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EatSafe – Evidence and Action Towards Safe, Nutritious Food

Focused Ethnographic Study on Food Safety Values, Knowledge and Practices in Traditional Markets in Birnin Kebbi, Nigeria

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This EatSafe report presents evidence that will help engage and empower consumers and market actors to better obtain safe nutritious food. It will be used to design and test consumer-centered food safety interventions in informal markets through the EatSafe program.

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TABLE OF CONTENTS

LIST OF TABLES AND BOXES

ACRONYMS

Below is a list of all acronyms and abbreviations used in the report.

COVID-19	Coronavirus disease 2019
DALYs	Disability-Adjusted Life Years
EatSafe	Evidence and Action Towards Safe, Nutritious Food
FES	Focused Ethnographic Study
GAIN	Global Alliance for Improved Nutrition
GLV	Green leafy vegetables
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immunodeficiency Syndrome
ILRI	International Livestock Research Institute
IRB	Institutional Review Board
LMIC	Low- and Middle-income country
NAFDAC	National Agency for Food and Drug Administration and Control
NHREC	National Health Research Ethics Committee
USAID	United States Agency for International Development

EXECUTIVE SUMMARY

Food safety is an important problem in many low- and middle-income countries, including Nigeria. Addressing it requires leveraging the power of consumer demand to steer the decisions of value chain actors (particularly consumer-facing food vendors) towards the provision of safer food. Doing this requires understanding how consumers and vendors perceive food safety, both as a concept and in their daily lives, and how food safety-related decisions are made. The focused ethnographic study (FES) within the USAID EatSafe project aimed to do this by using ethnographic methods to examine perceptions, knowledge, and experience related to food safety among both consumers and traditional market vendors. This report summarizes the main results of that study.

The FES used a modular approach using different types of qualitative methods: in-depth interviewing, semi-structured interviewing, cognitive mapping techniques (e.g., free listing and ranking), and market observations. It was conducted in two phases, with the results of the initial phase informing the focus of the second phase. It focused on three target markets in Birnin Kebbi (Central Market, Yaryara Market, and Tsohon Kasuwa Market) and on the following focus foods: rice, maize, cowpea, soybean, fish, green leafy vegetables, and beef. Data was collected in partnership with a local research partner, Ipsos Nigeria, and involved interviews with 16 consumers and 12 vendors plus market observations in Phase 1 and interviews with 31 consumers and 24 vendors in Phase 2. Data analysis was iterative and used best-practice techniques from the field of applied ethnography.

Key results include that all focus foods aside from soybean were purchased regularly, with open-air markets being the primary but not sole source, and that shopping was typically planned ahead and based on joint household decisions. Shopping was an enjoyable experience for most, with the main negative aspects associated with it being high prices and unexpected price increases. While women were solely responsible for home cooking, both men and women played a role in shopping – and there were strong gender-related differences noted for *how* they shopped. Women were seen as discerning shoppers who would take their time and bargain hard, whereas men were seen as being less discerning and often in a hurry.

Most consumers reported shopping at more than one market but having one primary or preferred market. The main traits considered when choosing a market included price, availability of products (i.e., knowing a certain food would be available, or being able to buy all in one place), and convenience (e.g., it being close to home); familiarity and habit also played a role. When choosing a vendor, consumers often (but not always) stuck to a trusted vendor they had used before, with a strong mutual benefit seen in repeat consumer-vendor relationships (including both in terms of the quality of the goods and complementary services, such as credit provision or delivery). The main concerns steering vendor choice were price, interpersonal qualities, and product quality. For both market and vendor choice, cleanliness was noted rarely when not first suggested through prior questions or interview probes—

but was commonly mentioned once it had been suggested by the interviewer, with consumers able to name several different signs and signals of cleanliness in markets.

While about half of consumers named a type of foodborne illness as a health worry without prompting, consumers voiced somewhat vague conceptions of different types of diseases and did not clearly separate foodborne illness from other causes of gastrointestinal illness. Consumers generally had a moderate level of concern about foodborne illness, with about one third of consumers reporting personal experience with it. However, consumers' concerns about food safety did not seem to be overriding or strongly motivating – i.e., they recognized that food safety concerns might arise with certain foods in certain circumstances, but not commonly, and those concerns did not prevent consumption of that food. Most food was seen as safe, and most food safety issues were seen as things that could be mitigated with in-home behaviors like washing or cooking, or a result of individual intolerances. The foods seen as generally safe tended to be processed and packaged products and tubers and grains, whereas the "less safe" foods included cowpea, beef, maize, local rice, and green leafy vegetables (GLV). Among the focus foods, cowpea raised the most concerns, followed by GLV, beef, and fish; local rice was also a minor concern but only due to the presence of stones. The main issues consumers worried about with regards to foodborne illness were pesticide chemicals and insects (both particularly associated with cowpea and green leafy vegetables). In general, consumers believed they could detect many problems by visual inspection. When asked about responsibility for ensuring food safety, consumers generally named government, particularly health officials; some also mentioned market managers, vendors, suppliers, and consumers themselves.

Vendors tended to sell only 1-2 focus foods, with the exception of grain/legume vendors who sold multiple grains and legumes. Their business aspirations were typically modest, focused on providing for their families and enabling key ceremonies and milestones (e.g., a wedding) as opposed to entrepreneurial business expansion. Most vendors reported their customers to be primarily repeat buyers, and they offered numerous complementary services to attract and retain these loyal customers. Being patient, honest, and reliable were seen as essential traits in a vendor, and vendors' competition was constrained by norms about "fair pricing" (i.e., not raising prices too high, even if supply and demand motivated it) and strong ties with other vendors, both socially and through official vendor associations. Vendors generally respected the vendor associations as useful and acting in their own interests, and relationships among vendors tended to be collaborative and supportive. Regarding gender, women vendors were rare and concentrated in certain foods, often selling at smaller volumes. They were also reported to be largely absent in the earlier stages of the value chain (e.g., wholesale, transport, processing), at least within the Kebbi region. This was ascribed both to religious and cultural norms (specifically those associated with Hausa Muslims) and to various barriers women would face when sourcing products (e.g., heavy loads and remote settings).

While vendors were divided in terms of their worry about food safety, all saw clear gradations in food quality and recognized serious quality degradation (i.e., food that was so degraded it was unsafe) as equating to a hard-to-sell product. Similarly, vendors felt that only a minority of consumers were motivated by ensuring they purchased safe food – but that nearly all were determined to get high-quality food. Vendors largely agreed with consumers in terms of which foods were the most and least safe.

The results suggest several potential in-roads for EatSafe intervention design, as well as a few potential challenges. These are summarized in Box 3 (page 68).

1. AIMS AND OBJECTIVES

Consumer demand is thought to be a critical driver of increased supply of safe foods in lower-income countries—particularly in settings with limited capacity for regulation and enforcement. The EatSafe – Evidence and Action Towards Safe, Nutritious Food Nigeria program thus aims to generate evidence and knowledge of the potential for increased consumer demand for safe food to substantially improve the safety of nutritious foods in traditional market settings in Nigeria. The five-year program is funded by USAID and managed by a consortium led by the Global Alliance for Improved Nutrition (GAIN), along with the International Livestock Research Institute (ILRI), and Pierce Mill Education and Media; for the implementation phase of the project, these partners are joined by the Busara Center for Behavioral Economics. In Nigeria, the program focuses in Birnin Kebbi, a city in Kebbi State.

In order to understand whether and how increased consumer demand can be used to improve food safety, it is important to generate evidence on how consumers and vendors perceive food safety, both as a concept and in their daily lives, and how food safety-related decisions are made. The focused ethnographic study (FES) aimed to probe this subject by using ethnographic methods (e.g., in-depth interviews, observations, cultural domain elicitation, rating, and ranking) to examine perceptions, knowledge, and experience related to food safety among both consumers and informal market vendors. The FES will complement other research conducted by EatSafe, including a quantitative survey of consumers and vendors, a risk assessment, and several literature reviews. It aims to contribute actionable information to inform the development of consumer-focused approaches to improve food safety within EatSafe and beyond. As this was the first time the FES method was explicitly applied to the topic of food safety, the work also offers insights, tools, and procedures that allow the Food Safety FES approach to be applied in other settings in the future.

This report is organized as follows: Section 2 offers background information on the motivation for the study; Section 3 summarizes the methods; Sections 4 and 5 present results from the consumer and vendor interviews, respectively; Section 6 discusses main results and their implications for the project; and Section 7 concludes.

2. BACKGROUND AND MOTIVATION

2.1. THE IMPORTANCE OF FOOD SAFETY

For a food to be safe, it must contain minimal levels of or be free of foodborne hazards—including pathogens (viruses, bacteria, and prions), parasites, chemical contaminants, or adulterants. Foodborne hazards can both cause acute illness and raise the risk of long-term disease. They are responsible for a large burden of illness and death (1), as well as considerable economic costs (2). The majority of the foodborne disease burden falls on those living in low- and middle-income countries (LMICs) (3,4), and particularly in Africa (1). Nigeria, as a transitioning lower-middle-income country with considerable urbanization, falls into the category of countries for which food safety concerns are generally at their most critical due to rapid economic, demographic, and dietary change but limited food safety management capacities (2). Informal markets, where a large share of consumers in LMICs purchase their foods (5), can be especially risky for foodborne pathogens. This is due to poor market infrastructure, including limited access to potable water (6), poor hygienic conditions (7,8), and poor storage practices (9), among others (10). Past studies have shown high levels (contamination in up to 100% of samples) of risk and hazard for numerous foods sold in informal markets in Nigeria (11).

Studies document the need to improve food safety knowledge and practice in informal markets in Nigeria (12). Doing so requires understanding (and potentially shaping) the motivations, attitudes, beliefs, and practices that shape the decisions of both consumers and food vendors, in order to enable consumers to demand safer food and vendors to deliver it (13,14). While there have been several prior studies of consumers and vendors' knowledge and practice related to food safety in Nigeria, an EatSafe review (12) found that those tended to focus on only consumers *or* vendors (not both), primarily focused on prepared foods, relied on quantitative surveys (with none using ethnographic methods), and did not generally assess the salience of food safety as a concern or cultural and socioeconomic issues that might influence food safety-related behaviors. To address those gaps and inform future interventions, the present study sought to examine perceptions, knowledge, and experience related to food safety among both consumers and traditional market vendors.

3. METHODS

The full methods are provided in Annex 1 and only summarized here. In brief, this study used the Focused Ethnographic Study (FES) approach, which has been applied to various topics in health and nutrition but not food safety. It used an iterative qualitative research design with two phases separated by reflection and analysis: the initial phase aimed to discover key themes and issues related to the phenomenon in question, and the second phase delved more deeply into these dimensions.

The study sought to answer the following overarching research questions:

1. How do people in the research area (consumers and vendors) understand, speak about, and recognize issues related to food safety?
2. How do consumers make decisions about food safety in informal market settings?
3. How do vendors make decisions about food safety in informal market settings?
4. How does gender influence food safety risk, exposure, and ability to mitigate or manage these issues?

The study focused on informal market vendors and consumers for seven 'focus foods': rice, maize, cowpea, soybean, fish, green leafy vegetables (GLV), and beef. It focused on three markets in Birnin Kebbi: Central Market, Yaryara Market, and

Tsohon Kasuwa Market. **Consumers** was defined as those who shop in at least one target market, at least once a month on average, and have primary or shared responsibility for purchasing food for their household. **Vendors** was defined as those selling at least one focus food regularly in a target market (i.e., at least once a month).

All fieldwork was done through a local firm contracted for data collection, Ipsos Nigeria. Structured market observations occurred only in Phase 1 and covered all three target markets. The rest of the data was collected through in-person (face-to-face) interviews with consumers and vendors. These interviews included three cognitive mapping techniques: free listing, rating, and ranking. In *free listing,* respondents were asked to name all the items in a defined domain (e.g., "all the foods that can generally be considered safe"). In the *rating* exercise, the respondent was presented with a list of items one by one and asked to rate each of them on a Likert scale according to a series of attributes (e.g., rating fresh catfish or cowpea along a scale from 'disagree strongly' to 'agree strongly' in terms of whether it can easily cause diarrhea or vomiting). In the *ranking* exercise, respondents were asked to rank items on a scale; for example, the ranking of "reasons to buy from a specific vendor" asked consumers to rate reasons such as 'Vendor's food is usually priced lowest' and 'Vendor's stall and food is cleanest' along a scale from 'less important' to 'more important'. For these and certain interview questions, images of the focus foods were used to help respondents picture the food being discussed (Annex 2). In Phase 2, *Storytelling vignettes* were also used: the respondent was shown an image with a basic 'story' behind it (about a man or woman going to the market and bringing back vegetables to his wife / her husband) and asked to speculate as to their dialogue and emotions (see images in Annex 2).

The sample size for Phase 1 was 13 vendors and 16 consumers. The sample size for Phase 2 was 24 vendors and 30 consumers. Both consumers and vendors were recruited through visits to the markets. To ensure inclusion of a diverse range of consumers, quotas were set for the following characteristics: men, women, those under age 30, those over age 30. In Phase 1, consumers were recruited only from Central Market; in Phase 2, 10 consumers were recruited from each of the three markets.[1]

For vendors, Phase 1 sampling included sellers who each sell each type of target food, with three vendors each for the foods thought to have the highest associated food safety risk (beef, fish, and GLV) and the other foods (soybean, maize, rice, cowpea) having just one vendor interviewee each. In Phase 2, the focus was on GLV and fish only, and we sought 12 vendors from each category. In Phase 1, vendors were recruited only from Central Market; in Phase 2, eight vendors were meant to be recruited from each of the markets. Where both female and male

[1] In order to meet the quotas, one additional interview was conducted, which was included in the analysis for a Phase 2 sample size of 31 consumers.

vendors were available, we intended to interview both female and male vendors; however, no female vendors were available for the majority of commodities sold.

All interviews took place in Hausa and were audio recorded and transcribed into English. Demographic data and rating/ranking data were recorded by recruiters at recruitment and entered into a spreadsheet. Demographic data and responses to other closed-ended questions were analyzed in Excel and/or Stata SE15. Text data from interview transcripts was subjected to thematic analysis either through hand-coding or using ATLAS.ti. Free-list data analysis used the approach described by (21), using Visual Anthropac 4.9 software (Analytic Technologies). Analysis is presented in the text by synthesizing results across all respondents as well as selecting quotations to illustrate either commonly held perspectives or interesting deviations from these; all quotations are presented verbatim from the transcript, aside from small corrections to correct typos and improve punctuation.

All data collected in the study were treated with confidentiality throughout the study, and all participants provided signed informed consent. The research took place in the context of the COVID-19 pandemic, with methods adjusted to protect the safety of the research staff and participants. The protocol and tools were reviewed and approved on 15 December 2020 by the National Health Research Ethics Committee of Nigeria, Protocol Number NHREC/01/01/2007-26/11/2020.

The market observations are intended primarily to provide context for the interview data; as such, the results of the market observations are included in Annex 3.

4. RESULTS: CONSUMER INTERVIEWS

4.1. CONSUMER DEMOGRAPHICS

The demographic characteristics of consumer respondents are shown in **Table 1**. Consumers are about half women, with an average age of about 34. Most are Hausa and Muslim, with a sizeable minority of Christians, who are mostly Zuru. The sample is highly educated, with just over half having completed post-secondary education. The sample is also fairly well off, with only 12% of households estimated as being below the 3.10 PPP international poverty line. Most are (monogamously) married, and the average household has 2.7 children. Nearly all male respondents were the principal household income earner. Other than three women who self-identified as the principal income earner, the women typically named their husband as the principal earner. Most men (12 of 23) had professional/managerial jobs, whereas women tended to be homemakers or have small-scale business activities (e.g., re-vendors of goods). Nearly all households had electricity, TVs, and improved toilets; all but one had a mobile phone. The main cooking fuels used were wood and electricity, followed by gas. There were no significant differences in demographic characteristics between phases.

Table 1. Consumer Demographic Characteristics (n=47)

RESPONDENT CHARACTERISTICS		HOUSEHOLD CHARACTERISTICS	
Gender	Male (49%), female (51%)	**Avg. HH size (range)**	6.2 (1 - 19)
Avg. age (range)	33.7 years (22 – 64 years)	**Avg. number of children (range)**	2.6 (0 - 11)
Ethnicity	Hausa (47%), Zuru (30%), Fulani (15%), Igbo (6%), Other (9%)	**Home has electricity**	91%
Religion	Muslim (62%), Christian (38%)	**HH owns car**	32%
Pct. completing primary school	94%	**HH owns radio**	49%
Pct. completing secondary school	87%	**HH owns TV**	87%
Pct. completing tertiary school	53%	**HH owns computer**	32%
Marital status	Married (monogamous) - 66%; married (polygamous) - 6%; single - 26%, widowed - 2%	**HH owns refrigerator**	66%
Occupation	Professional/Managerial - 30%; Small business owner/ entrepreneur - 15%; Not employed outside home - 23%; Sales/services employee - 11%; Petty trader, hawker - 6%; unskilled labor - 2%, technical labor - 9%, agriculture - 4%	**HH owns freezer**	26%
		HH owns mobile phone	98%
		HH has improved toilet	91%
		Farms or owns farmland	55%
Respondent is HH's principal income earner	45%	**Pct. poor (1.90 PPP)***	2%
		Pct. poor (3.10 PPP)*	12%

** 'Percent poor' refers to the percentage of households estimated to be poor based on the poverty probability index, using the 2018 World Bank thresholds of 1.90 PPP and 3.10 PPP per person, per day.*

4.2. GENERAL SHOPPING PRACTICES

All of the 'focus foods' were purchased regularly by all or nearly all consumers, with the exception of soybean, which was purchased less often (in some cases, never) and usually for specific uses, such as feeding young children or making snacks. Fish and meat were also purchased less widely than grains/legumes and vegetables, primarily due to their higher price, but were still widely consumed.

Consumers' shopping frequency varied by type of food. For grains and legumes, most consumers interviewed purchased these once a week to a few times a month, primarily from a main market like Central Market. However, a few noted that they did not have the means to purchase in bulk, and thus purchased just enough for the day. For vegetables, meat, and fish, as well as other perishable "stew/sauce and soup ingredients", these were purchased more frequently.

Aside from the target markets, a few other Birnin Kebbi markets were mentioned as food sources.[2] Food acquisition sources other than markets were mentioned only occasionally and included hawkers and street-side sellers (particularly for raw meat, fresh fish, and fresh vegetables), supermarkets and small shops/kiosks (for packaged rice and other packaged goods), fishermen (for fish), and one's own farm (for vegetables). The reasons given for using those outlets related to price (cheaper when bought from the source) and convenience (open later, in one's neighborhood).[3] Small purchases, particularly of non-perishable packaged foods and cooking ingredients (e.g., bouillon cube) were commonly made from small neighborhood shops. Some consumers also had access to a small garden for vegetables (particularly leafy greens), when the season permitted it, or to a farm for growing other crops.

In general, the market/retail outlet chosen varied only slightly by the food in question: most consumers generally used the same market for all foods. The exception to this general practice was for foods that were highly perishable and needed to be purchased regularly, which might be bought from a roadside or neighborhood seller or another nearby source when they needed to be purchased outside of a market trip. This was often the case for vegetables, which consumers described buying regularly from non-market sources in their neighborhood and on the roadside. It was true to a lesser extent for meat or fish, which were sometimes bought from roadside sellers or hawkers, and for soybeans, which were sometimes bought from resellers in the neighborhood.

> *I buy vegetables twice, in a week with other soup ingredients. There are places I buy them aside from the Central Market; not too far from my house there is a shop they sell the same. I prefer buying it at the Central Market, but I can't go to the main market because of only vegetables… when I am buying vegetable alone, I prefer to get in it around my neighborhood… because of the [transport] expenses that I will incur going to the main market. – C1213, a 28-year-old man*

Consumers typically described deciding what to buy before going to the market, often in consultation with their wife or husband, and following a planned course through the market once arriving. This plan sometimes needed to be adjusted upon arrival at the market, due to higher-than-expected prices.

While some respondents described shopping as something they just did because they needed to, shopping was seen by most to be a satisfying experience, as long as one was able to obtain the intended items. The main elements contributing to satisfaction were striking a good bargain, getting exactly what one needed, being able to cook as planned for the family, getting good services from vendors, seeing

[2] Old Market, Mekeran Gandu, Kofar Kola, Kalgo Market, Karaya Market, Gwadangwwaji Market, Ambursa Market, and Kara Market.
[3] Some consumers in Birnin Kebbi may never or rarely use markets to source food (e.g., relying instead on own production), but they were not within the scope of this study.

new things, and being able to socialize and see people. These did not appear to differ considerably between men and women.

> *I enjoy it [going to the market] because I get to meet people. There are people that I've seen for a while, I get to meet them and my customer**, you know, since he's welcoming, he's very friendly, so I get to meet him once in a while. Though I don't go to the market always, the times I go to the market I enjoy my outing because I meet people, I buy many things, it's a form of exercise to me.… [And] even after buying everything I ought to buy, I end up bringing some change home, so it gives me that satisfaction, and I feel happy. – C2202, a 31-year-old man*
>
> *** see* ***Box 1***

One aspect noted as being particularly satisfying by some respondents, particularly women, was having change left over—i.e., not having had to spend the full amount provided (usually by the husband) for the shopping. This could give the respondent either extra money to spend on something else or the praise of being able to return the money to their spouse. Indeed, one respondent illustrates the importance of price and having change for the relationship: having been asked to imagine a scenario illustrated in the vignettes and told it was about poor-quality vegetables being purchased, she instead (and despite repeated prompting from the interviewer) interpreted it as being about prices being too high and the wife not providing the husband with any change – ending with a quarrel in which the man angrily demanded his change.

Box 1. *Who is the 'Customer'?*

In many interviews with both consumers and vendors, the word 'customer' was used to refer to the *vendor*, as well as the shopper – i.e., that a vendor to whom a client went repeatedly was the client's 'customer' just as the client was the vendor's 'customer.' Respondents explained this relationship as entailing that the vendor would treat them well, particularly in terms of offering good prices, credit, and discounts, and would know what they needed. They noted that it made them happy, to have such a relationship with a given vendor—one even described it as giving 'a sense of belonging'. **This suggests a high level of importance of, and mutual benefit and trust seen in, repeat consumer-vendor relationships.**

The main aspects cited that made it unenjoyable or unsatisfying were not getting the expected items (i.e., products unavailable or poor quality) and high prices or price fluctuations[4]:

> *Nowadays, you can't go to the market and know if you will happy or not because of the fluctuation of price. Today the groundnut oil I bought is N330,*

[4] Indeed, Nigeria's annual inflation was at a four-year high around the time of data collection, at 18.2%, largely driven by increases in food prices. See https://www.reuters.com/world/africa/nigerias-annual-inflation-hit-more-than-4-year-high-march-2021-04-15/

tomorrow you will go, it's N400, next tomorrow you will go, it's N500, now again I'm hearing that it is N700 -- so tell me, how will you be happy? – C2210, a 35-year-old woman

In addition to poor availability or price issues, a few respondents noted quarrelling with vendors, the sun/heat, transport problems, the experience being stressful, theft, or the market being overly crowded as aspects that made a market trip unenjoyable (especially within the COVID-19 context).

4.3. GENDER ROLES AND RELATIONS RELATED TO FOOD AND SHOPPING

Most respondents reported decisions on which foods to buy and prepare to be made jointly by the husband and wife, taking into account the children's preferences; for unmarried respondents, decisions were made with other household members, such as parents or siblings (only one of 47 respondents lived alone). Shopping was usually noted as being shared by the husband and wife of the household, in the case of a married couple, and sometimes involving children (particularly for small purchases), neighbors, or, more rarely, household help. Even if the woman did the shopping it was common that the man, as the main income earner in all households interviewed, would provide some or all of the money for it—as noted below, this could constrain women's ability to make choices on what to buy if it had cost ramifications. Both men and women shop in the market, but respondents (vendors and consumers) generally felt that, in married households, it was more common for men to do the shopping due to local Islam-based norms—but that this varied from one household to the next. Men's shopping tended to be incorporated into a commute (i.e., shopping on the way home from work), whereas women's was more likely to be a dedicated market trip.

All respondents, vendors and consumers, felt that the market was a welcoming space for both men and women and that women would feel comfortable to visit any part of it – though there would be some (mostly non-food-selling) areas where they might be less likely to visit, due to gendered roles (e.g., men wouldn't visit the women's clothing section). Though respondents differed and some saw few differences in what men buy versus what women buy, the general tendencies were: women purchase vegetables, seasonings, and condiments, and other " stew ingredients" for sauces; men purchase rice, maize, and other grains. Both purchased meat and fish.

