi foods used on the questionnaire

<i>food</i>	<i>description</i>
<i>singara</i>	Potato fried cubes wrapped with a flat bread and deep fried
<i>jhalmuri</i>	Puffed rice mixed with green spices
<i>aloo chop</i>	Mashed potato fried with butter
<i>Chanachur</i>	Bombay mix, spicy snack mix of dried nuts and pulses
<i>Logence</i>	hard sugar candy
<i>Puri</i>	Thin flat bread wrapped with cooked lentils and deep fried
<i>fuchla</i>	flour based deep fried and pea stuffed common street food
<i>chola makha</i>	Boiled chickpea and vegetable dish
<i>Mojo</i>	Sugar sweetened beverages
<i>chotpoti</i>	Chickpea based spicy snack dish
<i>chola boot</i>	Roasted dry chickpea
<i>ghoogni</i>	Cooked pulse based snack dish
<i>jilapi</i>	Grain based deep-fried and soaked in sugar syrup sweet
<i>buns</i>	Bread bun/roll
<i>semolina / sujl</i>	Porridge cooked with sugar and given a shape
<i>Bonroti</i>	Bread bun/roll
<i>Parota</i>	flat bread shallow fried with oil
<i>Khichuri</i>	rice, lentils and vegetable based dish
<i>Biriani, biryani</i>	Rice cooked together with meat
<i>tehari</i>	Rice cooked together with meat
<i>polao</i>	Rice dish