There were strongly held and shared opinions among nearly all respondents that men and women differed in their shopping practices. Women were noted as taking more time (including on choosing a vendor and negotiating prices):

[At the market], women are more patient than men. Because men will always be in a hurry. But women are always patient because that's their nature… a woman can go to market to buy groundnut oil, after that she will proceed to another section to buy meat and come back to drop it where she bought oil….

men prefer to buy all their things in one place. Because they don't like wasting time like women. – C1216, a 28-year-old woman

When in the market I head straight to the place I want to get that item, and when I am through buying the items, I leave the market instantly. What am I waiting for, or looking around me for? - C1211, a 38-year-old man

It was also noted that women tended to be more discerning in terms of quality, with more knowledge about what types of foods were needed for the household given their central role in cooking, and harder negotiators on price – which also related to their willingness to spend more time in the market, searching for good items at cheap prices.

*When men go to the market most of the time, they don't check what they buy, they will just buy what they see so there's difference… Like if they're buying beans**, they're supposed to check for the ones that have holes, but if it's a woman she would check it by herself, she can even perceive it whether that chemical is still there or has already reduced, but men always buy what they see especially when it comes to beans, they'll just buy it without checking it… [And] they don't normally negotiate… the women will always negotiate because she always knows the price of the items she used to buy from the market, since she goes to the market all the time…. - C2211, a 40-year-old woman*

***Note: 'beans' is the local term for cowpea; all uses of 'beans' in quotations throughout the report refer to cowpea.*

While a man explained that for men, '*we try to look for a reduction [but] if we don't get it, we buy what we want to buy*' (C2201, a 25-year-old man). It was also noted that men had more financial flexibility in making shopping decisions, due to being the ones who provide money.

When it comes to cooking, this was done almost exclusively by women, with the occasional mention of children or household help playing a role. It was generally seen that cooking was women's role and responsibility. While in general boys and men/husbands were not noted as playing a role in cooking, there were exceptions to this—typically due to a specific need, such as the wife being ill.

4.4. CHOOSING A MARKET

Many consumers purchased from more than one market, but most had one market (e.g., Central Market) as their primary market, to be supplemented with purchases in their neighborhood or other locations, particularly for perishable, regularly purchased items (e.g., vegetables) or if something was needed after the market was closed. The two main criteria for choosing a market were cheaper prices and better product availability—which entailed both being able to buy everything in one spot, or to choose from multiple varieties of a given food.

Price was a key concern when considering a market, and certain markets (or markets in general, as opposed to resellers), were known to be cheaper than others. The second most commonly cited factor was availability of certain products (i.e., knowing one could get what one came for) and the convenience of being able to buy all products (including non-food products) in one location (for Central Market in particular). And the third-most-commonly noted factor was location close to home, along a commute, or easy to get to. Familiarity or habit and necessity were also mentioned.

> *The main thing that takes me to the main market is to get things at an affordable rate. Most times you can get these items around the home as well, but I prefer buying at the main market because of the price. – C1213, a 28-year-old man*

> *I prefer buying it [vegetables] in the market because I have choices to make, among others. But in my vicinity, I just have to buy what they offer for sell. – C1214, a 30-year-old man*

> *Yes, Central Market is the only market I buy things, I understand the market very well, and I don't know if there are other markets around. This is the reason I always shop there and also its proximity to my home. I have heard of other markets like the Kalgo Market, but I have not been there before. – C1206, a 30-year-old woman*

Mapping of Phase 1 coding frequencies suggested that men tended to mention product availability and price in about equal measure, whereas women were less likely to note product availability and instead focused more on ease and convenience of access to the market—with price being equally important to them as it was to men. Women's focus on ease and convenience of market access might reflect the constraints on movement in public experienced by married women or their working less outside the home (and thus not integrating shopping with a commute).

Only two Phase 1 consumers (both women) brought up issues related to food safety or cleanliness, unprompted, when it came to market choice. One noted that Central Market was comfortable to shop in because 'it is very neat'—with beef vendors, in particular, mentioned as being neater than elsewhere (C1206, a 30-year-old woman)—while another noted that soybeans sold in Central Market was served using a sieve to remove dirt "and it looks very clean" (C1210, a 25-year-old woman). While Phase 2 interviews and additional questions in the Phase 1 interviews (discussed below) focused on cleanliness and food safety specifically, it is important to pay particular attention to whether it also came up naturally, unprompted: this suggests a higher degree of salience and prominence in decision making, whereas agreeing that safety is important after being specifically asked may be more reactive and reflective of an understanding of the 'right answer'—as opposed to one's key motivations. This issue is considered more in the Discussion section.

In Phase 2, where the topic of foodborne illness was broached at the beginning of the interview, respondents were more likely to mention cleanliness as being something they sought in a market or a vendor:

> *Interviewer: when you are deciding to shop at a given open air market what features did you look for?*
> *Respondent: number one, I look for the quality of the product… [Second], the vendor that's selling it… if the vendor has clean personal hygiene…and thirdly, I look for the price that the vendor is willing to sell.*
> *Interviewer: Okay, so what are the signs that will tell you that a market is clean?*
> *Respondent: … I will look at the general environment of the market… I look at the area [where] I want to buy and the vendor himself, so this is how I look maybe the market is clean or not…*
> *M: Okay, is it something that … [disturbs or concerns you], the cleanliness of the market and the food safety?*
> *R: Yes, it disturbs me a lot. As [in] the saying 'health is your wealth': if the market is not clean and the food safety is not guaranteed, you will just be eating and before you know it you will end up spending on medical bills.* ***What you eat is who you are****. – C2209, a 33-year-old man*

> *[A shop being clean is important because] cleanliness is part of health….* ***If you are not healthy, you cannot do anything with your life.*** *– C2217, a 50-year-old man*

4.5. CHOOSING A VENDOR

4.5.1. REPEAT USE OF VENDORS

Consumers differed considerably in terms of whether they tended to patronize the same vendors or not, with just over half of consumers reporting that they generally went to the same vendors repeatedly, at least for certain goods. Others reporting regularly switching venders, including to compare options and as a strategy adopted to keep vendors from becoming complacent and taking the shopper for granted (and thus, e.g., making them wait for service or not pricing competitively). Those who changed vendors were somewhat more likely to be women, in line with the comments above reporting that women spend more time shopping and comparing prices and quality. Switching vendors was more common for perishable foods, like fish, meat, and vegetables, due to greater reported variation in availability and quality, whereas consumers were more likely to rely on specific repeat vendors for grains and legumes.

> *I maintain one to two particular vendors… because now we have become good customers to each other and whenever there is trust, he can give me items even when I don't have money, so I pay later. Another thing that makes me maintain a vendor is that when I discover that his prices are cheaper than that of others, I would always go to him whenever I need anything. – C1207, a 31-year-old woman*

When I stay with a particular vendor, I may not know when or if he had increased the price of his goods, or what the current market rate is. So, when I buy from a vendor, I will leave and go to another one simply to understand how the market price is… to know if there has been an increase in price or a decrease…. Another thing that could make me change a vendor is if I noticed he doesn't have good attitude, or he is not relating well with people. I look out for his patience level, too. And when I noticed the goods are getting pricey for no reason, I change the vendor. – C1213, a 28-year-old man

Repeated use of the same vendors was particularly important for obtaining credit or special discounts and ensuring high product quality. Some also mentioned other services offered by vendors with whom they had an existing relationship. This included that they could deliver goods to their homes, could notify them by phone when desired goods were in stock, could hold cash for them either in the short term (while the customer shopped) or in the long term (while the vendor was working to locate the desired goods), and could make introductions to or borrow from other vendors when their own supplies were depleted.

4.5.2. PRICE AND CREDIT ACCESS

Similar to the choice of a market, the choice of a vendor was driven largely by price (13 of 16 Phase 1 consumers), including the provision of discounts or the addition of free goods. Ability to buy on credit was mentioned by one quarter of respondents in Phase 1, and about half of those in Phase 2 noted it as important to them (when asked directly). While it was clear that this was not a key concern for all shoppers, particularly the better-off ones, it does seem to be an important motivator for lower-income shoppers, particularly in a context of often increasing and unpredictable food prices. Credit provision was also noted as a central motivator of a repeated vendor-shopper relationship, contingent on trust. Indeed, offering credit was noted as one aspect that might make a vendor into a 'customer' (see Box 1). However, it was also noted that shoppers had a role to play in maintaining a trusted relationship in terms of not being overly reliant on credit and paying credit back promptly.

[If] you go to the market to buy food stuff and you are short of cash, if the seller gives you what you want and later the next day you get money and returned back to the seller, it will make you happy that the seller trusts you to release goods for you even when you did not give him complete money. Because of that singular act, the next time you would like to go back to that seller to buy anything you want to buy. - C2231, a 28-year-old woman

4.5.3. INTERPERSONAL CHARACTERISTICS AND OTHER FACTORS

Beyond price, the main characteristics motivating the choice of a vendor related to interpersonal qualities: niceness, politeness, and good customer relations were named as important by more than half of Phase 1 respondents. This included feeling that the vendor considered their wellbeing, that they could joke and talk together, that they were happy or friendly, and that they related in a respectful way with customers.

> *There are some vendors, there is a way they treat you, like if you treat a customer like a king. But some vendors treat you as if they are doing you a favor, not knowing that you are doing* them *a favor. – C2209, a 33-year-old man*

Chief among the interpersonal qualities named was patience, which was specifically cited by six (of 16) Phase 1 respondents. This was related to the vendor's willingness to bargain and spend sufficient time discussing the price with the consumer, but also being generally supportive of customers.

Perhaps surprisingly, quality of products was only mentioned as a vendor-choice criterion by a few respondents in Phase 1, though it was somewhat more frequently mentioned in Phase 2. As noted in the vendor section, this may be due to many vendors relying on the same supplier, leading to little actual variation in quality at any given time. Additional criteria occasionally mentioned related to vendor choice, but only by one or two respondents, were having a wide variety of goods, speed of service, ability to deliver to the home, other family members' preferences, the person being in business for a long time, and large numbers of other customers choosing that vendor.

Of course, few respondents had a single criterion that they used to choose a vendor: most relied on balancing a whole set of important criteria to come to a decision:

> *I so much appreciate it when vendors are friendly and are humble the moment I go to their shops. Friendliness is one thing that is very important…. Then humility, those are the main things and also, if his items are affordable. I will also take note of quality, no matter what one is selling, the items should have quality. – C1210, a 25-year-old woman*

Four (of 16) Phase 1 consumer interviewees brought up the topic of vendor cleanliness unprompted, when asked about general criteria relating to vendor choice. This was usually presented as one criterion among several—but a necessary one:

> *I have one to two customers [sellers] that I buy things from,* ***some of them look dirty and you won't like to interact with such a person, so you go to another person****. Some are neat but their goods are pricey… things are expensive, but one will still want a seller that you trust will not cheat you. – C1207, a 31-year-old woman*

> *I check the quality of what I want to buy and then the price…. I will visit 2 to 3 shops and then go for the cheaper one. For me, though, I go for quality before I make a purchase, and I look* ***for how neat it is and the surroundings*** *for the entire products I am going for, that is what I normally do. - C1215, a 37-year-old man*

One additional customer mentioned cleanliness when asked what vendors' way of 'setting up or maintaining their space' suggested about their trustworthiness (but not asked about cleanliness or food safety, specifically):

> *…even though the spaces they sell are of different types, some of the spaces are modern in nature while some are locally made, but they all do their best to make the place very clean.* ***You will agree with me that cleanliness is also very essential****. - C1205, a 53-year-old man*

But others did not see any connection between trustworthiness and cleanliness or safety. No customers specifically mentioned 'safe' products or those that would not make one sick when asked about trustworthiness (See **Box 2** for more discussion of the concept of trustworthiness and vendors).

Box 2. *What Makes A Vendor Trustworthy?*

Vendors being honest, truthful, or trustworthy was mentioned as important by both consumers and vendors. Several interview questions examined specifically the qualities that made a vendor trustworthy. These included being honest about prices and offering fair (or comparatively cheap) prices; being friendly; having good quality or authentic products; being willing to accept credit; and being willing to exchange damaged goods. The main way noted for a vendor to break a consumer's trust was charging an unfair price (e.g., if the market price for a good had fallen, not passing on that discount but instead charging the 'usual' price) and, to a lesser extent, providing poor-quality goods. Trust was seen primarily as something for the vendor to maintain, but some also noted that a consumer also had a role to play in terms of repaying promptly when buying goods on credit; it was also noted that the vendor would have an expectation that his trusted 'customers' would buy from him regularly—but consumer respondents also opined that there was no problem with choosing a vendor other than one's typical vendor in the case of better prices, availability, or quality. Two respondents noted that another aspect of the consumer's side in the 'trust' relationship was to respect the vendor's need to make a profit and not underprice them in negotiations.

In Phase 2, as noted above, the interview structure was such that vendor choice was discussed after foodborne disease and how to avoid it had already been introduced, thus perhaps 'priming' respondents to be thinking about it when they might not have been otherwise. Indeed, vendor or shop cleanliness was mentioned much more commonly (26 of 31 respondents). Moreover, when asked to rank five potential ways that a vendor could attract customers, cleanliness was commonly rated first (above low prices, patience, tasty food, and allowing purchase on credit) (See Annex 4).

The main things that respondents mentioned regarding vendor and shop cleanliness were: cleanliness of the table (i.e., whether it had been washed, did not have dirt/blood on it); neatness of the table or wares (i.e., whether they were arranged in neat stacks); cleanliness of the vendor; cleanliness of the surroundings; cleanliness of the food (e.g., whether there was dirt on vegetables, tubers, or packaging); presence of insects; and proper handling of the food. A few also mentioned goods being covered or stored in containers or not being stored on the ground, one noted lack of a smell, and another noted good flooring.[5]

> *For meat, at times when you go to the market… **if you don't close your inner eyes, you'll not buy meat.** The way flies will be flying over the meat all around is somehow. I think proper washing will reduce flies perching on bloody meat, I think that we all need to help each other… the sellers and the buyers, and again keeping the place hygienically clean. There are some people, even the feces of the animal and the blood, you'll see it all around the seller's place. I think proper washing and maintaining clean hygiene is another way of making foods okay for the buyers, too. – C2210, a 35-year-old woman*

> *[To feel confident in the foods I buy, I look at] how he [the vendor] handles those stands, does he normally sweep… does he wash those bowls that he's using ...there are some people even the bowl will be up to 100 years, they will not wash it! They don't mind how it's being taken care of, what they are concerned about is money, how they will get money. So, I'm being concerned about those things. - C2210, a 35-year-old woman*

However, concerns over cleanliness continued to coexist alongside other concerns – and might not necessarily be overriding, particularly when compared to the strong salience of price-related concerns when it came to choosing both vendors and markets. Mapping of coding frequencies from Phase 1 suggested that both women and men considered trust and price highly important when choosing a vendor, but that men were more likely to mention cleanliness and product availability or convenience than women.

4.6. HEALTH ISSUES OF CONCERN

When asked about concern for their family's health in general, nearly all respondents noted that they were concerned about certain health issues. Chiefly, these included malaria and diabetes, followed by COVID-19 and heart disease/high blood pressure. Also named were HIV/AIDs, asthma, cholera, catarrh, sickle cell disease, cancer, hepatitis, and ulcers. Concern often focused on particularly older or ill relatives (e.g., a diabetic father, a sister with sickle cell disease, a child with asthma), but also on young children in general. Among the actions taken to address these health issues were some related to diet – e.g., choosing healthy or non-sugary foods. In addition, about 15 of 31 consumers (Phase 2 only) mentioned a type of foodborne disease without prompting; this was primarily typhoid, cholera, or general (unspecified) illness caused by food; one respondent mentioned hepatitis from food and water.

When asked specifically about which diseases caused diarrhea and/or vomiting, most respondents were quick to note typhoid, cholera, and malaria, but some also

[5] Comparing consumer comments to existing normative guidance on market best practices, consumers mentioned some elements (e.g., vendors wearing clean clothes, waste managed, separating products, vendor hygiene) but not others (e.g., cold storage, use of clean water, short fingernails, avoiding eating/smoking).

mentioned 'fevers' (used as a general term for illness). In the free listing for this topic, malaria was the most commonly named cause of diarrhea and/or vomiting, named by 74% of respondents, commonly as a first response; typhoid, stomachache, and cholera were named by 40-50% of respondents, while 35% noted 'fever' and three respondents noted ulcers (See Annex 5). Typhoid and cholera seemed to be used as general terms for gastrointestinal illnesses as opposed to referring to those caused by specific bacteria (e.g., *Vibrio cholerae* or *Samonella typhi*). One respondent noted that consuming GLV with pesticides on them would "cause cholera", another said the same for air pollution. None described either disease with specific reference to bacteria. Several respondents noted that they did not know the names of particular diseases. A similar vagueness was also the case for malaria: ambiguity in the mapping of malaria symptoms onto specific terms for 'malaria' and the use of 'malaria' terms to describe various general illnesses has been documented throughout Africa, including several parts of Nigeria (22). Other, less common, causes of diarrhea/vomiting named included headache and children's teething. Diarrhea and vomiting were commonly dealt with via medications from the pharmacy, like Flagyl® (metronidazole, an antibiotic and antiprotozoal), tetracycline, or oral rehydration salts. Traditional medicines or herbs were mentioned rarely.

About half of respondents made a connection between typhoid or other causes of diarrhea and unclean or spoiled food; connections to unclean water or environment were equally common. Several respondents expressed the idea that certain people just could not tolerate certain types of foods and should avoid them, or else they would fall ill. One respondent noted the importance of buying from a clean shop/market as a way to prevent getting these illnesses – but making this connection was not common.[6]

> *You know vegetable can be contaminated…. If you just buy vegetable without washing it properly and you put it directly into your mouth, I think those are the things that could cause diarrhea, yes... If you see the way they [market vendors] just expose fruits, and flies will be following it around in the market, honestly, I think the main cause of all the diarrhea is from those flies. - C2210, a 35-year-old woman*

> *[Cholera is caused by] eating foods that the body system does not want. In some cases, mango can cause cholera in a situation whereby you are not used to taking it, or food that are left open or got spoiled and one decides to eat it can also cause cholera too. – C2221, a 64-year-old man*

When asked why these illnesses were worrying, people generally referenced the general displeasure of oneself or a family member being ill. A few noted illnesses limiting their activities, or the inconvenience of having to spend money on drugs or doctors, and one noted the time lost to illness.

[6] In contrast, respondents generally (with a few exceptions) had strong knowledge of causes of malaria and COVID-19, and ways of preventing their transmission.

Actions that respondents reported taking to protect their health included maintaining a clean neighborhood, kitchen, or home (9 of 31 respondents), eating good or clean food or being careful about what they ate (including avoiding expired food) (8), treating water or choosing safe water (5), washing hands or otherwise maintaining personal hygiene, particularly for children (4), using mosquito nets (5), avoiding drinking cold water (2), covering food (1), taking medications (1), keeping children away from water (1), vaccination (1), and prayer (1). Specifically, to prevent diarrhea or foodborne illness, participants noted washing food (5), avoiding particular foods or eating less of them (3), buying from a clean shop/vendor (3), handwashing or personal hygiene or handwashing (2), cooking food well (2), and covering food (1).

4.7. FOOD SAFETY PERCEPTIONS AND PRACTICES7

4.7.1. LEVEL OF CONCERN

When asked directly if they ever worried that foods could be harmful to eat, about half of Phase 1 consumers (9 of 16) replied yes,[8] though four of those expressed only a low level of concern. Worrying that foods might cause harm was slightly more common among men (5 of 8 versus 4 of 9). Others remarked that they had never thought of it, never seen such a thing, or did not believe it could happen. Some of those who expressed no concern about food safety reported that this was because they felt they were already making the appropriate choices to avoid unsafe food:

> *I have never encountered such problem before…. I have never bought something that became harmful to us, because when buying, I am always careful and sure of what am buying, and when buying I don't change them [vendors] too frequently, I am always consistent with where I buy from. – C1211, a 38-year-old man*

In contrast, when asked directly in Phase 2 about foods that could cause diarrhea and vomiting, all respondents could list foods they associated with these symptoms. Moreover, one third of Phase 1 respondents reported having personally experienced foodborne illness of themselves or family members. Interestingly, those that mentioned one incident were likely to mention several different incidents—no respondent mentioned it happening only once. The foods named in these incidents were meat (5 mentions among the 16 Phase 1 consumers), fish (4), vegetables (3), beans (1), and Semovita® (a branded ground semolina flour; 1). Such experiences were equally common among women as men. Those who mentioned personal experiences with food safety appeared to be slightly more likely to be concerned about food safety as an issue.

> *[Once, a man] bought meat that has been in a nylon for a very long time. When he brought it home, my family was given part of the meat, and his own family ate, too.… They were all taken to the hospital as a result of eating the*

[7] The content on food safety after this point emerged in response to specific questions and prompting.
[8] Excluding those respondents who referred to problems such as cardiovascular disease or diabetes but not foodborne disease/food safety issues, per se.

meat. Everyone that ate that meat felt sick… but they are all healed now. – C1205, a 53-year-old man

When I was still a boy, I ate a spoilt fish and I had running stomach as a result of this. I felt sick for a very long time, and I discovered the harm it causes to the body. We also learnt that when we discover a fish is spoilt, even if it is for free, we should refrain from eating it. -C1205, a 53-year-old man

4.7.2. TYPES OF SICKNESS CAUSED

The main types of illnesses and symptoms named as being caused by food (almost universally) were diarrhea, vomiting and stomachache or upset/bloated stomach. Less commonly mentioned were headache, fever, loss of appetite, rashes, weakness, brain problems, miscarriage, and death. Some respondents also mentioned chronic diseases, like diabetes, arthritis, or high blood pressure, but these were not treated as 'food safety' concerns, *per se.* The types of symptoms named generally did not differ across food types, though the mentions of chronic diseases not related to food safety were more common for beef. As noted earlier, unsafe food was not seen as the *only* cause of any of these gastrointestinal symptoms, which people also associated with malaria and unclean water.

Some of respondents' answers were clearly based on knowledge or experience of foodborne illness – while others seemed to be more speculative:

[Unsafe fish] can cause severe fever and weakness of the body. I think these are what eating such unsafe fish may lead to. Some may lead to death, it can cause…is it yellow fever? I'm not sure… maybe other forms of fever and stomach pains. – C1213, a 28-year-old man.

4.7.3. CAUSES OF FOOD SAFETY ISSUES

Overall, most consumers had moderate but limited understanding of the causes of food safety issues. The main causes mentioned were chemicals and insects. Chemicals were widely cited, both as a general, vaguely defined concern and in relation to specific types of chemicals: pesticides, fertilizers, and preservatives. Insects were named both as landing on uncovered food (and thus transferring dirt or transmitting disease) and infesting food—which respondents also cited as indications of 'poor quality'. Several respondents noted spoilage over time when food was improperly stored or kept for too long, particularly for beef; issues like dust or dirt; and poor food washing or handling practices. One explicitly noted exposure (of vegetables) to feces. In relation to fish and beef, animal disease and animal medications given before slaughter were noted as causes of unsafe food. Not all responses were tied to clear food safety hazards (e.g., two respondents mentioned animals being slaughtered too young as leading to unsafe meat). One Phase 1 respondent named typhoid as causing disease through beef and LGV, and one

Phase 2 respondent noted bacteria as the cause of illness from food; otherwise, no respondents mentioned bacteria, viruses, or protozoa.[9]

> *There are foods that they spray chemicals on. We have, for example, beans they sprayed chemical on it, and such can bring harm to the body. Then we also have vegetables the farmers always apply paste chemicals on it while it's growing... they [use them] as fertilizer, but we don't really know. The farmers would apply chemicals before bringing them to the market for sale, and maybe the vendors apply chemicals too for proper storage, we don't know! – C1213, a 28-year-old man*

> *I learnt those that sell leftover meat have some chemicals they apply on them to prevent them [the meat] from spoiling before the next day. I really don't know the exact name of the chemical, but I heard it is the type being used on dead bodies. So, if they are not able to sell off their meat and it happens, they don't have fridge to keep it cool, they use such [chemicals] on them. So, you see if one buys and consumes such kind of meat, it will have a negative effect on one's health. – C1210, a 25-year-old woman*

> *May be the vegetables are full of worms and they already have holes. Maybe if you cook it together with the worm, it can cause stomachache, or it has preservative and it's still working, and you cook it. It can cause stomachache. – C1208, a 24-year-old woman*

> *I am worried about vegetable and moringa which can be harmful to eat. Because it can cause typhoid. Meat can also be harmful, especially red meat which is cow meat. It can cause problem to the leg. Other foods that I worry about are sugar, groundnut oil. Sugar can also cause leg problems; adulterated groundnut oil can cause cancer. – C1212, a 30-year-old man*

The different types of hazards associated with each of the seven focus foods are shown in **Table 2,** which indicates the number of times that hazard was mentioned in connection with each food in the Phase 1 consumer interviews. This shows some variation across food type (discussed in the next section for specific foods) but also certain general patterns: a high level of concern related to chemicals and insects and little mention of other types of contaminants (e.g., bacteria).

[9] As noted above, typhoid and cholera were mentioned as illnesses of concern by many in Phase 2, but the connection to food / bacteria was not always clear.

Table 2. *Main Hazards Cited, by Type of Food*

	COWPEA	MAIZE	RICE	SOYBEAN	BEEF	FISH	GLV
Animal diseases	NA	NA	NA	NA	12	2	NA
Animal medications	NA	NA	NA	NA	5	3	NA
Chemicals	31	5	5	0	4	6	16
Insects	20	4	1	5	3	2	8
Physical contaminants	2	1	8	3	1	2	1

Note: *Number of times mentioned, across all Phase 1 consumer interviewees; darker shading indicates more mentions.*

4.7.4. WHICH FOODS ARE 'SAFE' AND 'UNSAFE'?

The study investigated consumer perceptions of 'safe' and 'unsafe' foods through multiple methods across both phases. These included free listing, in which participants were asked to list foods they could always count on to be safe – as well as those which were *not* always safe. Free list data are analyzed by examining two aspects: how often something is mentioned (i.e., the *frequency*) and how soon it is mentioned (i.e., whether it is near the top of the participants' lists, or near the bottom: the *rank* within the list). Items that are mentioned often and mentioned first or near-first are considered to be the most salient, in the minds of the study participants. The two components (frequency and rank) can be combined into a single measure of salience.[10] The results of the listing from Phase 1 for 'unsafe foods' is shown in **Table 3** and that for 'safe foods' in **Table 4**.

Table 3. *Phase 1 Consumer Free List Results for 'Unsafe Foods'*

FOOD	FREQUENCY	AVG. RANK	SALIENCE
Beans (cowpea)	75	1.33	0.667
Beef	50	3.75	0.233
Maize	31.3	2.4	0.22
Local rice	31.3	3.2	0.162
Yam	31.3	3.2	0.161
Sorghum	25	3.25	0.126
GLV	25	4.5	0.116
Tomato	25	4.75	0.103
Groundnut Oil	12.5	3	0.083
Cabbage	12.5	2.5	0.078
Palm Oil	12.5	2.5	0.086
Kanzo (scorched rice)	12.5	2.5	0.078
N	**16**		

Note: items named only once are omitted; of the study focus foods, this included soybean and dried fish. 'GLV' includes specific types of GLV as well as 'leafy greens' or similar and 'vegetables' not otherwise specified. Those foods in bold also appeared in the top ten foods named as causing diarrhea or vomiting.

[10] Following ANTHROPAC software, salience here is calculated as the sum of the item's percentile ranks divided by the total number of lists and ranges from 0 (low) to 1 (high). Very similar or synonymous items (e.g., 'pasta', 'macaroni', and 'spaghetti') were consolidated before analysis.

The Phase 1 listing for unsafe food reveals that the 'most unsafe' food in the minds of consumers is cowpea, which is named by three-quarters of respondents, usually as the first item in the list. This correlates well with responses to open-ended questions on cowpea, explained in the next section. Beef is the second-most-unsafe food—again correlating well with responses to open-ended questions discussed below. The next six items (maize, local rice, yam, sorghum, GLV, and tomato) were named by 3-4 respondents, seldom among the first items mentioned; while there is some agreement on them being unsafe, they are not of high salience. For local rice and GLV, this aligns to a moderate amount of concern related to food safety revealed in the open-ended questions; for maize, however, the reasoning is unclear, as few respondents voiced food safety concerns related to it. Two respondents each named groundnut oil, palm oil, cabbage, and kanzo (scorched rice). Interestingly, several types of food that food safety experts might describe as being at high risk for contamination (fish, chicken, eggs, and dairy and other types of fresh fruit and vegetables) were not named, while several of those named (particularly the grains, yam, and oils) are not seen as posing a high risk. When asked in Phase 2 about foods that specifically caused diarrhea or vomiting, beans (cowpea) again appeared near the top of the list, named by half of respondents, commonly first; if the bean-based dish *moi-moi* is included with this grouping, cowpea becomes even more salient. Alleyaho and other GLV were mentioned equally frequently to cowpea but appeared to be slightly further down the list of foods in participants' minds. Also commonly named were meat/beef, rice, and soybean cake (13% each; Annex 5).

For 'safe foods', several of the most salient 'safe foods' named are industrially packaged and/or processed: pasta, instant noodles, imported rice, Semovita®, and couscous (the distinction between imported and local rice is discussed in more detail, below), suggesting higher consumer trust in these types of products. Also prominent are several different grains and roots/tubers. Surprisingly, fish, beef and GLV all make the 'safe foods' list; for GLV, this is with slightly less salience than as an 'unsafe food', suggesting divided opinions, whereas for beef the salience is considerably lower. The appearance of cowpea on both lists is also surprising; reviewing the commentary accompanying the responses, it is evident that this reflects not that cowpea is *always* safe but rather that with the respondent's care and attention, they can *be made* safe. Remarks from different respondents illustrate this: "not the chemically preserved ones", "I buy the good ones", "except when there is weevils or chemicals", and "I do select the good and neat ones."

In general, several consumers named industrially packaged foods among those foods that were 'safe' or mentioned either their being packaged or 'from a company' as a reason for them being safe. As one respondent phrased it, "[Indomie noodles are] made by companies, so they wouldn't sell something of low quality" (C2219, a 46-year-old man). However, a few also named packaged / industrially processed foods, particularly Semovita (blended flour) as among their foods of concern due to either chemicals or prolonged storage.

Table 4. *Consumer Free List Results for 'Safe Foods'*

FOOD	FREQUENCY	AVG. RANK	SALIENCE
Imported Rice[11]	93.8	2.13	0.783
Beans (cowpea)	43.8	4.14	0.226
Spaghetti/Macaroni	43.8	2.86	0.306
Yam	43.8	4.14	0.247
Eggs	31.3	3.8	0.205
Maize	31.3	3.4	0.204
Fish	25	6	0.081
Beef	18.8	4.33	0.121
Millet	18.8	4.67	0.079
Indomie (instant noodles)	18.8	3.33	0.122
GLV	18.8	6.67	0.065
Sweet potato	18.8	5.33	0.063
Red pepper	18.8	5	0.092
Tomato	18.8	6	0.061
Irish potato	18.8	5.67	0.049
Semovita® (Commercial semolina flour)	18.8	2.33	0.123
Onion	12.5	3.5	0.083
Soybean	12.5	3.5	0.036
Guinea corn	12.5	2.5	0.102
Groundnut oil	12.5	1.5	0.117
Dried fish	12.5	5	0.06
Couscous	12.5	4	0.058
N		**16**	

Note: items named only once are omitted; this included none of the study focus foods.

4.7.5. RECOGNIZING AND COPING WITH UNSAFE FOODS

Regarding how to recognize and avoid safe or unsafe food, questions were asked specifically in relation to beef, GLV, and fish (phase 1) and GLV and fish (Phase 2). Most respondents cited specific signs they could use to identify safe products. However, some felt that there was little or nothing they could do to identify safe foods, sometimes expressing a degree of fatalism about the need to live with the risk, that the nature of the market was to have variable quality, or that the only thing to be done was to stop eating the food:

> *Sometimes you get good ones, and sometimes you get bad ones. Every day is not Sallah or Christmas day. That's a market for you. – C2204, a 40-year-old woman*

For GLV, fish, and beef, possible coping mechanisms for potentially unsafe food were examined—i.e., if the respondent bought the food at the market and worried it might be unsafe, was there anything they could do to it at home that might make it

[11] This includes those who named 'safe rice' more generally than imported rice: while many respondents explicitly said safe rice was the imported rice, some said instead 'the one without stones'; this was coded as imported rice based on responses to open-ended questions (see below).

safer? About a quarter of respondents felt there was nothing that they could do—they would just throw it out (or, in one case, would eat it anyway and take the chance). Among the majority who felt they did have coping strategies for unsafe foods, those named included (applicable for all three foods unless otherwise noted) washing with plain water, washing with salt, boiling with water (sometimes including throwing out the water and re-boiling), and cooking with certain spices/seasonings (for beef). One respondent also noted that certain food preparation techniques could be used to salvage insect-infested legumes or grains, one noted cooking beans/rice with potash, and two noted washing GLV and/or fish with vinegar. One respondent also noted, for GLV, washing with commercial 'vegetable wash' products.

4.8. FOOD SAFETY AND FOCUS FOODS OTHER THAN FISH AND GLV

For each of the seven focus foods, a series of questions examined consumers' perceptions of their safety, main concerns, and strategies for identifying safe food. For fish and GLV, this was followed in Phase 2 by more in depth and detailed questioning; these foods are thus each discussed in their own section, while the remaining five foods are considered here.

Cowpea. Among the focus foods, the one seen as the greatest food safety risk, as construed by the respondents, was cowpea (locally referred to as 'beans'). This was for two interrelated reasons: (1) cowpea might contain weevils[12] or other insects (named by 14 of 16 Phase 1 consumers), and (2) chemicals were used on the cowpea to preserve it from weevils (during either production or storage/retail), and that chemical might be unsafe (named by 12 of 16 Phase 1 consumers). At least one of these two problems was widely reported by all respondents, with the majority of respondents naming both of them. Overall, in Phase 1, chemicals were mentioned 31 times in relation to cowpea (compared to 16 times in relation to GLV, and six or fewer times in relation to other focus foods). Weevils or other insects were mentioned more than twice as often in relation to cowpea as in relation to GLV and at least four times as often than the other focus foods. They were seen as both an issue at the point of purchase (that may or may not be avoidable by going to a certain vendor or doing a close inspection) as well as in the home (which could be mitigated by not storing for long, storing in certain types of cannisters or in a freezer, or use of preservatives at home). Weevils were detected through physical damage and contamination (holes and weevils being present), while chemicals were detected via a bad smell.

> *[Chemicals on cowpea] come from the person that preserves it, maybe from the farmer, because if they're preserving it, they put this chemical to prevent insect; if it's consumed by us, the consumers it becomes harmful to our health, it can cause sickness, even the cholera that I had talked about, it can even cause death if care is not taken. – C2202, a 31-year-old man*

[12] While respondents referred to 'weevils', these are likely pod borer insects (*Maruca vitrata*), which are a major cowpea pest in Nigeria (Source: https://allianceforscience.cornell.edu/blog/2019/12/nigeria-clears-bt-cowpea-for-farmers-use/).

Rice. Rice was a focus food that was very widely eaten—but not very commonly seen by consumers as associated with food safety hazards. Only one consumer expressed any food safety-related concerns related to rice, and several noted it as a safe food, including because it was often sold packaged in a bag. A few consumers, however, noted the presence of stones in rice—as did seven of the 13 interviewed vendors. Rice was the only food for which physical contaminants like stones were a common concern.

> *I have one [vendor] I always prefer buying rice from him because he is also very honest. Anytime I want to buy 'stone free' rice, he always given me the assurance that what he will give me has no stone…. So, once I get home, I will be expecting to hear complains about the rice after cooking it, like the normal complaints when I buy rice that has stones, but to my surprise, no one will have anything bad to say about the rice. - C1211, a 38-year-old man*

An important distinction related to rice that was made by respondents had to do with *foreign* as opposed to *local* rice: foreign rice was purchased branded and often packaged, whereas local rice was often bought loose and typically de-husked and parboiled. As noted earlier, local rice was also the only focus food for which there were a large number of female vendors. Several vendors and a few consumers noted that the foreign rice was generally free of foreign bodies like stones, compared to local rice.

Maize. For maize, there were no food safety-related concerns noted by any consumers (or vendors); a couple mentioned insects, and one mentioned vendors applying chemicals to maize but did not seem concerned about this. None mentioned aflatoxin. Overall, maize was the focus food associated with the least amount of concern.

Soybean. Overall, consumers tended to have less experience with soybean than other focus foods, as not all consumers ate it regularly. However, among those who did have opinions on it, very little concern related to food safety was expressed: most felt it was overall a fairly safe food. One consumer, however, did note that soy products could cause upset stomach if not prepared properly, while a few others noted the risk of insects or physical contaminants (e.g., stones).

Beef. Fresh beef was associated with a comparatively higher level of food safety concern. The main issues mentioned for beef were spoilage over time, it being unclean, animal diseases, and animal medications and/or preservatives. Most respondents recognized that beef could spoil over time and be negatively affected by dirt, dust, and flies at the point of sale. It was also widely noted that cows might be sick when slaughtered and thus not safe to eat – or that excess medications used to treat such ailments or preserve meat after slaughter could have negative consequences for consumers.

> *Meat, too, [is a food that may be unsafe]. One is not sure of the slaughtered animal; they give injections to animals when they are sick…what if the animal*

did not survive the disease and they found that the animal is not worthy for consumption? … they can slaughter it and sell to consumers…. Sometimes, even if the medication given is not properly circulated all over the animal body, this will cause problems, since there's no total absorption of the medication within the animal body and that can make it unsafe…. – C1201, a 30-year-old woman

But you see meat; you will the way flies' perches on it. When you see it, you feel discouraged. I am actually thinking of not buying it again…. When you go to a place where nobody cares how the flies disturb the area, it becomes alarming. – C2201, a 25-year-old man

However, such worries were not universal, and some trusted that the existing systems kept beef safe or felt beef was generally safe.

Three-quarters of Phase 1 consumers felt that they could make decisions to avoid unsafe beef. In general, consumers felt beef was at its safest when purchased raw and cooked at home, so that one could control the cooking process and avoid any contamination during or after cooking. Signs noted for recognizing unsafe beef (in approximate descending order of frequency) included the color (looking green, brownish, or dark in color, compared to red); a bad smell; the presence of flies at the purchase point/on the meat; the presence of dust; an unclean vendor; the type of tables used by the vendor or their cleanliness; use of an official abattoir; and taste. Two consumers noted that keeping meat packaged in plastic for a long time could lead it to spoil, and a couple respondents noted that the use of trusted vendors would help them to avoid unsafe beef.

…for meat, I usually go for fresh ones. The vendors sometimes neglect if it's bad or not and put it in a refrigerator. So, what I do is to observe it when it is being cut, to know if it is a fresh meat, and when it has stayed for some days, it has a foul smell. – C1206, a 30-year-old woman

4.9. FISH

Fish was one of the two focus foods chosen for in-depth examination. Fish commonly available in Birnin Kebbi include fresh tilapia (typically caught wild), mackerel ('titus fish'), and catfish, as well as smaller dried fish and fried ready-to-eat fish. For Phase 1 of the FES, discussions of fish focused on catfish, a fresh fish sold alive and often (but not exclusively) the product of aquaculture and which most consumers reported to be their most commonly purchased fish. In Phase 2, the discussion broadened to also include fresh tilapia, but this was not very commonly purchased. In general, discussions did not distinguish between fish that was farmed or wild caught.

Fish aroused considerably less concern associated with safety than cowpea or beef, but somewhat more than rice, maize, or soybean. Six of 16 Phase 1 consumers and 12 of 31 Phase 2 consumers expressed some concern related to the safety of fish, while the remainder had no concern. Several of those with no concern reported fish to be safe because they were ‘healthy’ foods recommended by health personnel for other reasons. Some of those with little or no concern expressed the idea that unsafe or poor-quality fish might exist at the market, but they themselves were always able to choose ‘the good ones.’ Several respondents noted that fish (or, at least, catfish) being purchased while alive was protective in that the fish being alive indicated they were safe to eat.

However, some respondents noted that fish could spoil over time, that fish might have worms, or that fish that were ill or died before sale might be unsafe. Some respondents (two of 16 in Phase 1, four of 31 in Phase 2) noted the use of chemicals in raising or catching fish as a safety concern:

> *[Fresh catfish] may and may not be harmful. The reason is that there are some farmers that rear them by giving them their feed to enhance their growth. Then we have the ones that you catch directly from the river or water. It is very possible that the ones they grow with fish feeds can cause harm to people, but I don’t know… And these times that fishes are fed with food that is made of chemicals, and there is also the possibility that the person responsible for their growth is not careful in feeding them the proper way and with the appropriate portion of food mix. Also, they may give them the wrong medications, thereby causing health challenges. – C1211, a 38-year-old man*

Most consumers (13 of 15 Phase 1 consumers and 22 of 31 Phase 2 consumers) felt they could recognize safe fish in the market. Signs noted in both phases as being used to identify fish that were safe to eat included (in descending order of frequency of mention) looking for live fish or those that moved fast or well, the color of the fish, the texture (not being sticky or slippery), other aspects of the fish’s appearance (i.e., being swollen), the taste, the smell, and the appearance of the vendor and sale environment. One respondent also mentioned avoiding vendors and buying fish directly from fishermen or fish farmers. In Phase 2, where cleanliness was asked about explicitly, respondents noted factors like cleanliness of the table (free of blood, in particular), a lack of flies, and the cleanliness of the tubs and water in which the fish were kept; they were also more likely to note the cleanliness of the vendor.

> *When I am buying fish, I take note of how they react inside the water. If they move very fast and are lively inside the water, it means such a fish is healthy. But when you notice a very dull fish in the water, it shows that fish is sick, and I don’t go for that fish. – C1211, a 38-year-old man*

> *Some of the fresh fishes when you look at the rubber the fishes were inside the water will be dirty. Some of the vendors keep their fish in rubber with water that is clean. You will see the fishes swimming about. Then I select the one that I want. And then the table the vendors use in cutting the fish, some of the vendors will use it to cut their fish and flies will be swarming on the table. While some of the vendors if they use their table, they make sure that they*

> *clean the table clean. You will not know if they use the table or not. Because it will be clean. – C2212, a 30-year-old woman*

It was generally noted that fresh fish were the safest form of fish. Dried and fried fish were seen as riskier, due to contamination (e.g., by dirt) after cooking/drying, unsafe cooking practices (e.g., smoking with plastic bags), or because the cooking/drying made it hard to determine the fish's original type and quality. One respondent, however, held the opposite view: that smoking made fish healthier by killing harmful substances.

4.10. GREEN LEAFY VEGETABLES

The other focus food chosen for in-depth study was green leafy vegetables (GLV). GLV is a large and diverse category, including spinach, moringa, pumpkin leaves, cabbage, and other greens; in Kebbi, most GLV are cooked before eating, with the exception of lettuce and cabbage. For Phase 1, questions focused specifically on alleyaho (amaranth, also known locally as 'green'), which is widely consumed and usually bought raw and then cooked (boiled) at home; in Phase 2, the focus was somewhat broader. Overall, GLV aroused a moderate level of concern related to food safety, but less than for beef or cowpea. A minority of consumers (3 of 16 in Phase 1; 13 in Phase 2) had no concern about GLV safety. Consumers also noted that vegetables that were cooked were generally safer than those eaten raw, and one noted specifically avoiding any that had been pre-cut or prepared in the market, as likely to cause diarrhea.

The majority, however (13 of 16 in Phase 1; 18 of 31 in Phase 2), did have concerns. The concerns most commonly mentioned were specifically related to insects (primarily worms damaging the leaves or being inside the leaves but also flies landing on the vegetables and spreading dirt/disease) or chemicals (fertilizer, pesticide, or herbicide), which could lead to health issues (e.g., upset stomach or diarrhea). Some consumers also mentioned washing with unclean water or spoilage, and one noted typhoid. Dirt or sand was noted as a quality issue but not necessarily a safety one.

> *Yes, there is problem when one eats those that were grown with chemicals or have chemicals applied on them…. It can cause harm to the body. It can cause stooling, vomiting and severe fever. – C1213, a 28-year-old man*

In general, consumers' concerns did not seem to be overriding or strongly motivating – i.e., they recognized that food safety concerns might arise with GLV in certain circumstances, but not commonly, and those concerns did not prevent consumption of GLV as a category in any case. Most food safety issues were seen as things that could be mitigated through careful shopping and in-home behaviors like washing or cooking. It was rare that consumers reported avoiding consumption of GLV due to safety or quality issues.

All consumers who had concerns about unsafe vegetables felt they could recognize which were safe and which were not. The main ways of recognizing safe leafy greens were all based on visual signs: them not having insect damage (holes) or visible worms/insects, the color (being green as opposed to yellow or red), otherwise looking 'fresh', and them not being visibly dirty. A few noted that leaves should be kept fresh with water (without specifying 'clean' water), a few noted washing before selling, and two consumers noted that large leaves indicated fertilizer use (and were thus a bad sign). In Phase 2, when cleanliness was asked about specifically, respondents mentioned having a clean table or stall, proper washing, and the vendor being clean or handling the vegetables properly.

> *When you go to the market, you can easily identify a bad vegetable by the leaf. When the leaf is red in color, the vegetable is bad, but when it is green and fresh it is good. The reason why it turns out to be reddish in color could be as a result of the fertilizers applied on it during planting, especially when the right proportion of fertilizers are not properly applied. I can really say if the red vegetables can cause harm, but it is better to go for the fresh ones. – C1202, a 24-year-old woman*

In Phase 1, only one consumer mentioned that it was important to have a clean vending environment for GLV, but when asked directly in Phase 2, many consumers noted paying attention to the cleanliness of the environment and/or the vendor, or their hygiene-related practices, when choosing safe GLV. Markers that were considered included: the vegetables themselves being clean or washed, being well-arranged, being covered, or not being on the ground; the vendor being clean (including his/her clothes); and the table or setting being clean.

4.11. COMPARING ACROSS FOCUS FOODS

In Phase 2, a rating exercise was used to examine how respondents felt about different focus foods along four dimensions: obtaining consistent quality, causing diarrhea or vomiting, containing chemicals, and being safe. For fish and GLV, two specific types each (tilapia, which is usually wild caught, and catfish, which is usually farmed; and amaranth (*alleyaho)* and moringa (*zogale*) were included. Soybean was omitted due to low levels of salience associated with it in Phase 1, one non-focus food was included to offer some comparison between the 'raw' foods sold loose and a packaged, processed food – Indomie® instant noodles. This food was chosen because it was frequently mentioned in Phase 1, was specific, and was widely known.

Full results are shown in Annex 4. In brief, the results largely confirm the results presented above: cowpea stands out as scoring relatively poorly on all dimensions, with particularly strong agreement that it is likely to contain chemicals. Alleyaho also scores relatively poorly across all dimensions, particularly causing diarrhea or vomiting. Both fish are seen as very safe, unlikely to contain chemicals, and fairly unlikely to cause diarrhea and vomiting. Beef, while not containing chemicals and of consistent quality, is relatively likely to cause diarrhea or vomiting and is seen as relatively less safe. Instant noodles generally rank around the middle of the foods but are seen as having the most consistent quality. The grains are both seen as very safe and very unlikely to cause diarrhea or vomiting – though maize is seen as likely to contain chemicals. Overall, all respondents saw nearly all foods as being generally safe, of consistent quality, and unlikely to cause diarrhea or vomiting.

4.12. FOOD SAFETY RESPONSIBILITY, VENDOR TRUST, AND COMMUNICATION

4.12.1. WHO IS RESPONSIBLE FOR PROVIDING SAFE FOOD? CAN VENDORS BE TRUSTED?

When asked about who was responsible for ensuring the safety of food in markets, most consumers did not name any specific organization or structure (though two did mention NAFDAC, the National Agency for Food and Drug Administration and Control), but nearly all respondents referred to the government, and five more specifically mentioned health officials. Beyond government, Phase 1 consumers interviewed mentioned market management/officials (3 mentions among 16 respondents), vendors (3), suppliers/farmers (3), consumers themselves (2), security officers (1), and traditional leaders (1).

Consumers differed in terms of whether they could trust vendors to provide safe food. Most opined that the food they were getting from vendors (particularly their repeat vendors) was safe—but most also felt that, if a vendor were to have unsafe food, he would be unlikely to tell the potential customers about it. It was also commonly noted that at least some vendors were dishonest and would prioritize profits over quality or safety. As noted above on the subject of avoiding unsafe food, many consumers seemed to feel a lack of agency when it came to selecting a vendor who could guarantee them safe food:

> *Well, they [vendors] can sell anything they like, because we are not the sellers, we only buy from them. You know a vendor will never bring beef to the market and say the beef he has for sale is unsafe. They can only say it is good… They can't tell, since they're in a business, everyone wants to sell their products, so they will never tell the consumer if anything is wrong with it. – C1201, a 30-year-old woman*

> *No vendor will know what he is selling is bad and tell, he will not disclose it to you or be honest about it. Because he believes if he spills it out, no one will buy it. That is just the truth. – C1213, a 28-year-old man*

4.12.2. WHAT CAN VENDORS DO TO ENSURE SAFE FOOD?

In terms of actions that vendors could take to reduce food safety risks, consumer respondents generally noted specific actions like vendors washing or covering food, reducing chemical uses on food, not storing food on the ground, sourcing high-quality products, or keeping themselves and/or their selling environment clean. Also named were involving authorities (particularly to undertake inspections), engaging the vendors' union, providing training, having certified vendors, having a complaints/reporting mechanism for vendors who sell unsafe food, and/or promoting cleanliness. Three respondents also noted the need to provide refrigeration/freezers to enable safe meat, fish, or GLV storage and one noted the need for better processing (specifically for rice, to remove stones.)

Vendors should by all means make sure they slaughter the animals [cows] themselves. Just like they do in other developed countries, the government should make sure there are teams of inspectors who inspects the abattoir daily to make sure what they are selling is safe for consumption. – C1209, a 40-year-old man

The government should put in place health officials that will supervise or monitor the selling of fish and to know if they are selling harmful fish or not. Furthermore, there are registered vendors that the government knows are trusted and reliable to sell fish. So, when you decide to buy such fish, it is your decision. – C1214, a 30-year-old man

4.12.3. COMMUNICATING WITH VENDORS

Few consumers mentioned examples of having communicated with vendors about food safety in the past. However, most seemed to feel comfortable with doing so *in theory*, with a few exceptions related to it 'not being their place' or similar.

I won't do anything because it is the responsibility of the market unions to inspect how things are being done, they should not wait until people complain to them. They should be going round to check. I cannot talk to anyone about it…. When I do that myself, it means I have become a gossiper. – C1204, a 32-year-old woman

4.13. KNOWLEDGE, INFORMATION, AND MEDIA RELATED TO FOOD SAFETY

Most consumers (14 of 16 in Phase 1) mentioned having previously heard information or advice about food safety. The main sources mentioned were friends or neighbors (10 out of 14 people), parents (4) and other relatives (6), radio (6), television (5), and doctors or health workers (5). Less commonly cited sources included district government officials, text messages, and women's organizations. Men generally named more information sources than women and were more likely to name friends/ neighbors and radio, whereas women were more likely to mention parents. When asked who they would turn to for advice on food safety issues, relatives were most commonly named, followed by doctors and health workers, friends/neighbors, and market or environmental officials. As noted earlier, nearly all households have TVs and mobile phones, whereas only about half have radios; radio is thus a comparatively commonly cited information source, whereas mobile phone messaging was rarely cited, despite widespread phone ownership.

Messages heard by more than one person included the importance of washing food before preparing, having a clean setting for cooking/food preparation, avoiding chemicals, washing hands or pots, and avoiding unclean food or water.

…on radio and television, they usually talk on food hygiene, environmental cleanliness, and the need for pregnant women to always eat body-building food… I also get informed from friends, but one cannot verify the information if it is true or false. We only accept it as it is…. There was a time I was told that there are beans with chemicals that can cause harm to the body. When I

heard about it, I stopped buying beans so as not to fall a victim. – C1205, a 53-year-old man

I heard that eating unhealthy fish can cause bodily harm on a radio show. They informed us that eating an unhealthy fish will make one fall sick. But I don't even know how to identify unhealthy fish, so all that we are discussion here now is just my personal thoughts…I may be wrong please, so you don't say I'm misleading you. – C1214, a 30-year-old man

4.14. OTHER MOTIVATORS AND DRIVERS

Considering other factors that could motivate behavior change but were not related to food safety or purchasing decisions, specifically, two topics emerged: family approval (or critique) and religion. Family approval came up numerous times (unprompted) from five (of 16) Phase 1 consumers within the context of food choice decisions – including acting to earn praise from family members or to avoid their disappointment or complaints. In Phase 2, this was probed in more depth through the 'vignette' exercise (see Annex 2). Emotions associated with a successful shopping trip, in which appropriate vegetables had been found, included appreciation of or praise for one's effort, happiness, satisfaction, a warm welcome, love, and pride.

In contrast, a shopping trip in which poor-quality GLV had been purchased resulted in criticism, unhappiness, anger, arguments, an assumption that the buyer had sacrificed quality for a cheap product in order to have change, and/or feelings of a lack of appreciation and/or of a need to do better/try harder the next time (though a few respondents alternatively noted that, in a good relationship, such an issue would not cause any problems).

After showing him what she has bought from the market, I will be expecting him to say "is that the only shop, is that the only vendor in the market that sells the vegetables? At least you should have gone to someone else. Are there no other places that they are selling better quality vegetables? Then buying this lower quality one, it might cause problems for the children if they are around." …. [Then the wife will say] "I have walked and walked and checked most shops, these are the ones I see I have to buy it, please don't be angry; you have to bear with me this time, next time I'll try to get a better one." … She'll apologize and tell him to bear with her for this time and also promise that she's going to prepare it well and it would not be a problem to the family… She will feel bad, but there's nothing she could do, this is the only choice that she has, she will feel bad for her husband to be complaining, he has been complaining that she would have gone somewhere else after she must have gone through the market, through the sun and all that and then he still has to complain, so she'll definitely feel bad. – C2202, a 31-year-old man

Though based on a theoretical 'storytelling', these examples give insight into the kinds of benefits that shoppers get from buying good-quality produce in the eyes of their family – as well as some of the negative judgements associated with the opposite. Such emotions could be potential motivators for behavior change.

Religion also came through as a driver of behavior and beliefs. For example, respondents noted seeing Islam as a motivator of cleanliness, seeing another's religious faith as ensuring their ethical conduct, or having faith in God or religious leaders to protect one from harm or intervene on one's behalf. However, while mentions of religion occurred occasionally throughout interviews, religion was far from a pervasive or overriding theme or concern.

> *…there's a saying that says health is wealth, so when you eat food that is contaminated, your health will collapse and that will make you not to do anything so cleanliness. Even as a Christian, they say cleanliness is the next thing to God, so cleanliness is very important. – C2210, a 35-year-old woman*

As noted earlier, the sample included large shares of both Christian or Muslims, so single-faith-based appeals to consumers' motivations are unlikely to be successful but showing alignment between food safety practices and religious teachings, in general, may resonate with many.

5. RESULTS: VENDOR INTERVIEWS

5.1. VENDOR DEMOGRAPHICS

The demographic characteristics of vendor respondents are shown in **Table 5.** Interviewed vendors are all men, with an average age of about 40. Nearly all are Hausa, and all are Muslim. About half have completed primary school and 22% have completed secondary school, with only one completing higher education. Compared to consumers, vendors are more likely to be Hausa and Muslim, less educated, and more likely to be male. Though wealth-related questions were not asked of vendors, they appear (based on education level and occupation) to be lower-class than the majority of consumers. Nearly all are their household's principal income earner, and most have an additional income source – primarily farming. Nearly all vendors also shop in the market where they sell.

While all Phase 1 vendors were recruited from Central Market, Phase 2 vendors sold at Yaryara market (25%) and Tsohon Kasuwa market (17%) in addition to Central Market (58%).[13] In terms of food, Phase 1 included vendors of all seven focus foods: for each of fish, beef, and GLV, three vendors were interviewed; for each of maize, rice, cowpea, and soybean, one vendor was interviewed. In Phase 2, only fish and GLV vendors were interviewed (12 of each). In Phase 1, about a third of vendors sold other foods besides the 'focus foods'; this was particularly the case for grain/legume vendors, who tended to sell multiple types of grains/legumes. In Phase 2, only GLV vendors (75% of them) sold other foods; these were all different types of

[13] It was originally planned to recruit equal numbers of vendors from the three markets in Phase 2, but there were too few vendors of GLV and, particularly, fish at Yaryara and Tsohon Kasuwa markets to make this feasible.

vegetables, primarily onions, tomatoes, peppers, and okra. All fish and beef vendors in both phases sold only fish or only beef.

Table 5. *Vendor Demographic Characteristics*

RESPONDENT CHARACTERISTICS	
Percent male	100%
Average age (range)	40 years (22 – 65 years)
Ethnicity	Hausa (95%), Fulani (5%)
Religion	Muslim (100%)
Pct. completing primary school	51%
Pct. completing secondary school	22%
Pct. completing tertiary school	3%
Avg. years vending (range)	19.2 (5 - 43)
Respondent is HH's principal income earner	95%
Respondent has other stalls/shops	8%
Respondent has another income source	70%
Other income sources	Farming or livestock (23); selling other food/goods (2); contractor (1)
Also shops in market where selling	95%
BUSINESS CHARACTERISTICS	
Owned by vendor	100%
Pct with employees	54%
Average num. employees (range)	1.86 (0 - 10)
Shop type	Permanent stall with walls (1); Permanent wooden table, no walls (2); Permanent wooden table, no walls (27); temporary or portable table (7)
Stall has electricity	0%
Stall has refrigeration	0%
Stall can be locked	11%
Stall has piped water	3%
Stall has drainage	46%
N	**37**

Vendors typically owned their own business, and about half had employees – as many as 10, though the average was around 2. The most common stall type was a permanent wooden table, with no walls (73%); about 20% used a temporary or portable table. No stalls had electricity or refrigeration, and only one had piped water; however, almost half had rudimentary drainage and 11% could be locked. There were few significant differences in characteristics between Phase 1 and Phase 2.[14]

5.2. VENDOR MOTIVATIONS TO SELL

Vendors' aspirations for their businesses are uniformly modest. None of the vendors interviewed described any hopes or strategies for business growth beyond the level

[14] Phase 2 vendors had slightly fewer employees and were less likely to be able to lock their stalls but much more likely to have drainage; they were also more likely to be the household's principal income earner. These differences may be due to the differences in markets studied between Phase 1 and 2.

required to meet the basic household needs. These include the requirements of food, shelter, and clothing, but importantly also to make cash outlays at key moments in the household demographic cycle: births, marriages, naming ceremonies, illnesses, and funerals. Several vendors described the low bar to entering the profession as an attractive feature: little in the way of up-front capital is required beyond the funds to buy some initial stock and a table to display one's food products. For nearly half of vendors, the example or influence of a family member already in the business was a factor – whether by inheriting the business outright, opening up their own stall after assisting a family member with their business, or being inspired by a relative with a history of selling the same food.

> *What really gives me joy in this vegetable-selling business is that I make a good profit and I was able to build my house, got married, and I am able to meet my family's needs from what I gain, and I'm also able to help my parents – V2105, 36-year-old GLV vendor*

5.3. VENDOR INTERACTIONS WITH SUPPLIERS

Vendors were divided in terms of their use of preferred suppliers. Some noted always using specific suppliers – perhaps even placing orders by phone, sight unseen. Others noted "shopping around" in a wholesale market to find the best quality-price combination. When it came to choosing a supplier, the main driver of choice named was quality: having a high-quality product that customers would buy and be happy with. Slightly less prominent were affordable prices and the ability to buy on credit. Two vendors mentioned seeking a trustworthy or honest supplier – which was also described in terms of having a quality product and being truthful about it and being honest in pricing. Also mentioned, but less commonly, were the interpersonal qualities that consumers noted driving their choice of vendors: patience, joviality, and friendliness.

> *I look for supplier that will sell a little cheaper, a supplier that will give me credit for some while, not disturbing me. The most important factor is giving me credit for some while, to sell before paying back… If I know my fish is not healthy or good, I worry that customers will not use it and [will] start complaining. If I see any sign of fish that has a problem, I do not buy… I prefer not to buy to harming shoppers. – V1111, a 55-year-old fish vendor*

The main reported reaction to a poor-quality product was simply to not buy it and leave the market empty handed or, if the problem was discovered after purchase, to not patronize that supplier again.

> *If I discover that the meat is not good for consumption, I will not buy it… I choose good meat so that I will be able to sell good meat to my customers, so that they will visit me again. I would not like to sell bad meat to my customers. It will scare them away, and they will not come back to me again tomorrow… There are people who [buy potentially harmful meat], but I don't. – V1105, a 35-year-old beef vendor*

Vendors generally felt comfortable discussing quality issues with suppliers and trusted that suppliers would be honest in terms of food quality – or that it would be clear from a visual inspection. Fish and beef vendors, in particular, noted that they would search for healthy animals and inquire about that from the supplier. Interestingly, there were some gaps between what one interviewed GLV vendor prioritized when choosing a supplier – ample use of fertilizer to create a green, attractive product – and what consumers reported seeking: limited use of chemicals and even specifically avoiding those that looked too attractive due to concerns over excess fertilizer/pesticide use.

5.4. VENDOR INTERACTIONS WITH OTHER VENDORS

Vendors collaborate with each other both through formal organizations and informal ones. From vendor accounts, the key formal organization appears to be the association representing vendors of a particular food in a given market. Nearly all vendors interviewed for this study described themselves as members of such a body. The remit of these associations is described in some cases as very broad, including both defending and advocating for vendor interests on a variety of fronts (customers, suppliers, market authorities) and enforcing common behaviors across their memberships.

The areas of collaboration involved are many. The range of functions described by vendors includes: purchasing food supplies together in bulk to secure a low price; combining in the hire of transport to move food to market from suppliers in rural areas; relying on the financial guarantee of the association for loans or large purchases made by individual buyers; the rapid sharing of information on risks (for instance, customers who are prone to defaulting on credit purchases); and advocacy of individual or collective vendor concerns to wider authorities.

This fish vendor describes the advantages of his association, in this case allowing fish vendors to close ranks against a troublesome shopper:

> *We ordinary members … socialize well with our association members [leadership], and when we have a problem we report it to them, and they take the necessary action. Like when a customer comes to buy fish and later intended not to buy, when we start quarrelling, they will call the attention of the chairman, and the case will be settled. If the customer is found guilty, no vendor will ever sell fish to that customer, be it fresh or dried, until the customer realizes his or her mistake and comes back to apologize.… V1111, a 55-year-old fish vendor*

Vendors also rely on their associations to increase their leverage with suppliers, with whom they may have disagreements about the quality of foods supplied. In interviews, vendors made the positive case that vendors should stick together for these purposes—but some also suggested that doing the opposite (operating on one's own outside the association) would be likely to bring trouble:

> *People doing the same business are supposed to stick together so that they get quality goods from dealers. When we stick together and we have any issue with the type of goods that are supplied to us in the market, we can collectively make complaints, or even reject the goods, and the dealer will have no alternative than to either return the money or supply us with the quality goods that we want. Another thing again is that in the market, you cannot always be an island if you want to progress. When other vendors discover that you don't want to stick together with them, they will have a way of frustrating your effort. That is one of the things I noticed. – V2113, 35-year-old GLV vendor*

In addition to these supportive functions, vendor organizations also seek to establish unity across members on some matters of common concern, such as enforcing sound business practices (e.g., paying back credit, having quality food) or attempting to achieve a unified approach to the pricing of specific foods or grades of food quality. While the overwhelming majority of vendors spoke positively about the role and utility of the market associations, this was not a total consensus view, with one GLV vendor describing in bitter terms the self-interest that he perceived was driving the actions of his association's officeholder.

In addition to these formal food-specific market associations, many vendors also participate in informal traditional savings or contribution groups that include other vendors. These groups take regular contributions from members and then deploy savings to address needs experienced by those members. Depending on group rules, group funds may either be directed to business-related crises (e.g., an individual's entire stock has spoiled, threatening to sink his business) or to personal needs (e.g., cash is needed for an expensive life-cycle event like a newborn's naming ceremony). In both scenarios, the effect is to enforce savings and to spread risk beyond the individual to a wider pool of vendors.

There is likely to be considerable overlap between the memberships of the formal versus informal vendor organizations in a given market, with vendors being members of both. This study did not quantify the extent of this overlap—indeed, it was sometimes difficult to discern to which form of organization a vendor was referring. From vendor accounts, both formal and informal associations clearly offer the advantage of enhanced leverage and risk reduction to individual vendors, as well as an expanded network of social and business ties. The caveat is that group members may not be free to act wholly independently. The possibility that vendors may not always feel empowered to establish their own prices raises questions for an offering that would trade improved safety for a higher price.

5.5. VENDOR INTERACTIONS WITH CONSUMERS

5.5.1. VENDOR PERSPECTIVES ON GENDER AND SHOPPERS

Considering vendors' perceptions of how men and women shoppers vary, vendors generally saw women as more discriminating customers, more likely to ask questions, bargain over price, and potentially complain later. Some vendors believed that encounters with such a shopper also required a particular forbearance (see discussion of “patience”, below). By contrast, male shoppers were frequently described as too busy to engage in questioning or haggling, their main priority being to get in and out of the market without delay.

> *Women seem to be more concerned about food safety than others. They can say they don’t know if the fish are alright or not, and if you say [the fish] is okay and she later finds out it is not okay and returns it or goes to explain everything to the chairman, then there will be trouble… because the money she spent must be returned. The male [customer] doesn’t give any trouble. – V1103, a 55-year-old fish vendor*

However, vendors make an important distinction between female shoppers who are married and those who are not, with implications for the nature of the shopper/vendor encounter. Vendors described friendly jesting and a “playful” manner with shoppers as a skill that they deploy to secure business, but this is not possible with married women (or, in some vendors’ views, with all women).

> *Unmarried females feel freer to stop than married females because married females try to compose and control themselves. Because of their marital status, unmarried females can play and joke -- to the extent of carrying [away] your goods you did not give them. But married females come strictly for business. Religion does not permit [them] unnecessary jokes with a male outsider. – V1102, a 35-year-old GLV vendor*

5.5.2. THE VENDOR-SHOPPER ENCOUNTER

As noted in the consumer results section, many of vendors’ interactions with shoppers are not transient, but rather constitute repeat business in as many as 70% of interactions (as estimated by Phase 2 vendors). This repeated interaction gives shopping and selling in Kebbi a relational quality — familiar in traditional markets and neighborhood/village shops but not as common in some other contexts, like supermarkets in major urban centers. The results discussed below show how these relationships impose important constraints on vendor conduct.

Central to vendors’ relationship with certain shoppers is the matter of credit. For shoppers who are already known to vendors, being permitted to pay for purchases later is commonplace. This requires the trust of the vendor, which is founded in turn on the vendor’s familiarity with the shopper. Some shoppers inevitably have difficulty repaying their debt to vendors on time; how a vendor responds to those defaults (which, through a knock-on effect, can place the vendor in default with suppliers) is considered a signal test of vendor character.

5.5.3. THE IMPORTANCE OF INTERPERSONAL QUALITIES FOR VENDOR SUCCESS

To gauge the importance of food safety to vendors, we asked them to list the qualities that they believed were required for business success. We repeated this exercise with Phase 1 and Phase 2 samples, for a total sample of 37 vendors, sufficient to provide confidence in the results. Cumulative results are in **Table 6**.

Table 6. *Free Listing Results: Qualities Required to be a Successful Vendor (n=37)*

ITEM	FREQUENCY (%)	AVG. RANK	SALIENCE
Be patient	47.2	1.82	0.369
Be honest/truthful	38.9	1.86	0.286
Be friendly	36.1	2.15	0.259
Have competitive prices	25	3.22	0.128
Be trustworthy	22.2	1.63	0.194
Have capital	16.7	1.67	0.137
Be reliable	13.9	2.8	0.072
Offer credit	8.3	3.67	0.024
Be welcoming	8.3	3.67	0.035
Be clean	8.3	2.33	0.061
Be polite	5.6	2.5	0.028
Have quality product	5.6	1.5	0.051
Have clean/washed product	5.6	2	0.043
Add extra to purchase	5.6	2	0.032

Note: items named only once are omitted

“Cleanliness” and “having a washed/clean product” were the only responses with a direct bearing on food safety that the listing exercise produced. These appear at a low position on the list, suggesting minimal salience. Far more salient are list items describing vendor character, with “patience” ranked most salient of all – a result that was stable across both Phase 1 and Phase 2 lists. Several high-salience responses probably overlap (i.e., they may constitute different ways to describe the same phenomenon); for instance, “patient” and “friendly”, or “honest/truthful” and “trustworthy.” But while the relative position of high-salience items could be altered depending on assumptions about these related terms, the strong takeaway from the listings – one also supported by vendors’ narratives – is that for vendors, considerations of personal character are a far more present concern than the safety of their food. We discuss these facets of vendor character below, expanding and contextualizing them with insights and content provided by the interviews.

5.5.4. THE ROLE OF PATIENCE

Chief among the salient traits (as among the consumers) is **patience**. It is clear from our interviews, however, that while patience may be the chief virtue, it cannot stand by itself. Patience needs to be combined with other qualities – for instance, **trustworthiness** or **honesty**. Even then, a vendor’s interpersonal skill alone is considered no guarantee of success but must be combined with specific business practices, such as how they set prices or extend credit to shoppers. From vendors, it emerges that the consistent emphasis on patience is related to two separate challenges to their business: (i) the daily provocations and frustrations that emerge in the course of selling (including hard-bargaining customers), and (ii) the specific problem of loans that are in default.

Exercising patience in daily interactions with shoppers was often described in terms of holding one's tongue or keeping natural reactions in check for the sake of both sales (short term) and the business more broadly (long term). Scenarios described by vendors included unreasonable demands for price reductions; shoppers who are themselves rude or impatient; indecisive shoppers; and shoppers who dispute the amount of their debt.

> *Patient vendors like to satisfy their customers, and they need to avoid making troubles with customers because they value customer relations. A patient vendor hates to lose customers. They will try to retain customers – even the difficult ones. – V2117, a 50-year-old fish vendor*

Being patient with credit defaulters was characterized as placing long-term objectives (the prospect of continuous loyalty from a shopper) before short-term ones (payment for outstanding purchases). While it was acknowledged that sometimes vendors' own debts to suppliers do not permit them to be generous with customers' repayment timelines, it was considered the most prudent response.

5.5.5. TRUST AND HONESTY

The attribute of trustworthiness, while secondary to patience in the free list results (possibly due to overlap with other list items), was a central feature of vendor narratives. As noted, vendor interactions with many individual shoppers are continuous, permitting the development of long-term relationships in which mutual trust plays an important role. Shoppers need to demonstrate that they are worthy of a vendor's trust to make purchases on credit, while vendors, for their part, provide a number of services in addition to selling food, to which they ascribe the trust they enjoy from shoppers.

Interviewed vendors outlined a variety of scenarios that illustrate the forms of personalized service they extend to preferred shoppers: vendors serve as custodians of shoppers' other groceries or belongings while they move about the market; they can agree to retain shoppers' funds until suitable produce is received from suppliers; they fill orders for the children of regular shoppers sent on errands by their parents; they maintain mobile phone numbers of shoppers and alert them to the arrival of new stock; and when they are not present in the market, or when they do not have stock to sell, they may recommend a colleague who can make the sale at the same "trusted customer" price. Some vendors even described assisting in shoppers' purchases of other market foods, either by providing interest-free loans or by guaranteeing purchases made on credit from other vendors. These services constitute a vendor-shopper relationship in Birnin Kebbi that goes well beyond the transactional act of sales/purchase.

> *I think [my success] is due to the way I sell at a reduced price to my customers. And even if I don't have fish, I can collect their money and go and buy [it] for them. And whenever I have fish, I call them on the phone to tell them my fish is available, or I can even take it to their houses. – V2120, 35-year-old fish vendor*

Trust was also characterized as something easily broken by a failure to be honest about the limitations of a particular batch of food:

> *Trust is hard to retain… you have to guide your trust. When you buy goods from your suppliers, and it's not good [quality], you have to tell your customers. Because you know what they need. If customers want it like that, you give it to them…you have to tell your customer the truth. If he buys it, that is up to him. Already, you've told him the truth. – V2104, a 52-year-old GLV vendor*

Above all, vendors associate trustworthiness with honesty in the matter of pricing. Crucially, the opinions that vendors express reveal that they do not believe themselves to be operating in a free market in the classic sense. Rather than pricing products at what the market will bear, Birnin Kebbi vendors consider themselves obliged to limit product markup. Taking advantage of an unusually low supplier price to maximize profit (textbook rational economic behavior in most other settings) was repeatedly cited as a form of dishonesty, and even by some vendors as "a lie". The moral language employed in vendors' discussion of pricing is striking and marks this as an area of possible contestation. It is not surprising, then, to find it so closely bound up in vendor notions of trust and trustworthiness: a trustworthy vendor is one on whom shoppers can rely on to set his market price reasonably close to his cost of acquisition.

> *The characteristic [of a successful vendor] is, if you bought your perishable goods and they were cheap, you have to sell it cheap. If you bought your goods and it was expensive, you have to sell it expensive as well. But, if you bought your goods cheaper and you sold them expensive to your customer, that is not right. – V2104, a 52-year-old GLV vendor*

> *[A vendor earns trust] by being honest with customers, getting fresh vegetables at all times, and not lying about price…. The day your customer finds out that you are not being trustworthy, and you are nor telling them the truth when it comes to the price of goods, if that happens, then I will tell you the truth, that trust is lost. – V2109, a 50-year-old GLV vendor*

Figure 9, below, attempts to sum up the insights offered by vendor narratives into a composite picture of the necessary qualities for vendor success. This shows the relationship between the key themes emergent from interview data, as well as the specific "dos and don'ts" that exemplify these themes in vendor conduct. Trustworthiness occupies the central position and can be considered an umbrella term for the way that patience, reliability and honesty overlap in the view of Birnin Kebbi vendors; however, this central place may be partly an artifact of the terms around which our discussions with vendors were structured; vendors might equally recognize another piece of this composite – e.g., honesty – as the central piece. Whatever the case, there is little doubt of the importance to vendors of these main elements. Of note, both honesty and reliability have close relationships to the product sold (and the individual), whereas patience relates more to the individual and his/her interactions with others (but not closely to the product).

Finally, vendor narratives also conveyed a sense of concern about social disruptions in the marketplace. They described some customers (and occasionally their fellow vendors) as noisy or disruptive, and they reflected frequently on the value of social harmony, which was characterized by several vendors as "living peacefully with others."

> *If you are patient, customers will definitely come to your stand to buy fish from you. Don't be rude to customers, and try and give them listening ears, and try to serve each of your customers equally by making all your customers important. And if you offend me, I will not retaliate. I try to live peacefully with everyone, and people naturally like me. – V2106, a 35-year-old fish vendor*

5.6. VENDOR PERSPECTIVES ON COMPETITION

While there is no doubt that a form of competition does occur between vendors, it is important to understand the more muted form that it assumes in the Birnin Kebbi socio-cultural setting. The interviews revealed a strain of opinion among a minority of vendors that competition does not occur at all. Although such categorical statements can probably be put down to the specific competitive practices that respondents had in mind, they nevertheless suggest a degree of discomfort with the language, if not the concept, of competition.

> *We don't compete with each other. I don't know any vendor who competes, I have never heard of such… Here we don't do that. If you take your goods [to market], you just wish for luck. – V2104, a 52-year-old GLV vendor*

A more typical sentiment was that competition was necessary but must be subjected to some limits. This stance is consistent with the earlier discussion of vendor solidarity and the ways that vendor organizations also limit competition by coordinating action on pricing and other vendor concerns.

> *Yes, in business there must be competition. But we don't allow it to get to the extent of having problems with one another. For example, if a customer comes to buy vegetables of N 100, you can decide to give her the one of N 120 [i.e., a higher quality at the same price], and she will be happy to come back next time. – V2105, 36-year-old GLV vendor*

Also exerting an influence on competition is the prevalence of strong relationships between shoppers and individual vendors. As noted above, vendors form long-term relationships with some shoppers. One acknowledged area of competition between vendors is in the establishment and maintenance of these relationships, which vendors value for the shopper/vendor understanding that they embody, and the benefits that flow from this. The consumer results section, above, has already explained the particular meaning of the descriptor "customer" and how shoppers may apply it to trusted vendors, and vice versa. A vendor who comes to be called "my customer" by shoppers is one who can be expected to know their favorite forms of food; extend credit and be patient about repayment; undertake the types of personal service described above; add a little extra food to the amount purchased (*jara*); and be honest about the quality of his or her food. The vendor, for his part, expects the shopper to ride out the inevitable fluctuations in price and quality, accepting that the vendor is doing his honest best to offer a good product at the best price. Some vendors can rely on the loyalty of their customers even when they are not there in the marketplace: as one 39-year-old fish vendor noted, "My customers, if they come to the market and they do not see me, they will not buy fish from anybody. They will just go back home."

A noteworthy aspect of vendors' concept of competition is that they appear more comfortable with efforts to recruit unaffiliated shoppers, while a more proprietary approach applies where regular customers are involved.

> *Well, if you have a new customer who doesn't belong to anybody, you can draw that person to yourself by selling well to her or him…. Yes, in business, there must be competition. You will not just sit down and watch. If there is a new customer in the market, everyone will be struggling for that customer to become his own, so competition is not something bad; it is a way to progress. – V2110, a 39-year-old fish vendor*

But while there are self-imposed checks on poaching affiliated shoppers, all shoppers start off unaffiliated; and, as noted in the consumer results, even affiliated shoppers can switch without the active encouragement of other vendors. Thus, there are recognized ways of competing for new shoppers. Vendors describe three legitimate arenas of competition. Two of these (**vendor conduct** (i.e., politeness, trustworthiness) and **vendor pricing/credit**) have been described in some detail above. The third area is a vendor's **food quality**, discussed in the next section.

5.7. VENDOR PERSPECTIVES ON FOOD QUALITY

Phase 2 interviews with GLV and Fish vendors indicate that they construe food quality in general terms as "freshness" (their detailed perceptions of levels of quality are discussed below). A fresh product was perceived to be easily recognized and appreciated by shoppers, making it an effective way to both maximize sales, and recruit new customers. Some vendors gave freshness primacy – even above price – reasoning that higher quality, fresher food permits vendors to start the price conversation with shoppers on a very different footing. Vendors who cited quality/freshness as a means of competition still saw it as part of a broader strategy, including patience and pricing.

> *One of the ways to be noticed and selected by customers is that – imagine that this is my table and there is very fresh vegetable laid out on the table. Naturally, the freshness of the vegetable is one of the things that affects customers. Even before they ask of the price, the goods are what will first of*

> *all captivate them… One of the things a shopper expects from a trusted vendor is good quality product. Then, after that we can talk about good price. – V2113, 35-year-old GLV vendor*

One feature that separates **freshness/food quality** from the strategies of **patience** and **pricing** is that some aspects of food quality are not within the control of vendors. In situations where vendors are combining for bulk purchases, quality is likely to be undifferentiated across the shipment, leaving little leeway for a vendor to distinguish the quality of his food from the next vendor. Where purchases are made individually, there exists more opportunity to maximize quality. One GLV vendor described how he and his peers compete to arrive first at the peripheral farms where their suppliers are located. Another described how, through a kind of vertical integration, his household both grows and sells GLV, which allows them to control both the supply and the quality of the product.

The aspect of freshness that makes it such a prized quality – **capable of elevating prices** – **is precisely its transience**. Fish and especially GLV vendors consider themselves to be on a ticking clock from the moment they receive their product from suppliers. The risk of being left holding product that is less-than-fresh (even inedible) is a preoccupation for vendors. For both GLV and fish vendors, the transition from peak freshness to unsalable product can occur within days or even hours, since market vendors have no access to refrigeration. Fish vendors expressed more fear of being stranded with unsellable product, perhaps because the quality of fish may reveal itself only after acquisition from the supplier. GLV quality is probably more readily determined at the point of purchase. On the other hand, while the quality of GLV is more apparent, it begins its decline within minutes of harvest. Both fish and GLV vendors stated that the challenge of securing high-quality product was exacerbated by the impact of seasonality on supply and demand.

> *The major challenge we face at times is that you can experience the fish will all die. And sometimes, you will have big fish, and before you get to the market with them, they are already spoiled. In fact, you cannot escape challenges in this, our type of business. – V2106, a 35-year-old fish vendor*

To slow the decline in quality, fish and GLV vendors draw on a limited repertoire of actions. Vendors' descriptions of the preservation measures taken were highly uniform within each food type. For fish vendors, the critical concern expressed by all vendors was to ensure that the fish water is changed regularly and that they are protected from the sun during transport to the market. Apart from this, few described other actions (e.g., feeding or care of fish, temperature conditions, oxygenation).

GLV vendors described cutting the roots from fresh greens after they receive them from suppliers and washing away any sand from the leaves before presenting them for sale. Once the greens are laid on the table, they are covered with a burlap or cloth sack to keep them from being exposed to drying winds and sun, and they are periodically sprinkled with water to keep their appearance fresh. These actions to maximize the freshness of their product were also characterized by one vendor as an additional arena of competition:

> *The competition I know that we do in the place [i.e., the market], is that everyone will be struggling to see the way that they wash their vegetable is better than the way the other person washes his. Because they want to attract customers with the way they arrange their vegetables on the table. – V2123, a 40-year-old GLV vendor*

But whereas shoppers were considered by vendors to be knowledgeable and demanding about GLV quality, the quality of fish appears from vendor accounts to be less apprehensible to shoppers. The only frequently recounted question asked by shoppers was whether the fish was caught in the river, or raised on a fish farm, with a premium attached by some shoppers to river fish. On the general issue of quality, one vendor characterized this as a non-issue for shoppers, provided the fish was still alive:

> *Customers are concerned more about the price. Fish is not like meat: if it is alive, then it is okay. It is only when the customer comes to buy and sees a dead fish, then the customer will ask if the fish is okay or not. – V2103, a 35-year-old fish vendor*

5.8. VENDOR PERSPECTIVES ON FOOD SAFETY

5.8.1. EXPLORING FOOD SAFETY WITH PHASE 1 VENDORS

We have noted already that food safety themes are assigned only a minor place by vendors when they identified and ranked qualities required for success (**Table 6**). Our interviews also explored the topic of food safety more directly, by asking vendors to discuss their specific food safety experience and concerns, and by engaging them in free listing exercises centering on the risk/safety of specific foods. These additional tactics revealed vendor awareness of problem foods that is broadly consistent with expert guidance, but also confirmed the impression that food safety is at most an issue of moderate concern among vendors, and one for which they believe responsibility lies elsewhere.

Our Phase 1 interviews with 13 Birnin Kebbi vendors attempted to explore the topic of food safety through exploratory, open-ended questions about vendors' own food safety concerns; the concerns expressed to them by shoppers; and vendor opinions on where responsibility for food safety should be situated. Fish, beef, and GLV were represented by three vendors each. The remaining focus foods – cowpea, maize, soybean and rice – were represented by one respondent each.

Within this mixed group, five of 13 vendors stated that safety of their own foods (i.e., foods for sale) was not an issue that concerned them. Among those who acknowledged a concern, the issues identified were familiar from the consumer interviews: chemicals (fish, GLV), stones and dirt (soybean), and animal health (beef). One vendor mentioned shoppers' allergic reactions (beef). Nine of 13 vendors stated that shoppers sometimes raise food safety issues, but their accounts of these encounters make clear that much of this consumer concern is directed not at food safety strictly speaking, but rather food quality (e.g., weevil damage to cowpea). Women were cited by some as being more likely to have concerns or to be more discerning, as were urban salaried and educated shoppers. These more discerning shoppers were not always welcomed:

> *We come across married people that are financially stable, like government workers… If there is a slight mistake, they don't have patience at all. They complain about almost everything -- complain to people in the metropolis, villages, or elsewhere. They don't take it as a slight mistake. But if it is other people, when they discover a mistake, they do come back and explain [their problem] to you and the rest. The metropolitan people can't be patient. They are the people that don't have a care for the poor. They select things too much, and if they see a mistake, they can't adjust. – V1110, a 38-year-old maize vendor*

In the view of vendors, the shoppers least likely to raise food safety concerns were "non-Hausas" and the poor; as one vendor noted, for the poor "whatever they get, they take home" (V1102, a 35-year-old rice vendor).

Vendors believe that ultimate responsibility for food safety rests with government. Asked to consider who ought to be taking charge of food safety, only two of 13 vendors responded that responsibility rests with vendors themselves. Eight proposed some arm of government, including "government", NAFDAC, "health officials," and KUDA (Kebbi State Urban Development Authority). Other suggestions included market leaders and suppliers. Following prompts from the interviewer, five vendors acknowledged that vendors, too, could play a role. Considering vendors' direct experience with authorities who oversee food safety, two of 13 respondents said that they were unaware of anyone checking the quality of foods sold at market. Of the 11 who stated that they had observed inspection activities, most attributed this work to more than one body. The authorities cited include state health authorities (by 8 vendors), the market administration (6), and NAFDAC (3).

5.8.2. RISKY FOODS

We also sought to approach the food safety topic by asking about any specific foods that caused vendors' concern**.** We employed a free-listing technique (described earlier) to elicit a domain of "foods not always safe to eat", as well as an opposite domain, "foods that can generally be relied upon to be safe." Results, presented in Tables 9 and 10, must be viewed with some caution due to the small sample (13 vendors). However, taken together with the interview data, they offer several broad insights: the items on vendors' "unsafe" list show a high degree of alignment between the foods they themselves see as potentially unsafe and the foods of concern for public health experts, with GLV, fish, and beef all numbered among the most salient. The appearance of local rice is related to the problem of stones, which can present a serious hazard to consumers' teeth, and which vendors said are frequently found in locally grown rice, but not in the imported variety. The "safe foods” list is notable for the frequent appearance of processed and packaged foods (tinned foods, pastas and noodles, packed rice; Maltina®, Semovita®, and tea were also named by one vendor each), as well as more stable of grains and legumes – also broadly consistent with expert guidance.

Two of the most salient items in vendors’ “unsafe foods” list – Fish and GLV – were the subject of more extended discussions with vendors in Phase 2. Insights gleaned from vendors on these foods form the basis of our discussion of vendors’ views on food quality, above. Indeed, the discussion of food safety is difficult to separate from vendors’ ideas on the more general topic of quality. At first glance, vendors’ statements about food safety seem inconsistent with the free list results obtained in Phase 1 (**Table 7** and **Table 8**). The prominent place of Fish and GLV in the “unsafe” list is interesting, when compared with statements of Phase 2 Fish and GLV vendors, most of whom said (when asked directly) that they had never had concerns about the safety of food *they were selling*. Because the listing exercise and the safety discussion were conducted with different respondents, it is plausible that this result reflects genuinely different views between the two samples. It seems just as likely, however, that with the more personal nature of the Phase 2 questions, vendors made a separation between the risk associated with certain foods in general, and the risk they attached to the same foods *when sold by them*. Their explanations (“I only sell the good ones”; “they can tell by looking at it that the quality is good”) also support this interpretation.

To triangulate the data on food safety gathered from consumers, we asked vendors about the types of questions asked by shoppers about their GLV or fish. Averaging the estimates made by 23 vendors, less than a third of customers were said to ask questions about either the quality or safety of their food. Mirroring the data gathered from consumer interviews, vendors said that shoppers’ questions about GLV revolved mainly around “chemicals”, which included both the problem of fertilizer residue and of pesticides/insecticides, while questions about fish were either about chemicals or about whether the fish originated in the river or were farmed (often referred to as “bred at home”). The results of the consumer interviews suggest that the interest in distinguishing farmed from wild caught fish is also an attempt to minimize chemical exposure, as some shoppers believe that fish farming operations are administering undesirable chemicals to their fish.

Table 7. *Free Listing Results: Foods That Are Not Always Safe To Eat (N=13)*

ITEM	FREQUENCY (%)	AVG. RANK	SALIENCE
GLV	76.9	3.1	0.506
Local rice	69.2	3	0.475
Beef	61.5	2.88	0.431
Fish	53.8	2.86	0.366
Tomato	38.5	3	0.293
*Fura**	23.1	4.67	0.117
Fruits	23.1	5.33	0.066
Millet	15.4	5	0.078
Beans	15.4	1	0.154

*Note: Foods named by only one vendor are excluded. * Fura are millet dough balls, often used in a milk-based drink 'fura da nono'*

Table 8. *Free Listing Results: Foods Generally Considered Safe To Eat (N=13)*

ITEM	FREQUENCY (%)	AVG. RANK	SALIENCE
Imported Rice	61.5	2	0.477
Instant noodles	30.8	2.75	0.213
Millet	30.8	3.25	0.192
Maize	30.8	1.5	0.269
Spaghetti/Macaroni	23.1	4	0.099
Tinned fish	15.4	3.5	0.065
GLV	15.4	3	0.081
Beans	15.4	2.5	0.096
Groundnuts	15.4	3	0.11
Tinned Tomatoes	15.4	2	0.126
Fish	15.4	3	0.069
Sorghum	15.4	4	0.038
Wheat	15.4	5	0.06

Note: Foods named by only one vendor are excluded.

5.8.3. CLEANLINESS AS A PROXY FOR SAFETY

Understanding vendor perceptions of food safety *per se* is made difficult by the tendency of interviewees to merge the topic of safety with the topic of quality (which is in itself instructive). We address this food quality/safety continuum below. As a means to approach the topic of food safety without the challenge of distinguishing it from more general problems of food quality, we utilized the idea of **cleanliness** as a proxy in Phase 2 – recognizing that this also bears some relation to quality, it did appear to be understood as a more specific trait in vendors' minds than the amorphous "quality." When asked to list the qualities required to be a good vendor in Phase 1, cleanliness had appeared in the vendors' list (albeit far down the list). We reasoned that by ranking it against several other qualities on that list in Phase 2, we might derive a better picture of the relative importance of cleanliness (and food safety) compared to several key attributes that featured prominently in Phase 1 interviews. Twelve fish and 12 GLV Phase 2 vendors (total 24) were asked to rank five potential ways that vendors could attract and keep customers based on their importance. The results are shown in **Table 9.**

Table 9. *Results of Vendor Ranking Exercise*

	GLV (N=12)	FISH (N=12)	TOTAL (N=24)
Being more patient	4.25	4.42	4.33
Being more trustworthy	1.67	3.08	2.38
Maintaining a cleaner stall	3.25	2.75	3.00
Maintaining lower prices	3.17	3.08	3.13
Allowing purchase on credit	2.58	1.5	2.04

While there appear to be some differences in the importance assigned to trustworthiness between the two types of vendors, several results are more or less consistent across the combined sample: both groups placed patience emphatically at the forefront of strategies for vendor success, reinforcing the conclusions from interviews and listing. Both groups ranked “offering credit” below the other strategies. Both groups placed “cleanliness” in the middle (roughly on par with lower prices).

5.8.4. THE FOOD QUALITY-SAFETY CONTINUUM

As noted, Phase 1 vendor narratives of food safety do not fit easily into a binary (safe/unsafe) model. Rather, risk appears to be assessed along a continuum, with the problem of safety arising only at the outer edge, while intermediate stages of declining quality seem to represent more of a business concern to vendors than unsafe food *per se*. To explore this, we engaged Phase 2 vendors in an exercise intended to identify commonly recognized points along a food quality continuum. Fish and GLV vendors were presented with a board divided into four stations, representing four levels of food quality (best quality at one end, unsafe at the other, and two intermediate stations in between). Vendors were asked to describe signs that would be evident in fish or GLV at each of the four stations.

Both fish and GLV vendors found this to be a straightforward task to perform. Respondents’ differing assumptions (e.g., whether at the lowest level of quality, the fish being described was dead or still alive) prevent a quantitative analysis of vendor consensus. Nevertheless, the data provided by the 12 fish and 12 GLV vendors permit the assembly of a composite picture of commonly recognized signs of quality for each focus food (Figures 10 and 11, below). A range of sensory cues is employed in vendor assessments of quality. Vendors of both focus foods tracked alterations in quality through changes in appearance and texture, and in the final stage, odor. Fish vendors also draw on the behavior of the fish for cues as to its level of quality.

Table 10. *Vendors' Mental Typology of Fish Quality*

SENSORY CUE	LEVEL OF QUALITY			
	UNSAFE	INTERMEDIATE		FRESH
Behavior	Fish now dead	Very weak, not moving in water	Less active, permitting easy capture with hands	Highly active: "you can't hold it easily"
Appearance	Skin becomes black; Body leaks fluid	Body develops patches	Color starts to fade	Body is "shining" or "bright"
Touch	Skin peels if held		Skin texture becomes rough	Skin is smooth to the touch
Odor	Begins to smell			
Taste		Flavor declines further	Less flavorful	

Table 11. *Vendors' Mental Typology of GLV Quality*

SENSORY CUE	LEVEL OF QUALITY			
	UNSAFE	INTERMEDIATE		FRESHEST
Appearance	Color now very yellow/red Worms or Insects have eaten holes	Green color is turning to yellow (or red); If shaken, some leaves fall off	Green color is fading Leaves start shrinking, folding	Color is dark green Leaves are large
Touch	Less heft to the leaves	Stems become tough		Leaves are soft
Odor	Has an offensive smell			

5.8.5. VENDOR PERSPECTIVES ON FOCUS FOODS

Cowpea. The cowpea vendor interviewed generally aligned with the interviewed consumers in terms of what consumers sought in cowpea: no weevils or weevil damage, and a lack of chemicals. It was agreed that these were pervasive issues with cowpea – but also noted that new storage bags could prevent weevil infestation without chemicals and that this was communicated by vendors to consumers. Absence of weevils was detected by the cowpea not having holes and no visible weevils or eggs; it was also noted that cowpea infested with weevils would be warm to the touch, indicating it was not safe. Chemicals were detected by smell – as a cowpea vendor noted, "nobody will come to buy beans without smelling it" (V1108, a 65-year-old cowpea vendor).

> *[Customers'] concern was mostly for beans that there are chemicals…. They complain that someone ate beans with chemicals, the person had a swollen stomach and was taken to hospital. Someone ate beans and died because of the chemicals. I tell them [that due to the new bags, there are] no chemicals, they should go home, wash, and cook [them] no problem. I also use the same beans in my house! – V1108, a 65-year-old cowpea vendor*

Maize. For maize, there was fairly little concern about quality or safety issues (as in the consumer interviews); three vendors specifically noted that maize was safe because no chemicals were used on it. The main issues that were named were dirt and remainders of the cob left with the kernels; these were seen to be the result of poor-quality processing up the value chain. For maize, inspection was also visual and entailed ensuring a strong unbroken bag, no visible dirt, and it being dry.

Soybean. Soybeans were also not a main source of vendor concern related to quality and safety; indeed, it was noted that they were less prone to pests than cowpea, which was an advantage to selling them even though they had a fairly small market (used mostly to make soybean cake, often for sale). In addition to stones, vendors noted unripe or spoiled beans, and dirt or sand.

Rice. As with consumers, the main issue vendors noted in connection with rice was the presence of stones. Consumers were said to frequently ask about stones and checked products when deciding whether to buy. Aside from this, no concerns related to safety or quality were noted, though it was noted that some rice varieties tasted better than others. To determine quality/safety, rice was inspected to be clean, free of chaff, and free of stones—though it was also noted that scent could be an indication of quality. As with consumers, vendors saw foreign rice as being safer, as it did not contain stones. Some vendors opined that other foreign goods were also safer than local ones.

> *…Foreign rice, it is safe to eat. Foreign canned tomatoes, foreign canned fish, foreign salad cream is safe, foreign Bama is safe, but our own Nigerian made is unsafe…. In my own opinion, [the] Nigerian Government does not care about what is produced here, while their own [foreign] government makes sure quality foods are produced for its citizens. … I do not know the reason, but foreign is better than Nigerian made. I am not in that [foreign] country, but I know [its] government makes sure and makes it mandatory to produce quality products, the company wants to maintain good reputation and maintain their customers. But here, since we don't have a choice, anything produced will sell, consumers will buy. – V1107, a 43-year-old soybean vendor*

Beef. Beef evoked more concern about food safety issues among vendors than did the grains or legumes. The main problem noted was cattle being sick at slaughter and their meat being dangerous to eat; vendors also mentioned spoilage (particularly due to a lack of refrigeration, a common constraint noted by vendors), the use of animal medications that might not be safe, and the presence of dirt or flies on the meat. Quality/safety of meat was usually determined by visual inspection: to see that it had a good color (red, not too dark) and was not too bloody. A firm texture and lack of odor were also noted, as was inquiring of the supplier to ensure the animal was healthy. Unlike for the other focus foods, two beef vendors noted the importance of a clean sale environment and a clean vendor for communicating safety/quality and encouraging customers to purchase.

Meat could be from a sick animal or malnourished animal; all these reasons make me skeptical about the meat to buy. If you see the meat of a sick animal, you will see that it is very reddish, not attractive at all. Some meat, you will see flies surround it, you will see the big, big flies, the one that will perch on people's feces, leave the feces and perch on meat. For my home, I buy my meat very early in the morning because of flies. – V1110, a 38-year-old maize vendor

5.9. FEMALE VENDORS

All vendors interviewed in both Phases 1 and 2 were male, despite efforts to identify and recruit female respondents. Asked to reflect on the gender composition of the vendor population in Birnin Kebbi markets, vendors were highly consistent in their responses: in their view, none of the seven focus foods are sold by women, with the exception of rice (particularly local rice). This is consistent with our own market observations. Several fish vendors could recall a time when older women also sold fish but said that as this group of female vendors retired, the business has become completely male.

Male vendors offered two explanations for the absence of women among focus food vendors. One explanation was that the Islamic culture of Hausa/Fulani vendors made female vendors uncommo. The phenomenon was not completely unheard of, but respondents identified it with non-Hausa/Fulani vendors and with foods – often traditional – that do not have a central place in the market.

They [vendors] are all male. Not a single female in this market sells leafy greens because women cannot; it's against our religion. The females you are seeing are not Hausas, or they are not indigenes of Kebbi. Greens, meat, and fish? No female vendors. But females sell iced [frozen] fish, crayfish, garri, kpomo (cow skins), locust beans, and washed bitter leaves. – V1102, a 35-year-old GLV vendor

Although the male vendors were clear that propriety and custom prevented Muslim or Hausa women from selling food in the Birnin Kebbi market, they are evidently selling food in other locations. Vendor narratives made frequent reference to shoppers they called "re-sellers," who appear to be mainly female. These shopper-resellers buy foods from the market vendors and then sell them in their own communities and neighborhoods, where it seems there are fewer limitations on action and movement that apply in the public arena of the main markets.

The other commonly offered explanation for the absence of female focus food vendors was connected to the process of securing product from suppliers. Male vendors frequently described women as too frail or too uncommitted to withstand the exigencies of travel in rural settings to purchase food from suppliers. Further, these rural suppliers were also described as male, creating additional obstacles for a would-be female vendor, who could not easily engage with male farmers/suppliers.

> *Men are very courageous and energetic; there are places females can't go. Men will struggle to get the goods when there is scarcity no matter how hard it is to get; but women cannot do that. You see the difference: they cannot do hard job like men do. – V1102, a 35-year-old GLV vendor*

Two respondents also made reference to the role played by capital in the establishment of a vendor's business, and reasoned that men were in a better position to acquire this. One suggested that the lower barrier to entry for rice home processing and vending was a reason why women could be found selling this food. Overall, women tended to sell smaller amounts and items over which they had more control in production and/or could add value through home processing or re-sell locally (as opposed to making profits through buying in bulk in wholesale markets, as male vendors tended to do).

6. DISCUSSION

6.1. LIMITATIONS

This study has examined, in depth, the perceptions and practices of Birnin Kebbi vendors and consumers vis-à-vis food safety, painting a rich picture of the local context for intervention. Certainly, the study has some limitations. The greatest limitation lies in the fact that all vendors interviewed were male. While the field data collection firm at the time advised that no eligible female vendors were found to be interviewed, a census of all vendors in the studied markets conducted soon after this study found that there were some female vendors of certain focus foods, particularly soybean, rice, cowpea, and certain GLV (for the other focus foods, fewer than 10% were women). Hence, some women should have been included in the sampling; the reasons why they were not under investigation. In addition, the consumer sample seems to be somewhat more affluent than the total Birnin Kebbi population; Nigeria's urban poverty rate is estimated at about 18%, whereas about 12% percent of this sample (using a somewhat more generous threshold) were found to be poor. Similarly, the sample is also somewhat more educated than the average for urban Nigeria, according to the 2018 Demographic and Health Survey. The population studied is thus more representative of the middle class (as opposed to lower-income consumer) and may have greater ability to access information related to food safety, be discerning when shopping in the market, and/or mitigate food safety risks in the home. These differences should be taken into consideration when interpreting the results.

6.2. KEY RESULTS AND IMPLICATIONS FOR INTERVENTION DESIGN

6.2.1. CONSUMERS

Those limitations aside, the study yields several key results with implications for design of EatSafe interventions, which are discussed here and summarized in Box 3.

The results give a somewhat ambiguous answer to a key question for the EatSafe project: among consumers, how important of a concern and motivator of choice is food safety? The study found a fairly low level of salience compared to other concerns *when the topic was not specifically primed or prompted*; however, once consumers were asked directly or had been primed on the topic, it was much more prominent, with the majority of consumer respondents opining on the importance of vendor and market cleanliness and naming strategies to avoid unsafe food. In general, however, consumers' concerns about food safety did not seem to be overriding or strongly motivating – i.e., they recognized that food safety concerns might arise with certain foods in certain circumstances, but not commonly, and those concerns did not prevent consumption of that food. Most food was seen as safe, and most food safety issues were seen as things that could be mitigated with in-home behaviors like washing or cooking, or a result of an individual intolerance. It was rare that consumers reported avoiding consumption due to safety or quality issues. Moreover, while unsafe food was associated with gastrointestinal diseases, it was not seen as the only cause of any of the gastrointestinal symptoms, which people also associated with malaria and unclean water. Respondents had rather vague and flexible ideas about types and causes of illnesses, including foodborne ones, and less than one third reported direct experience of getting sick from food.

Jointly, these results suggest that, while food safety is unlikely to be a top-of-mind key motivator of consumer choice at the moment, there is some recognition of its importance – and people can likely be convinced to make it more central in decision making, if given the right cues and motivators. Cues could include reminders to pay attention to the signs of cleanliness of which many are already aware (assuming these are actually correlated with lower risk). Motivators could include reminders of the uncomfortable effects of consuming unsafe food that consumers know well (being ill, incurring expenses, and missing out on life activities) or of the positive attributes of bringing home good food. However, in so doing, EatSafe will need to deliver clear messages on how safer food can be linked with fewer illnesses, given consumers' inability to separate foodborne illness from causes with similar symptoms. Consumers might not naturally make a connection between food and disease and could attribute a reduction in gastrointestinal illness to other causes, such as malaria prevention.

In addition, food safety will always be competing in consumers' minds against other salient motivators of food and vendor choice. In particular, it was clear throughout this study that price is a strong motivator: prices were seen as central to driving vendor choice and even defining what a "trusted" vendor was; having change left over was a key aspect of shopping that was satisfying; and higher-than-expected prices were the most-cited contributor to an unsatisfying experience. Given this primacy, it seems unlikely that consumers will be willing to set aside price concerns in order to prioritize safety. This is particularly true for women, who have less agency when it comes to choosing to pay a higher price (as they are often using their husband's money), are harder bargainers, and particularly appreciated having change left over. Moreover, credit also proved to be a key motivator for some consumers—while this was true for only a minority, it is likely particularly important for lower-income consumers (though perhaps not the poorest, who may not be seen as credit worthy). Dependence on credit implies less flexibility in choosing markets and vendors, as consumers need to rely on those with whom they have relationships.

Another key question for the project is whether **consumers may be willing to change their choices of markets and vendors.** In general, consumers tended to have a primary market at which they regularly shopped, motivated by price, availability, convenience, and/or habit. Whereas some consumers visited multiple markets regularly and recognize differences across them, others nearly always visited the same market without considering alternatives. Similarly, loyalty in the vendor-customer relationship was seen as building useful social capital (e.g., being able to access credit or have food delivered) and was important for both consumers and vendors, but far from universal among consumers: about half of consumers reported regularly changing vendors, including as a strategic decision, and nearly all used alternative vendors at least sometimes. There is thus some scope for encouraging comparison or change among vendors and markets; this may be more feasible among the consumers who are less dependent on credit. However, as discussed below, vendors seem unlikely to actively compete among one another, except for unaffiliated customers. The strong ties between some vendors and consumers also create a platform of existing social capital that could be leveraged for intervention – e.g., by appealing to the consumer's or the vendor's responsibility to his/her "customer" (using the two-way meaning of "customer" as used in Birnin Kebbi).

Consumers do have existing beliefs about what is safe and techniques for making judgments about food safety. Consumers' conceptualizations of food safety were overlapping with other aspects of quality, such as insect damage, and few consumers articulated a clear definition of "safety" that was separate from these issues and directly and uniquely linked to foodborne disease. Consumers were (when prompted) able to list a number of aspects of "cleanliness" and practices and signs associated with cleanliness related to food, vendors, and markets. However, their main food safety concern did not relate to cleanliness but instead centered on chemical contamination of food—primarily pesticide, preservatives, fertilizers, animal drugs and other unspecified chemicals. Interestingly, several types of food that are often identified by experts as being at high risk for contamination (fish, chicken, eggs, and dairy and other types of fresh fruit and vegetables) were not named by consumers as "unsafe," while several of those named (particularly the grains, yam, and oils) are not seen as posing a high risk.[15] Intervention strategies might explore how existing consumer concerns related to chemical contamination of food could be referenced to increase concern about more actually risky foods and thus motivate relevant consumer practices.

[15] Consumers also associated packaged foods (particularly packaged foreign foods) as being safer; while this may be true in some ways, it is also true that many of these foods are nutrient-dense ultra-processed foods, unhealthy from a nutritional standpoint.

Consumers express agency in some areas of avoiding food safety risk – but not others. For each of the foods examined here, consumers named certain cues and heuristics that they used to obtain safe or high-quality food, and most were fairly confident in their effectiveness. Consumers also named several different strategies that they could use to make food safer once brought home, thus mitigating risk in the market. At the same time that consumers expressed confidence in accessing quality food in the market, some also expressed a certain fatalism related to food safety—in the form of a need to live with the risk, or just avoid a food altogether, as well as opining that at least some vendors lie about the safety of their food, even if this is not common. Vendors also agreed that at least some vendors will sell unsafe or poor-quality food, even if they themselves opined that they never would, and expressed ideas such as “it being our lot in life” or something happening “because God intended it.” These views are in contrast to the high degree of agency that consumers feel in the matter of securing quality at the best price: at least some see themselves as strong bargainers (and particularly for women, this may be a point of pride). One potential inroad for an intervention could be to harness this related area in which people feel empowered to transfer that perceived agency and motivation to the domain of food safety.

The study results also indicated strong and shared norms and stereotypes associated with gender. While women and girls are exclusively responsible for cooking, both genders play a role in shopping. However, women are seen as discerning, time-consuming shoppers and hard price negotiators who must bring home good-quality food with which to cook (with the quality of the cooking reflecting directly on their role as wife/mother). They will take longer to make a purchase and “shop around” more, which is noted to require considerable patience on the part of vendors (with “patience” being a key trait of a successful vendor in the eyes of both vendors and consumers). In contrast, men do not want to “waste time” and will shop quickly, with less discernment and less price sensitivity or desire to bargain. For women, bargaining well seems to be both a necessity – they have a tighter budget, since money is normally provided by men – and a point of pride. Similarly, some men seemed to take pride in the fact that they “didn’t have time to waste.” It may be possible to leverage these perceptions and the rivalry between the genders on this point (i.e., of women being “good, discerning shoppers” and men being “busy, with no time to waste”) and the associated pride that women/men feel in order to motivate changes in shopper behavior.

6.2.2. VENDORS

Together, insights from this study’s exploration of vendor perceptions suggest the existence in Birnin Kebbi of a “moral economy,” with implications for intervention design. Three related findings support this conclusion: (i) the presence of vendor associations and social ties that function to minimize conflict and competition between individual vendors (including sometimes by fixing prices); (ii) the prevalent idea of a “real” price that functions to limit vendor freedom to set prices at what the market will bear; and (iii) the importance in Birnin Kebbi of the reciprocal "customer" relationship that connects a shopper with a certain vendor in a type of mutual loyalty, to which some (but not all) consumers are bound through credit and which vendors consider to some degree proprietary (i.e., vendors do not attempt to recruit shoppers already affiliated with another vendor). These three pillars of the moral economy do not necessarily militate against food safety, but they are likely to complicate an intervention approach that seeks to spur or leverage competition – e.g., through offering safer food at a higher price or undertaking particular actions to attract consumers. Irrespective of whether consumer demand could be generated for such an offering, given consumers price sensitivity, vendors' norms of competition in Kebbi markets are likely to form an impediment at the individual vendor level. At the same time, there may be positive ways to leverage the value placed on consensus and harmony among vendors for intervention purposes—such as by working to foster shared practices, norms, and enforcement of certain food safety practices among vendors. In addition, there is no norm against attracting shoppers passively or attracting unaffiliated shoppers. As such, vendors will likely have an incentive to adopt practices that make their goods appear more attractive to consumers, thereby allowing them to increase demand for their products without needing to call out to consumers, cut prices, or otherwise actively entice shoppers. If such practices also improved food safety, this could offer an intervention opportunity.

At the same time, existing forms of vendor organization are an asset that could factor into project design. Vendor associations appear to have significant relevance to vendors. In particular, they appear to have secured vendor compliance while at the same time being seen by their members as a genuine advocate for their interests – making them a potentially effective contact point and even partner in efforts to reduce the risks associated with specific foods. More needs to be learned about their universality, their representativeness, their equity, and their status in the eyes of other stakeholders such as market management, but there is little question that they are important to vendors.

Birnin Kebbi vendors – as well as consumers – will probably prove more responsive to an intervention that focuses on the issue of *quality*, rather than food safety per se. Both consumers and vendors tend to speak of quality and safety concerns somewhat interchangeably, or as occurring along a continuum. For vendors of perishable foods, the central challenge is how to realize a good price on goods that are losing value with each passing hour. They are likely to see the value in any intervention that can change the equation – whether on the supply side through improving transport or storage conditions, or on the demand side, for instance by using new approaches to expand networks and broaden and/or leverage the range of buyers.

A project strategy built around food quality faces several challenges – but each of them is conceivably also an opportunity. First is the issue of **uniformity:** where groups of vendors rely on the same supplier, actual quality of the goods is unlikely to differ within that lot of goods. This makes it hard for a vendor to distinguish himself based on his product alone (and elevates the importance of vendors' other documented strategies: pricing; personal service; credit) or for a consumer to discern differences among vendors' wares. It thus may elevate the importance of non-product-related attributes that consumers may use to make choices between vendors, such as cleanliness. Second, **seasonality** can make it difficult for vendors, particularly those of perishable goods (e.g., GLV) to secure high-quality products. Vendors also reported that finding sufficient demand was problematic during some seasons. These periods of seasonal scarcity of supply and/or demand put added pressure on vendors to make ends meet – but the periods of abundance could conceivably be an effective entry-point for the project, as they are moments when vendors face less thin margins, have more choices, and could be encouraged to take more risks (e.g., by experimenting with new handling or display practices). Third, the very quality that makes fresh food desirable is its **transiency**. Fish and GLV vendors see themselves on a ticking clock, with value declining rapidly once they take delivery of supplies. This presents risks and can limit vendor choices – for example, it militates against holding large volumes. This also highlights (and helps to explain) the importance of credit to vendors: in the Islamic setting, where charging interest is not practiced, it might be hard to see the business case for vendors to offer credit, except as a way to attract customers. But seen in the context of rapidly devaluing perishable foods, offering credit might be an effective way to lock in value, since transactions can take place at peak freshness, even when customers have insufficient funds. Any intervention (food safety or otherwise) than can accelerate the transfer from buyer to seller—i.e., let them part with their perishable goods faster—would likely be positively received by vendors.

Finally, Birnin Kebbi cultural values offer some potential themes for project design and communications. Vendors returned consistently to key virtues that they believe should guide and inform vendor conduct – among these were trust, honesty, and patience. Similar traits are seen as markers of "good" vendors in the eyes of consumers. Also stated on a recurring basis was the importance of avoiding conflict – often expressed as "living peacefully with others." It would be easy to dismiss these statements as aspirational. However, the interviews suggest they are something more, and the concrete ways in which the actors in this setting are muting aggressive competition and discord support this, too. Even if such statements represent a form of ideology (as opposed to reality), they still indicate the values that are important to the target population, and with which any food safety intervention must align. Thus, if Kebbi seems to be missing something in the way of capitalistic competitive spirit among vendors, and if it might not so easily support a market competition-led intervention, it nevertheless possesses other key attributes that offer the foundation for other intervention approaches. **Such an approach could be built around ideas such as the collective safety of the community, the civic contribution of vendors and their associations, the building of long-term consumer-vendor relationships, and the continued earning of consumer trust.**

7. CONCLUSION

This focused ethnographic study sought to examine perceptions, opinions, and experiences related to food safety among consumers and market vendors. The focus was placed on consumers and vendors at three traditional markets in the city of Birnin Kebbi and on seven focus foods: rice, maize, cowpea, soybean, beef, and particularly fish and green leafy vegetables. Data were collected using different qualitative data collection methods, spread over two phases, with iterative analysis. The results indicate moderate levels of consumer concern related to food safety, which did not seem to be overriding or strongly motivating (when compared to, for example, price, availability, or habit) and focused primarily on chemical hazards. Most food was seen as safe, and most food safety issues were seen as possible to mitigate with careful selection practices at the market and with in-home behaviors like washing or cooking. In general, consumers believed they could detect many problems by visual inspection. However, consumers were also able to name several different signs of market and vendor cleanliness they could inspect for, and many named foodborne disease as a health concern of theirs. Consumers commonly used the same vendor repeatedly, and these repeat relationships were valued on both sides and associated with various complementary services and a feeling of trust. In addition to the qualities associated with food products, interpersonal qualities were seen as key aspects of being a “good vendor” by consumers and vendors alike. Vendors’ actions were shaped by social norms and their close ties with other vendors, both socially and through official vendor associations.

The results suggest several potential in-roads for EatSafe intervention design, as well as a few potential challenges. These are summarized in **Box 3** (next page). Overall, the study has painted a complex and nuanced picture of the cultural and social setting of traditional markets within Birnin Kebbi, the vendor and consumer behaviors that are practiced there, and the beliefs and norms upon which those practices are predicated.

Box 3. *Recommendations For Interventions Design Under EatSafe*

This study suggests certain paths EatSafe could consider in the design of interventions:

- While food safety is not currently central in consumer decision making, consumers can likely be convinced to make it more central if given the right cues (e.g., reminders to check for known aspects of cleanliness) and motivators (e.g., reminders of effects of consuming unsafe food).
- EatSafe will need to be cautious in terms of communicating how safer food is linked with fewer illnesses, as consumers generally view food as safe, have flexible understandings of gastrointestinal illnesses' causes, and do not clearly separate foodborne illness from other causes. It is also unlikely that consumers will be willing to set aside price concerns in order to prioritize safety; this is particularly true for women, who have less price flexibility and particularly appreciate having change, and for consumers who use credit.
- A gender-targeted strategy could leverage strong, shared perceptions of gendered shopping behaviors and/or gendered rivalry (i.e., of women being "good, discerning shoppers" and men being "busy, with no time to waste" and the associated pride that women/men feel with each of these traits) in order to motivate changes to shopper behavior.
- Consumers' (particularly women consumers') strong feeling of agency related to securing quality at a good price could be leveraged to transfer that perceived agency and motivation to the domain of food safety.
- Consumers' main food safety concern relates to chemical contamination. Intervention strategies might explore how these existing concerns could be referenced to motivate relevant consumer practices to address more actually high-risk foods.
- Strategies that encourage active competition among vendors, particularly related to price, are likely to run into barriers related to vendors' norms of competition. At the same time, the value placed on consensus and harmony among vendors could be leveraged for intervention purposes—such as by working to foster shared practices, norms, and enforcement of food safety practices among vendors. Vendor associations are one promising potential platform for such an approach.
- Vendors would likely welcome any practices that make goods appear more attractive to consumers, thereby allowing them to increase demand for their products without needing to actively recruit consumers loyal to other vendors (going against social norms), or that allow them to sell perishable goods faster (which is a key concern for them). If these practices can also increase food safety, they could be intervention strategies.
- While vendors are stressed during seasonal periods of scarcity, periods of abundance could be an effective entry point, as vendors face less thin margins at these times and could be encouraged to take more risks (e.g., by experimenting with new handling or display practices).
- Given social norms and values (especially among vendors), key foundational themes for an intervention approach could include the collective safety of the community, the civic contribution of vendors, building long-term consumer-vendor relationships, and the continued earning of consumer trust. In particular, the strong ties between some repeat vendors and consumers creates a platform of existing social capital that could be leveraged for intervention – e.g., by appealing to the consumer's or the vendor's responsibility to his/her "customer" (using the two-way meaning of "customer" as used in Birnin Kebbi).

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9. ANNEXES

9.1. ANNEX 1. METHODS

A1.1. The Focused Ethnographic Study as a Method

The Focused Ethnographic Study (FES) is a modular approach using different qualitative methods that is based on (but extends beyond) a central concern of ethnography: the discovery and description of the "emic" (or insider) perspective and the "cultural domains" that make up this perspective (23). FES has proved to be a robust and versatile method of conducting formative research, especially for developing knowledge to inform understanding of the cultural context for interventions. Insights from the FES method have been produced and operationalized to support interventions in a variety of ways, including devising more effective health education messaging, altering service delivery architecture, and identifying entry points for novel interventions such as fortified foods or micronutrient powders, as well as for the design of program evaluations (23,24).

An FES uses an iterative research design with (in this case) two phases separated by reflection and analysis: an initial phase works with so-called 'key informants' to discover the key themes and issues related to the phenomenon in question; and a second phase delves more deeply into the meaning of these dimensions in the populations under study, with a slightly larger sample (though still considerably smaller than used in most quantitative methods). Greater confidence in the results arises through triangulation between Phase 1 and Phase 2 and from exploring emerging issues from Phase 1 in more depth in Phase 2 (and thereby confirming them).

A1.2. Specific Research Questions

This study focused on informal market vendors and consumers (specifically, the people who utilize the targeted informal markets to purchase any of the seven focus foods mentioned below, which they prepare and consume in their homes). The goal was to identify both food safety behaviors and beliefs concerning food safety. The study sought to answer the following overarching research questions:

1. How do people in the research area (consumers and vendors) understand, speak about, and recognize issues related to food safety?
2. How do consumers make decisions about food safety in informal market settings?
3. How do vendors make decisions about food safety in informal market settings?
4. How does gender influence food safety risk, exposure, and ability to mitigate or manage these issues?

A1.3. Study Area and Focus Commodity

The study focused in Kebbi state and on the following foods: rice, maize, cowpea, soybean, fish, dark green leafy vegetables, and beef (henceforth referred to as 'focus foods'). Within Kebbi state, it focused on specific markets in Birnin Kebbi, the state's main city: Central Market, Yaryara Market, and Tsohon Kasuwa Market. The geographic and food focuses were determined in consultation with the study funder, USAID Nigeria, based on local priorities and alignment with existing policies and programs. These foods were chosen as they are USAID Feed the Future Priority Commodities in Nigeria. Most also have high inherent nutritional value, are accessed via informal markets for domestic, human consumption, and are sold directly to consumers.

The following criteria were used to select the chosen geographic area: city being within a Feed the Future Zone of Influence; undernutrition being prevalent in the state; the target foods being widely consumed in the city; the city being of sufficient size to have multiple markets, the city and state having sufficient security to allow for the work to take place safely. Within Kebbi state, Birnin Kebbi was prioritized based on size (with the preference for a city, large enough to have multiple markets but small enough to facilitate research), security, and other relevant factors. Within Birnin Kebbi, the specific markets were chosen based on their location (all being within the city), their relative size, and the diversity of foods being sold there.

A1.4. Populations of Interest, Inclusion Criteria, and Sample Size

There were two main groups of participants in the study: consumers and vendors. **Consumers** was defined as those who shop in at least one target market, at least once a month on average, and have primary or shared responsibility for purchasing food for their household. **Vendors** was defined as those selling at least one focus food regularly in a target market (i.e., at least once a month).

Inclusion criteria for **consumers** were:

- Be over the age of 18
- Have primary or shared responsibility for purchasing food for their household
- Shop at a target market at least once per month
  - In Phase 1, this included only Central Market; in Phase 2, it also included Yaryara Market and Tsohon Kasuwa Market
- Not be a food vendor themselves (for Phase 2, this included reselling food in their local neighborhood, whereas that was not made explicit in Phase 1)
- Be able and willing to give informed consent
- For Phase 2 of the study, not have participated in Phase 1 or in the EatSafe cross-sectional survey
- For Phase 2 of the study, purchase both green leafy vegetables (GLV) and fish at least once a month

Inclusion criteria for **vendors** were:

- Be over the age of 18
- Sell at least one focus food regularly in a target market
  - In Phase 1, 'target market' included only Central Market; in Phase 2, it also included Yaryara Market and Tsohon Kasuwa Market)
  - In Phase 1, 'focus food' included all seven foods; in Phase 2, this included only two focus foods: green leafy vegetables (GLV) and fish
- Be able and willing to give informed consent
- For Phase 2 of the study, not have participated in Phase 1 or in the EatSafe cross-sectional survey

Exclusion criteria for **both groups** are:

- Being unable to give informed consent
- Not speaking English or Hausa

The sample size for Phase 1 was 13 vendors and 16 consumers. The sample size for Phase 2 was 24 vendors and 30 consumers. These sample sizes were determined based on the finding that data saturation on most topics tends to appear between 25 and 30 respondents; on topics of very high cultural consensus, it can be determined with as little as 20 respondents.

To ensure inclusion of a diverse range of consumers, quotas were set for the following characteristics: men, women, those under age 30, those over age 30. For each of those groups in Phase 1, we aimed to include at least 8 consumers (a consumer can be counted as contributing to more than one quota); in Phase 2, we aimed to include at least 10 male and 10 female consumers, and approximately half from each age group. In Phase 1, consumers were recruited only from Central Market; in Phase 2, consumers were recruited from each of Central Market, Yaryara Market, and Tsohon Kasuwa Market, with the aim of including 10 from each market, though this was adjusted due to inadequate numbers in the two smaller markets (Yaryara and Tsohon Kasuwa). In order to meet these quotas, one additional interview was conducted, which was included in the analysis for a Phase 2 sample size of 31 consumers.

For vendors, Phase 1 sampling included sellers who each sell each type of target food, with three vendors each for the foods thought to have the highest associated food safety risk (beef, fish, and leafy greens) and the other foods (soybean, maize, rice, cowpea) having just one vendor interviewee each. In Phase 2, as discussed below, the focus was one GLV and fish only, and we sought 12 vendors from each category. In Phase 1, vendors were recruited only from Central Market. In Phase 2, vendors were recruited from each of Central Market, Yaryara Market, and Tsohon Kasuwa Market, with the aim of including 8 from each market, though this was adjusted due to inadequate numbers in the two smaller markets (Yaryara and Tsohon Kasuwa). Where both female and male vendors were available, we intended to interview both female and male vendors; however, no female vendors were available for the majority of the commodities sold.

The market observations, which occurred only in Phase 1, covered all three target markets. Other components of the EatSafe primary research also included market observations; the specific purpose of those included within the FES was to provide general context for interpretation of the FES results.

All fieldwork was done through a local firm contracted for data collection, Ipsos Nigeria. Due to local cultural sensitivities, most interviewers and recruiters were women and all female interviewees were interviewed by female interviewers.

A1.5. Recruitment and Interviewee Selection Process

Vendors were selected through visits to the target market. All vendors seen to be selling at least one focus food were eligible for participation in the study. For vendors not selling any focus foods at the time of the market visit, they were asked whether they regularly sell any of them at that market; if responding affirmatively, they were considered eligible. During the visits, a member of the study team explained to eligible vendors the purpose of the study and what participation would entail. For those who agreed to participate, contact information and demographic data were collected. Interviewers then arranged to interview a subset of the vendors at a future day and time; while vendors were offered the opportunity to be interviewed at home, all preferred to be interviewed in the market, while working.

Consumers were recruited by observing consumers shopping and approaching them once they had purchased a focus food. Every potential consumer was asked if they regularly purchased foods at a target market and what foods they purchased. If they were regular purchasers, they were considered eligible. A member of the study team explained to each eligible consumer the purpose of the study and what participation would entail. For those who agreed to participate, contact information and demographic data were collected, and interviewers arranged to interview them at home at a future day and time.

In Phase 1, recruitment only focused on Central Market. In Phase 2, we used the same procedure as in Phase 1 but included the two markets not covered in Phase 1 (Yaryara Market and Tsohon Kasuwa Market). Consumers were recruited during the same market visits as vendors, which were spread over a total of six days for Phase 1 and 10 days for Phase 2). Initially, up to 50% more potential interviewees than needed were recruited; consumers and vendors to follow up with to interview were then selected from this larger-than-needed pool in line with the quotas noted above.

A1.6. Data Collection Techniques

In-person (face-to-face) interviews were be used to collect data from consumers and vendors. These interviews included a set of different techniques:

In-depth interviewing: In-depth, open-ended interviewing with probing was employed at key points in both Phase 1 and 2, based on the ethnographic interviewing technique described by Spradley (25). For select topics, interviewers were encouraged to use their discretion to depart from the semi-structured interview guides and pursue a respondent's comments or ideas in service of the overall module objective (which was included in training and in the module's written instructions to interviewers).

Semi-structured interviewing: Whereas the open-ended style requires the interviewer to decide in real-time how far to follow an informant's lead, the semi-structured approach is partially scripted, offering more guidance to the interviewer, while providing opportunities to loosen control at defined points in the interview. This semi-structured form of interviewing characterized the bulk of both Phase 1 and 2.

Cognitive mapping techniques - Free-listing, Rating and Ranking: These methods comprise a suite of systematic data collection techniques that are used in the FES following the recommendations of Weller and Romney (21). Used in series, these techniques are a way to elicit cultural domains and can also be helpful in avoiding monotony in an interview.

> *Free listing,* used primarily in Phase 1, is a simple task for both interviewers and key informants, in which informants were asked to name all the items in a defined domain (e.g., "all the foods that can generally be considered safe") and the answers were systematically recorded by the interviewer or an assistant. From the individual lists offered by informants, a composite list was developed. Items that were frequently cited and that also tended to be among the first cited by informants can be considered particularly salient.
>
> *Rating and ranking* were used in Phase 2. These activities were used to gain greater insight into participants' views and provide data that lend themselves readily to quantification. In the rating exercise, the respondent was presented with a list of items one by one, and asked to rate each of them on a Likert scale according to a series of attributes that have previously been identified by the study team (e.g., rating fresh catfish or cowpea along a scale from 'disagree strongly' to 'agree strongly' in terms of whether it can easily cause diarrhea or vomiting or is likely to contain chemicals). The items were illustrated with words on cards or photos, so that they could be placed physically by the respondent on a rating board (a piece of plastic or cardboard) divided into positions corresponding to a five-point Likert scale. The ranking exercise worked similarly, except that respondents were asked to rank the cards, relative to one another, along a scale. For example, the ranking of "reasons to buy from a specific vendor" asked consumers to rate reasons such as 'Vendor's food is usually priced lowest' and 'Vendor's stall and food is cleanest' along a scale from 'less important' to 'more important'.

Storytelling vignettes: In this technique, used in Phase 2, the respondent was shown an image with a basic 'story' behind it (in this case, about a man or woman going to the market and bringing back either high-quality or low-quality vegetables to his wife / her husband) and asked to speculate as to their dialogue and emotions (see images in Annex 2). This was used as an indirect way of generating information on the vocabulary and emotions relating to food quality/safety discussions in the domestic sphere.

Market Observation: In addition to the interviews, **a market observation** was carried out in each target market. The market observations sought to describe the overall layout of the market (i.e., where different types of foods are sold, where there are entrances and exits, where media are displayed) as well as the specific conditions in which vendors sell their foods, including access to water and sanitation infrastructure, space, proximity to other vendors, and physical set-up of stalls. This work helped to contextualize the data collected from vendors and consumers.

Information was recorded in two forms: field notes and audio recordings, which were then transcribed. Each interviewing team consisted of two members: an interviewer and a note-taker (who had also done the initial recruitment of the interviewee). All interviews took place in Hausa. During the interview, the note-taker's role was to take detailed notes, in English, recording closed-ended data like free lists and ratings as well as the main elements of the interviewees' response and notes on his/her body language and the context (e.g., interruptions, observers). After the interview, the audio recordings were transcribed verbatim into English and used for the analysis. The transcripts were reviewed by GAIN and the FES consultants for quality control, with any data quality issues raised with Ipsos for re-transcription. Demographic data was recorded by the recruiters at recruitment and then entered into a spreadsheet by data-entry personnel. For the market observations, notes were recorded alongside photos, where relevant.

A1.7. Determining the Scope of Phase 2

After Phase 1, rapid analysis was undertaken to identify key themes emerging from the Phase 1 results, including those topics that had been fully covered and those in need of additional probing. These preliminary results were discussed with the full EatSafe Nigeria project team via a video conference in late March, in order to make decisions about the focus of Phase 2.

Key decisions emerging from this discussion included exclusion of consumers who also re-sold food in their own neighborhood, after purchasing it from a market; greater focus on religion and its influence on food safety/hygiene behaviors; understanding more about vendor-vendor collaboration and communication and 'peer pressure'; understanding more about emotions and emotional motivations for consumer choices (i.e., satisfying one's family); understanding more about illness symptoms of foodborne illness, including desire to avoid and any non-food causes that are recognized; and examining environmental/cleanliness cues within the market. It was also decided to focus on only two key foods in Phase 2, in order to be able to examine them in more depth; these were chosen to be green leafy vegetables and fresh fish, based on USAID Nigeria priorities (for fresh fish) and desire to have a highly contrasting food with foodborne hazards likely associated with it.

Based on these decisions, the Phase 2 interview modules were drafted.

A1.8. Data Analysis Procedures

The interview data consisted of (i) demographic data, (ii) narrative data in the form of interview transcripts, and (iii) systematic data (free-lists, rankings, and ratings). The market observation data consisted of notes from the market observations.

Demographic data and the responses to other simple closed questions were tabulated in Excel and/or analyzed in Stata SE15. Text data from the interview transcripts was subjected to thematic analysis involving multiple passes to identify cultural themes (25) and elicit cultural domains (26). The data was analyzed by two researchers (J. Lee and S. Nordhagen) separately, each of whom focused on one set of respondents. Text data was analyzed either through hand-coding (J. Lee) or using the qualitative data software ATLAS.ti (S. Nordhagen). In both cases it used a process of grounded thematic coding followed by interpretation of that coding alongside comparison across multiple group characteristics such as gender; vendor/consumer; older/younger; and other distinctions emerging from the data. Analysis of free-list data used the approach to domain identification described by (21), using Visual Anthropac 4.9 software (Analytic Technologies) to assign salience ratings to each free-list item. Individual rating and ranking data were aggregated for analysis in Excel. Market observation notes were analyzed through synthesis and comparison across the three markets and triangulation with findings emerging from the interview transcripts.

Data analysis was iterative, with analysis of Phase 1 data beginning soon after collection began and running through the end of Phase 2 data analysis. Codes and themes were revisited and revised throughout the analysis process. Analysis is presented in the text by synthesizing results across all respondents as well as selecting quotations to illustrate either commonly held perspectives or interesting deviations from these; all quotations are presented verbatim from the transcript, aside from small corrections to correct typos and improve punctuation.

A1.9. Data Custody, Security, and Protection of Subject Confidentiality

All data collected in the study was treated with strict confidentiality throughout the study and beyond its duration, with identifier-linked data available only to study investigators. All analyses present results in a fashion that ensures no inadvertent exposure of individual identity. Names were collected only to ensure accountability of the data collection team and non-duplication in the data/interviewing; they were replaced with anonymous ID numbers for analysis.

Source data consisted of two forms: written field notes and audio recordings. Written field notes were scanned or typed into digital form, on a password-protected computer, and then backed up to a secure GAIN server. The audio data was transferred to password-protected Ipsos-managed computers. Transcripts created from the audio data were de-identified and backed up to a GAIN secure server. Access to all data was granted only to members of the research team. Any paper forms will be preserved for 2 years after the end of the research and then destroyed by shredding.

A1.10. Ethical Concerns: Consent, Risks, and Adverse Events

A process of signed informed consent (translated into Hausa) was used. The study objectives, procedures, and all associated potential risks and benefits were described to all participants, who had the opportunity to ask questions and determine whether they wanted to participate. They were also be offered the option of not answering any questions. Subjects participating in the study were exposed to no greater than minimal risks, not exceeding those accompanying a normal interview. Interviews were conducted in a private space, to preserve confidentiality. In terms of benefits, all participants received compensation for their time, in the form of a local fabric. The protocol and tools were reviewed and approved on 15 December 2020 by the National Health Research Ethics Committee (NHREC) of Nigeria, Protocol Number NHREC/01/01/2007-26/11/2020. No problems or adverse events occurred in connection with this study.

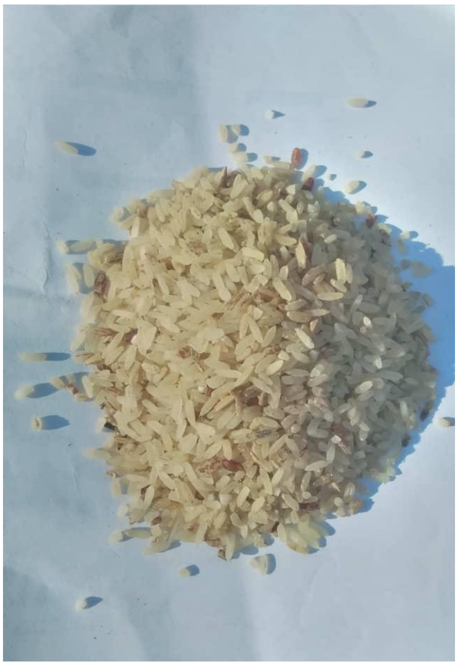
The research took place in the context of the COVID-19 pandemic. As such, methods were adjusted to protect the safety of the research staff and participants. This was done in compliance with the requirements of the IRB and informed by best practices emerging from studies in Nigeria and elsewhere. This included: both interviewer and interviewee using hand sanitizer before the interview, both wearing masks throughout the interview, holding interviews in the open air where possible, and ensuring social distancing between interviewer and interviewee. All research travel and training activities were also be carried out in line with local COVID-19-related restrictions.

9.2. ANNEX 2. EXAMPLE IMAGES FROM INTERVIEW GUIDE

A2.1. Commodity Catalogue

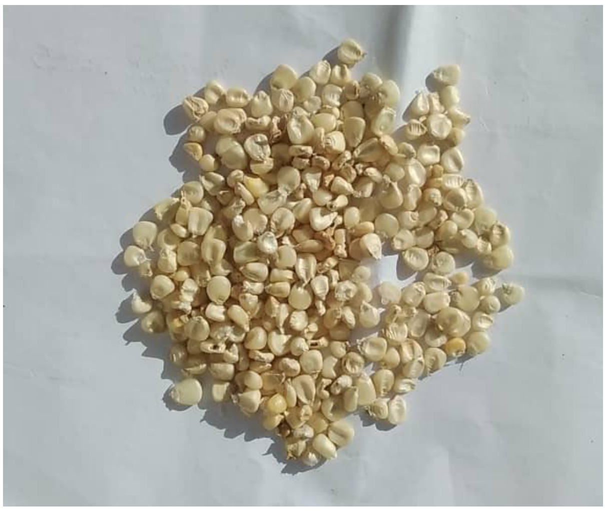
The below provide the focus food images used in the different interview exercises. All are from photos taken at Birnin Kebbi Central Market or of food purchased at that market.

Rice (local, 'Baiggila')



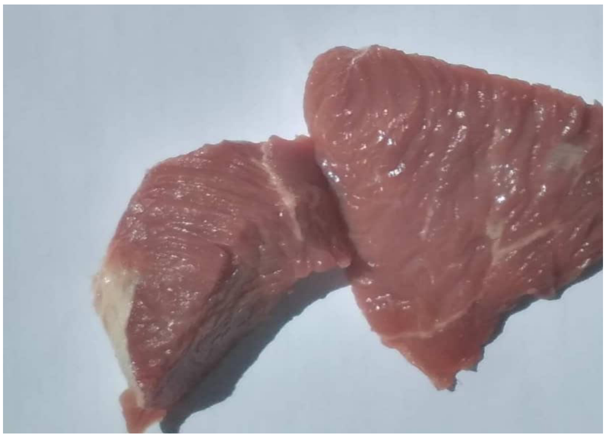
'White beans' (Cowpea; dried, whole)

Maize (whole kernels)

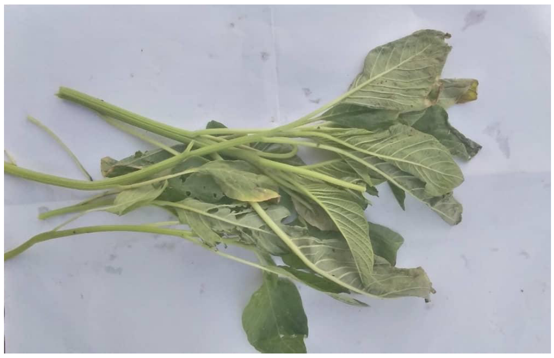


Soybean (dried, whole)

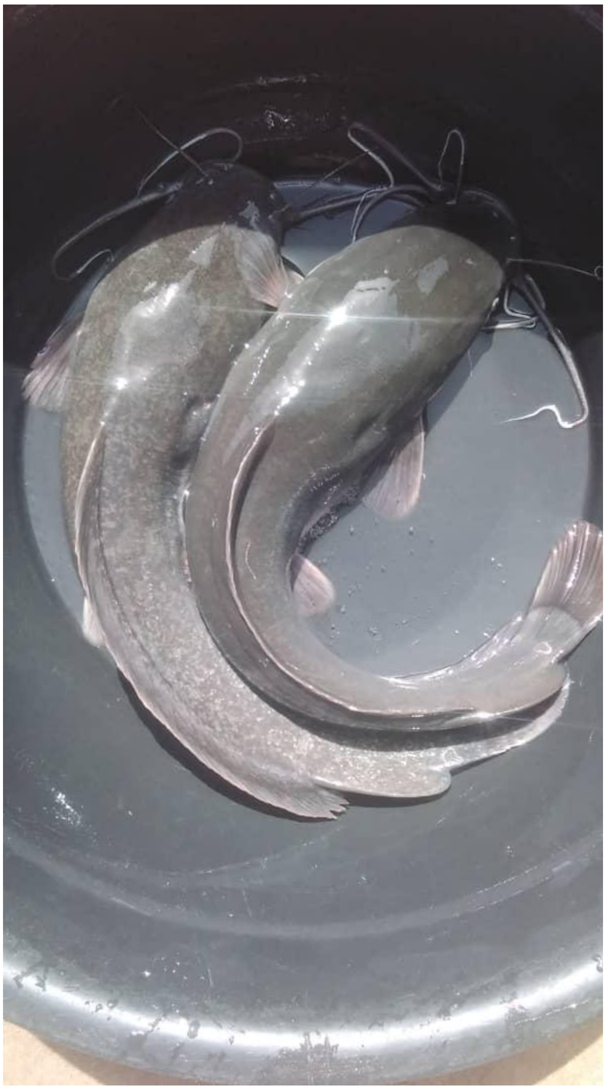
Fresh beef



Alleyaho ('green')

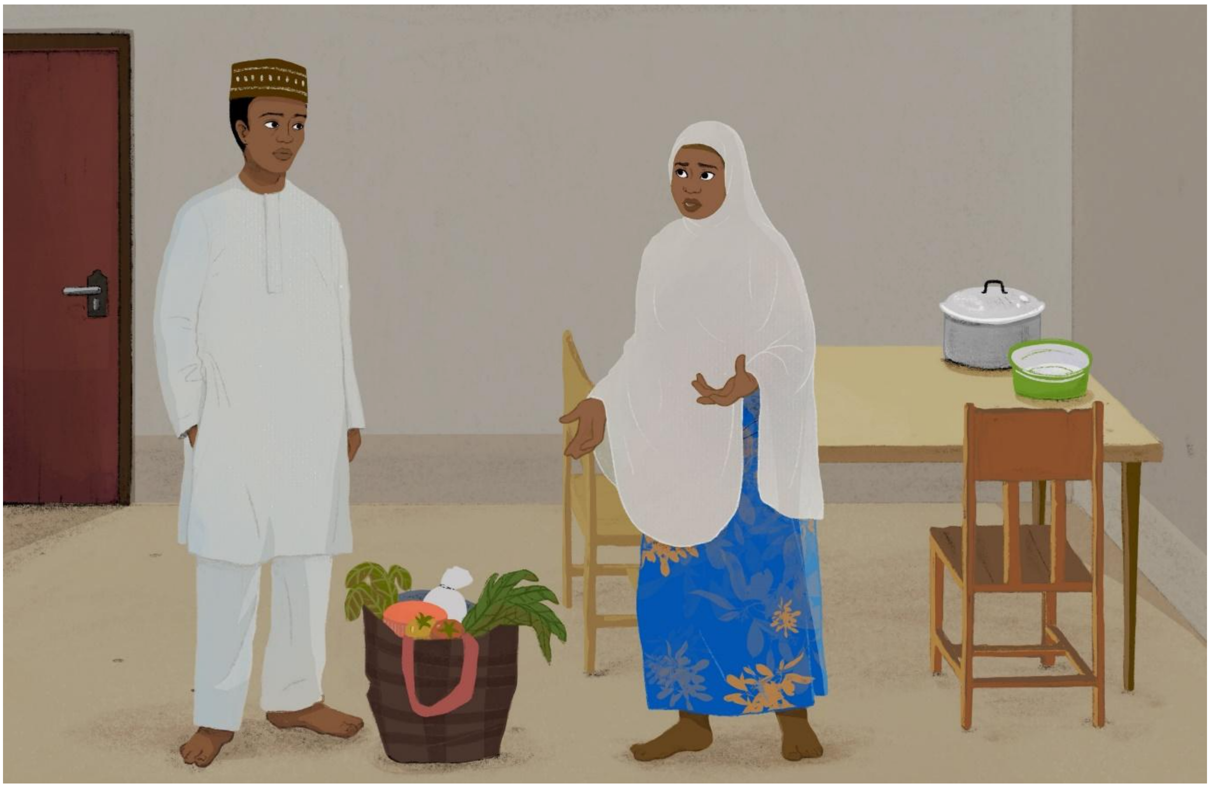


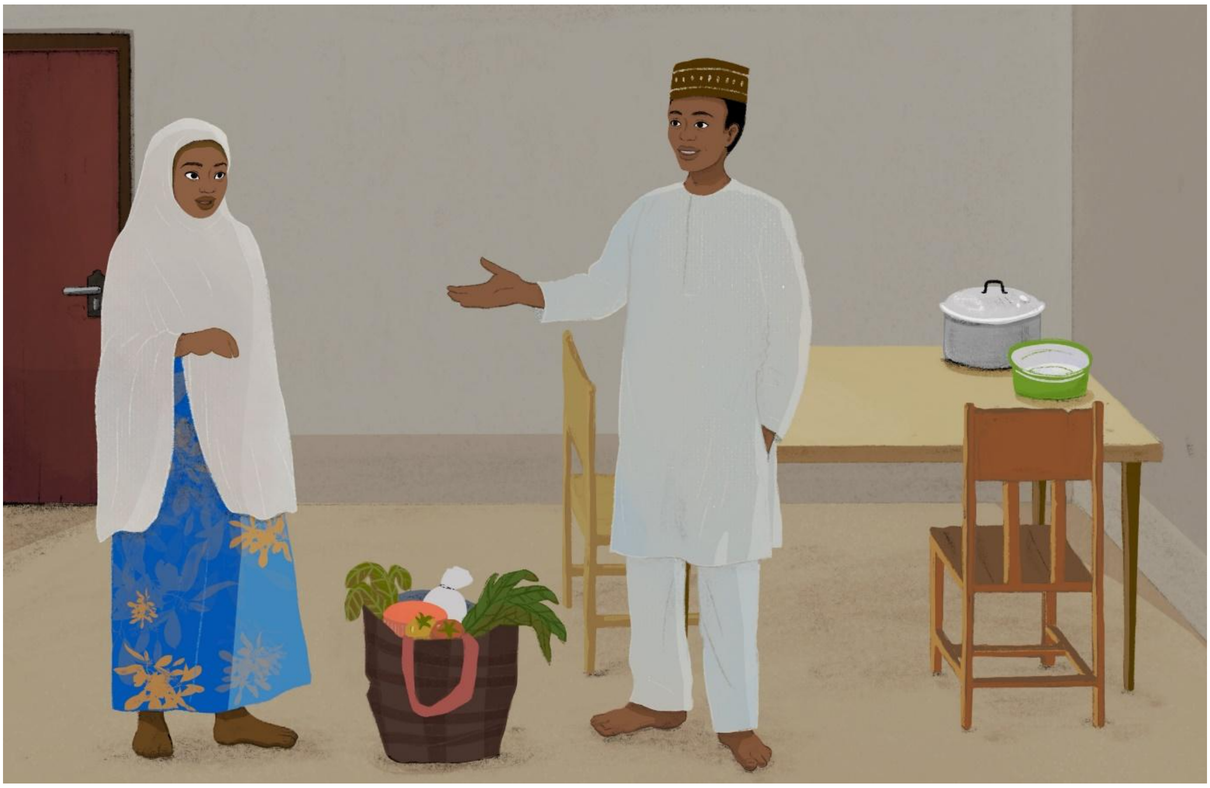
Catfish (live)



A2.2. Vignettes

Example prompt for storytelling questions, showing couple discussing vegetables that are not good quality, brought by the husband (top) and those that are, brought by the wife (bottom)





9.3. ANNEX 3. MARKET OBSERVATION RESULTS

A3.1. Market Structure and Facilities

Central Market is Birnin Kebbi's main market, established in 2001, and is considerably larger than the other two markets, with considerably more sophisticated infrastructure. It is surrounded by solid walls and has clear entrances (which also serve as exits): four large double gates of metal bars and 20 smaller ones (simple doors in the concrete walls). Adjacent to the main gate is a police station, and a motor park (public transport hub) is also nearby, particularly to bring consumers and vendors to and from nearby villages. Central Market also includes a market administration block. Central Market is mostly made of official shops/stalls built by the government, which have proper roofing and built-in concrete or wooden tables; about 80% of the market has concrete flooring. (See the table below for a summary of the main market characteristics).

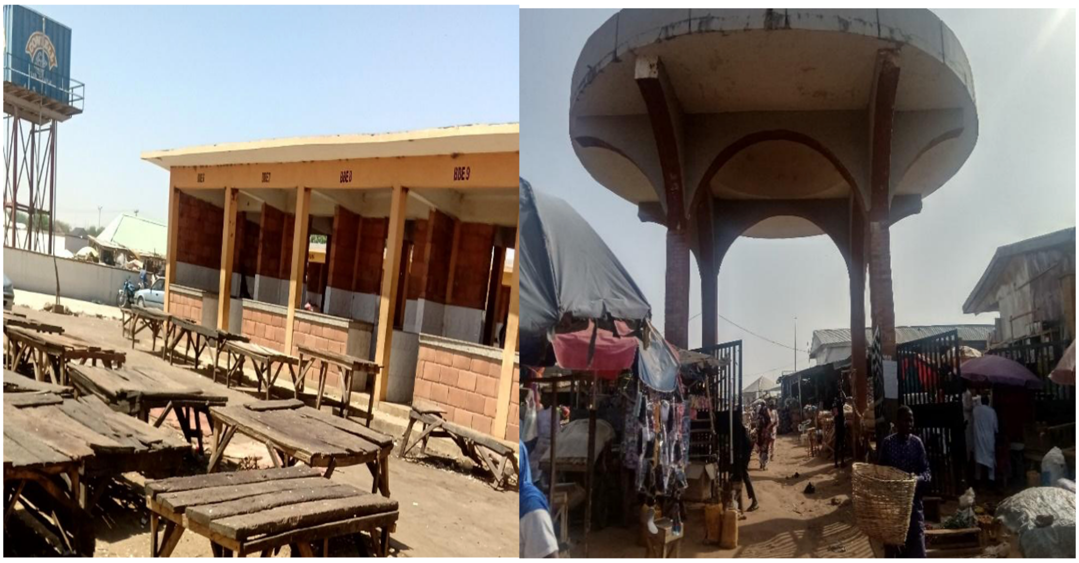
Tsohon Kasuwa Market, also established in 2001, is a smaller open market in a largely residential area, next to an Islamic secondary school. The wall of the school forms the back wall of the market; it does not have walls on the other sides. It has three entrances/exits and is comprised of individual stalls. Most of these have metal roofs, though others are thatched, and some are covered with worn-out umbrellas; vendors have wooden benches or chairs to sit on in their stalls. The market floor is not paved but rather made of earth.

Yaryara Market is the smallest and oldest of the three markets, with the least developed infrastructure; it is surrounded by a mixed residential and commercial area, plus a police station. Behind the market is an area for dumping trash, and an area along its side sells carpentry materials. It has a dirt floor and only one entrance/exit. There are individual roofs on some of the stalls, but others (especially rice sellers) sit under the sun; vendors use wooden tables to display their products.

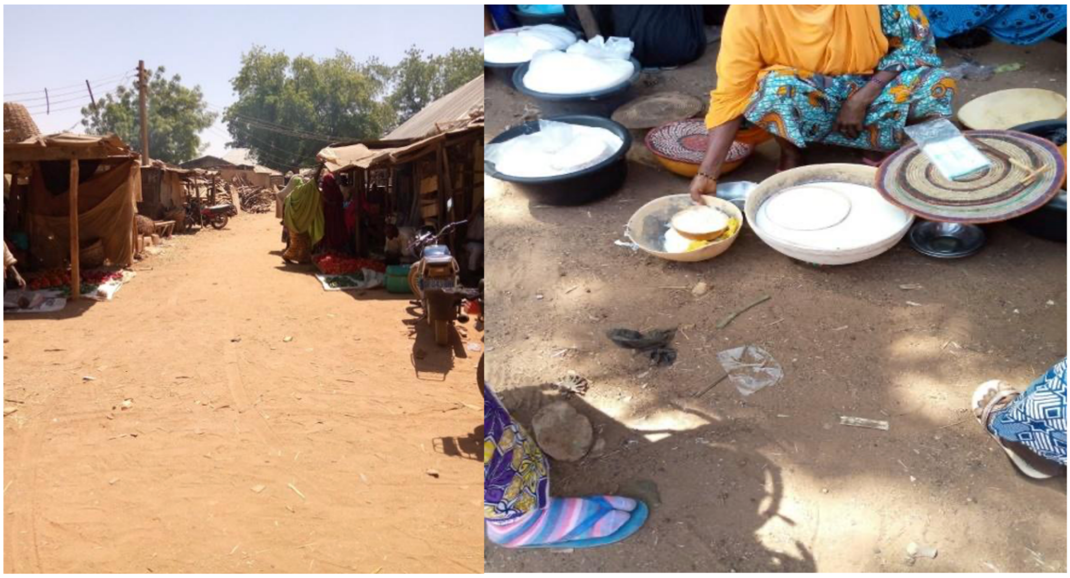
Main Market Characteristics

MARKET	ESTIMATED (EST.) SIZE	EST. NUMBER OF VENDORS	TOILET FACILITIES?	WATER FACILITIES?	GARBAGE FACILITIES?
Central	3,800 m^2	About 1875; almost 90% male	Yes (commercial and public)	Yes	No
Tsohon	500 m^2	About 200; about 80% male	No	No	No
Yaryara	420 m^2	About 13; <50% female (all teenagers selling rice)	No, but an incomplete building is used for urinating	No	No

All three markets have informal mobile sellers clustered outside the main market area selling either food (e.g., vegetables, fruit, milk, rice, and ready-to-eat snacks like cornmeal balls and millet in yoghurt) or non-food items (e.g., pesticides / insecticides). These food vendors are largely exposed to the elements (e.g., sun, dust, road pollution). Central Market also has mobile food/snack vendors wandering the market, in addition to those at established stalls/tables, and Tsohon Kasuwa market had some mobile water sachet vendors. All three markets operate daily and sell non-food items in addition to food, such as recycled wood, straw, metal roofing, animal feed, charcoal, polythene bags, clothing, electronics, and household appliances/tools. At Central Market, there are numerous signs advertising products and services, but no visible marketing media were reported at the other two markets. See below images from the three markets.



Birnin Kebbi Central Market
Left: formal government-constructed stalls (back) and vendor-provided tables (front); Right: Main market entrance gate

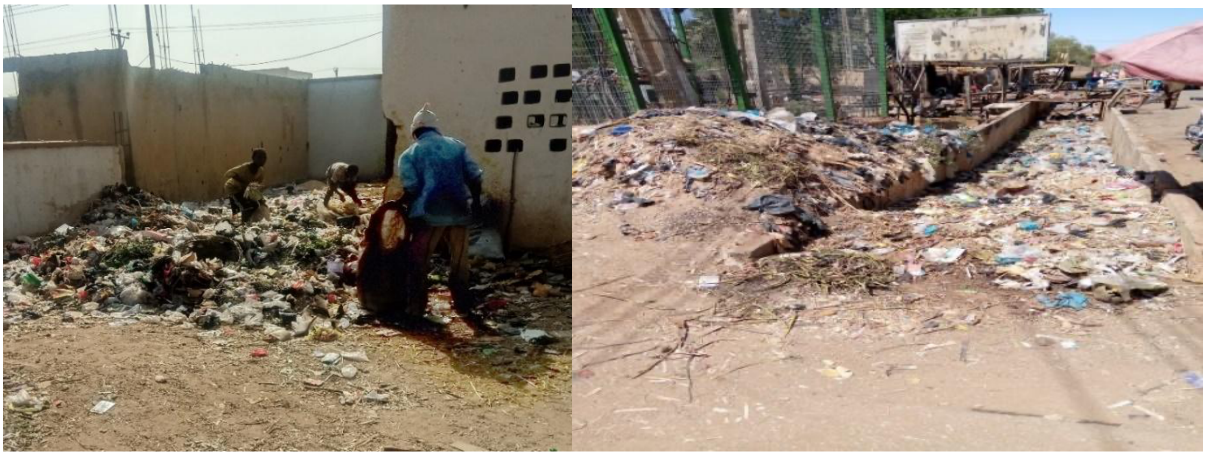


Tsohon Kasuwa Market
Left: main stalls; Right: an informal vendor of milk/yogurt and 'fura', a ready-to-eat snack made from millet

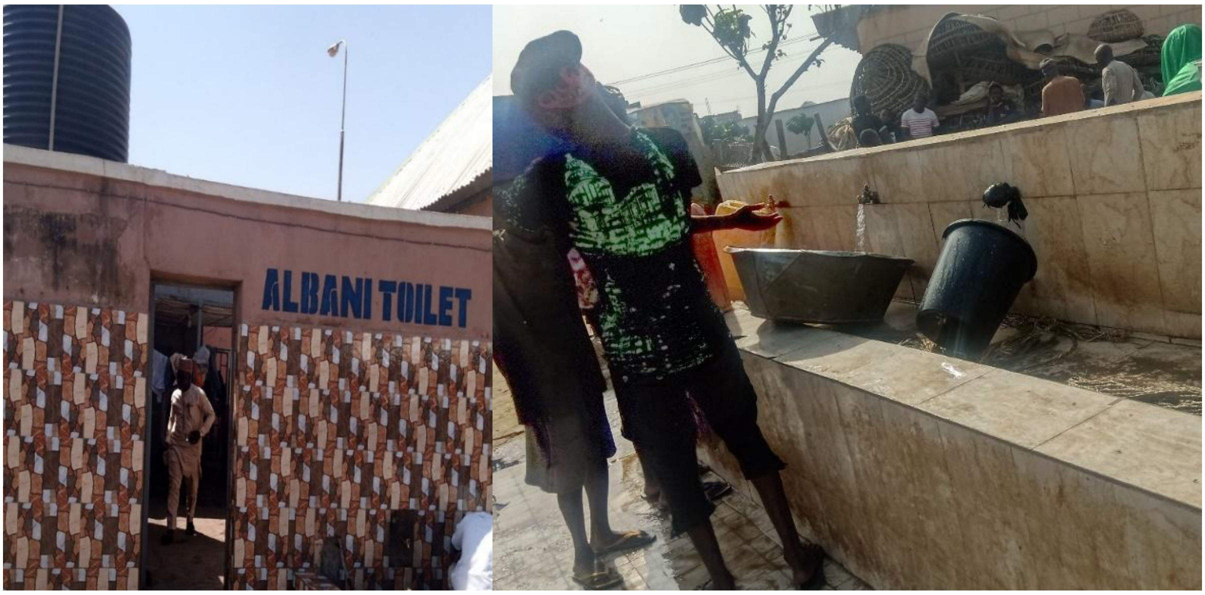
Yaryara market
Left: market stalls; Right: mobile vendors selling cooked moringa, and 'bula'

None of the three markets have well organized, enclosed non-human waste disposal facilities; instead, there is an area for garbage to be dumped (see Fig 4). In the case of Central Market, this is owned/managed by the market authority. In the case of Yaryara, it is for both nearby residents' and vendors' use and is burned off occasionally. None of these areas appeared well maintained or tidy.

Central Market has toilet facilities, which appeared to be fairly clean and well-functioning, made of tile and concrete; running water is available, as is soap (see Fig. 5). The other markets are both lacking toilets and water, though Tsohon Kasuwa has a non-functional water tank from a previously abandoned water project and Yaryara has an empty, half-finished building used for urinating. Tsohon Kasuwa was reported to appear relatively clean, but with a "strong smell of rotten foodstuff." Yaryara was noted to be generally unclean, due to the sandy ground, dirt being blown around, litter, hovering flies, and "a strong whiff of decaying fish in the air."



Left: Waste disposal facilities at Central Market; Right: Tsohon Kasuwa market

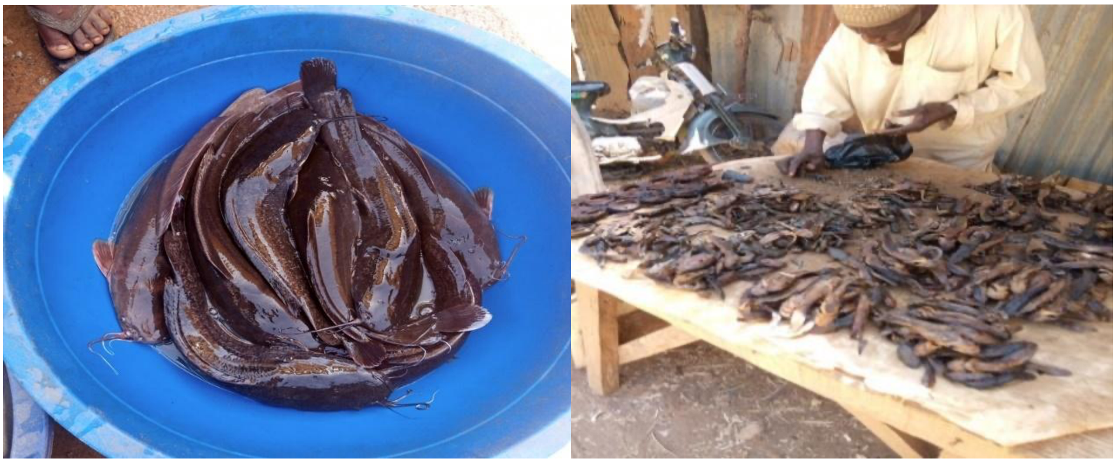


Left: Toilet; Right: Washing facilities at Birnin Kebbi Central Market

A3.2. Vending

Central Market is clearly divided into different sections for different types of products; in particular, meat and fish are sold in separate areas of the market, away from other foods. The other two markets are not formally divided into different parts, though it was noted at Yaryara that the rice vendors (many of whom sold from bins/buckets on the ground as opposed to stalls) were in another area from the other vendors. In all of the markets, vendors usually do not share stalls, but this was occasionally reported in Tsohon Kasuwa.

At Central Market, there are a fairly small number of fish sellers (estimated at 1% of the total), all of whom sell only fish and nearly all of whom are men (some women sell frozen, imported fish); fish are sold as whole live fish, dried, and fried ready-to-eat. After purchase, some processing (i.e., gutting, cleaning, fileting) takes place on site if the consumer requests it. At Tsohon Kasuwa market, the five male sellers of fish sold it either smoked (2) or fried ready-to-eat (3); as at Central Market, there are fish sellers who sell live fish and those that sell smoked fish. Fresh fish is not sold in Yaryara market but is brought to be smoked there and then sold; the only fish vendor present during the visit was a man selling smoked fish.



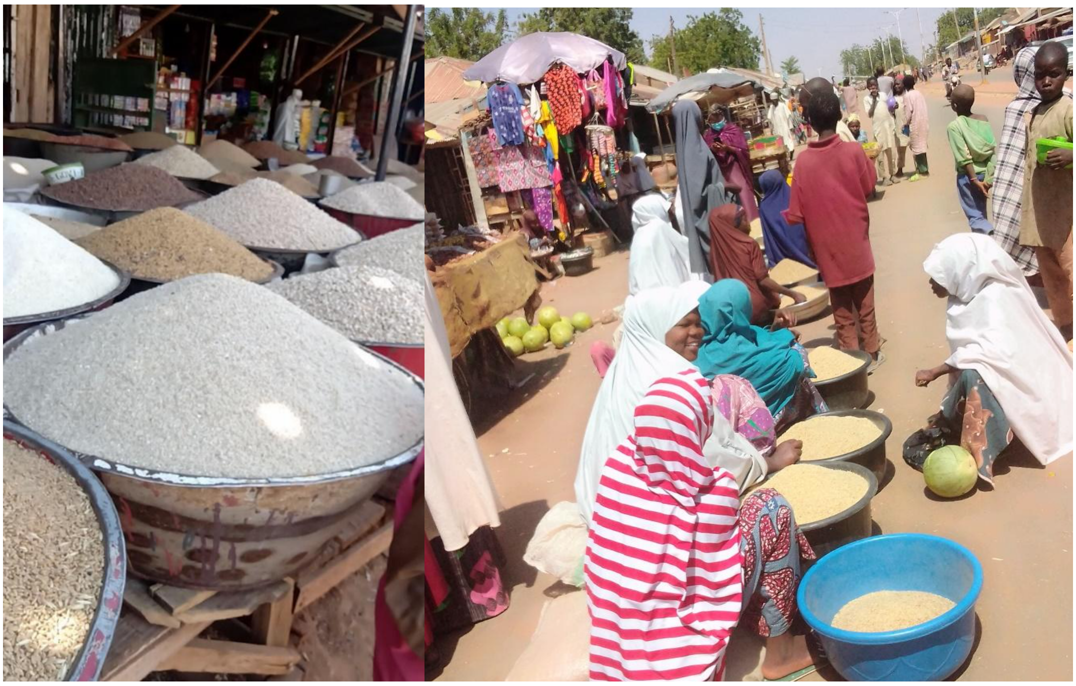
Live catfish for sale at Central Market; (R) smoked fish on sale at Tsohon Kasuwa market

It was estimated that about 5% of Central Market sellers sold beef, all of whom were men and only sold it in raw forms; again, no processing happened on site. The same was true for the two male beef sellers at Tsohon Kasuwa. Only one beef seller (male) was reported at Yaryara Market, but he was absent on the day of the visit. Aside from the live fish and (at Yaryara) live chickens, no live animals or whole animal carcasses were sold at any of the markets.

Leafy green sellers were less common than beef sellers at Central Market but more common than fish sellers; all were men, sold unprocessed forms of leafy greens, and no ready-to-eat products. Some, however, sold other vegetables alongside leafy greens (including tomatoes and peppers). At Tsohon Kasuwa and Yaryara, there were seven and two leafy green vegetable vendors, respectively; all were men, and they commonly also sold other vegetables (e.g., tomatoes, lettuce, spring onions, peppers, and okra) but not prepared or ready-to-eat foods.

In contrast to the other commodities examined, maize, cowpea, rice, and soybeans were commonly sold in the markets alongside one another and alongside other grains or legumes (e.g., millet, sorghum, and groundnut). Maize, cowpea, and soybean sellers (i.e., mixed grain and legume sellers) were fairly common in Tsohon Kasuwa and Central Market, and nearly all were men. Maize was sold primarily in whole kernels and much less commonly as maize flour, with the flour being more often sold by women; it was reported that most consumers buy whole kernels and then process their own flour. Cowpea and soybean were only sold in whole, dried forms. The vendors of these grains/legumes did not sell any ready-to-eat foods made with these grains. There were no sellers of cowpea or soybean at Yaryara Market.

Also, unlike the other commodities, rice was commonly sold by women: in Central Market, for example, it was estimated that about 65% of rice sellers were women, many of whom were teenage girls. Many of these female rice sellers only sold rice (whereas the multi-grain/legume sellers were mostly men). The female rice sellers would typically either buy a small quantity of rice directly from a farmer or take it from their family farm, then process (i.e., dehusk and parboil) it themselves to sell at the market; most male rice sellers, in contrast, buy a large quantity of rice either pre-processed from local processing companies or from farmers, employ people to process it, and later sell it in the market.



Left: Diverse grains and legumes sold by the same seller in Central Market; Right: Teenage girls selling rice at Yaryara market

As shown in the table below, there was a fairly clear gender division among vendors in terms of the food products sold at the markets. Overall, men were dominant for all EatSafe focus foods aside from rice, which teenage girls commonly sold in addition to men. For green leafy vegetables, there was some variation, with women selling *ugu* (*Telfairia occidentalis*) and bitter leaf (*Vernonia amygdalina*) in Central Market but not *Amaranthus spp.* (commonly called 'green', or 'allayaho' in hausa), the vegetable that was focused on for the FES. It was noted that, in Central Market, most of the female sellers of other GLV were from outside of Kebbi state (though now residing there).

Gender breakdown of foods sold in markets

FOOD SOLD MOSTLY BY MEN	FOODS SOLD MOSTLY BY WOMEN	FOODS SOLD EQUALLY BY MEN AND WOMEN
Beef, chicken, and other meat Fresh fish, including catfish Dry / fried fish (TK); smoked fish (Y) Grains other than rice (e.g., maize, millet, sorghum) (TK, CM) Legumes (cowpea, soybean, groundnut) Fruit Leafy greens (e.g., amaranth, sorrel, 'green', lettuce) Most other vegetables (e.g., tomato, onion, peppers) Spices (TK) Cooking oil (TK)	Crayfish, Stock fish (CM) Maize flour; maize 'swallow' (ground and cooked maize meal) Rice (Y) Grains other than rice (Y) Certain cooking ingredients (e.g., *egusi* Melon, Locust beans) (CM) Certain green leafy vegetables – e.g., *ugu*, Bitter leaf, moringa (CM) Local milk and dairy products Ready-to-eat snacks (e.g., *fura da nono*) (TK)	Rice (men: local or imported, sold alongside other grains/legumes; teenage girls: mostly local, sold alone)Palm oil (CM)

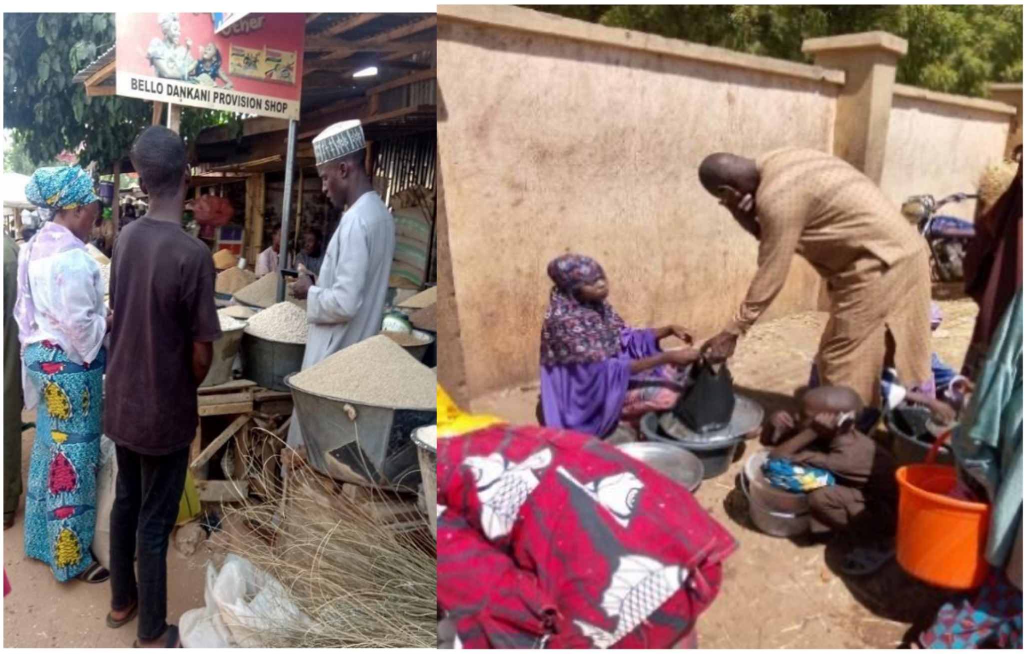
NOTE: Goods noted as differing across markets are noted with a TK, CM, or Y for the market at which they were noted (Tsohon Kasuwa, Central Market, or Yaryara, respectively). Non-food products noted as sold by men includes kola, electronics, textiles, appliance and tools, and wood; women were noted as selling kitchen implements and women's clothes.

A3.3. Consumer Interactions

In Central Market and Tsohon Kasuwa, it was noted that the vendors communicate regularly with one another and with customers, including calling out to attract customers to their products. In Yaryara Market, it was noted that the female teenage rice vendors were chatting with one another and actively calling out for customers' attention to their rice, while the male vendors were more silently waiting for clients and concentrating on their business. In all three markets, most customers shopped alone. At all three markets, it was observed that while most shoppers seemed to seek out a specific vendor and specific goods, some wandered around the market seeking their goods. Most shoppers were reported to buy multiple food items from the same vendor if the needed items were available at that stall but more commonly to go to multiple vendors to get the different goods they needed.

None of the markets have prices routinely displayed for products; instead, the price is communicated by the vendor to the client and may be bargained over. Most shoppers haggle over prices with the vendors, particularly true for female shoppers. Indeed, at Tsohon Kasuwa, women shoppers were noted to visit multiple vendors while comparing the prices and bargain heavily, whereas men shoppers would commonly just point at the item they want to buy (or say it) and pay the amount quoted by the vendor. Most observed transactions between vendors and shoppers were said to be 'quick and business-like.'

The clientele of Central Market was reported to be mostly middle-aged to older, middle-class, and including both men and women but with a majority of men (estimated at about 85%). At Tsohon Kasuwa, it was also reported that most shoppers appeared to be natives of Kebbi state and were men, with some teenage girls and boys; only about 10% of shoppers were female. At Yaryara, in contrast, most shoppers were women, whom observers described as mostly lower-class teenagers likely living in the area around the market. The few male shoppers were also described as lower-class teenagers. In Yaryara and Tsohon Kasuwa markets, most customers were reported to be locals, from nearby, but some customers at Central Market came from further away (e.g., outlying villages).



Left: A seller of grains and legumes discusses with a female client at Central Market; Right: Male shopper at Tsohon Kasuwa, who 'pays no close attention' to his purchase while making a phone call.

9.4. ANNEX 4. RATING AND RANKING EXERCISE RESULTS

The two tables below display the results of the food rating exercise along four dimensions. For each food, the number of people giving it each rating along the 1-5 (strongly disagree to strongly agree) scale is shown, with darker green shading indicating more people providing that rating. The average score across all participants is given in the last column; those greater than three should be interpreted as general agreement, while those below three as general disagreement.

Rating Results for First Two Rating Dimensions

It is difficult to obtain consistent quality						
	Strongly Disagree				**Strongly Agree**	**Average**
	1	**2**	**3**	**4**	**5**	
Tilapia	16	4	2	2	7	2.35
Cowpea	15	5	3	4	4	2.26
Alleyaho	19	1	1	5	5	2.23
Maize	17	5	3	1	5	2.10
Rice	18	4	1	4	4	2.10
Catfish	18	5	2	2	4	2.00
Moringa	22	0	2	5	2	1.87
Beef	21	2	2	4	2	1.84
Instant noodles (Indomie)	23	1	3	1	3	1.71
It can easily cause diarrhea or vomiting						
	1	**2**	**3**	**4**	**5**	
Cowpea	10	0	2	4	15	3.45
Alleyaho	9	2	2	5	13	3.35
Beef	14	3	1	6	7	2.65
Instant noodles (Indomie)	17	1	3	1	9	2.48
Catfish	18	0	3	1	9	2.45
Tilapia	20	1	2	4	4	2.06
Moringa	21	1	3	0	6	2.00
Rice	22	2	2	2	3	1.77
Maize	25	1	2	0	3	1.55

Note: the relatively poor rating for tilapia on the ‘quality’ dimension related partly to inconsistent availability altogether (i.e., they were not always sold) as opposed to consistent availability with inconsistent quality.

Rating Results for Second Two Rating Dimensions

It is likely to contain chemicals						
	1	**2**	**3**	**4**	**5**	
Cowpea	2	0	1	3	25	4.58
Maize	9	0	2	5	15	3.55
Alleyaho	11	0	4	3	13	3.23
Instant noodles (Indomie)	9	4	4	2	12	3.13
Rice	15	2	0	3	11	2.77
Moringa	15	3	1	2	10	2.65
Catfish	17	1	3	1	9	2.48
Tilapia	19	0	3	3	6	2.26
Beef	24	0	1	0	6	1.84
It is usually safe						
	1	**2**	**3**	**4**	**5**	
Catfish	1	1	0	4	25	4.65
Tilapia	1	1	1	4	24	4.58
Moringa	1	0	3	3	24	4.58
Rice	0	1	4	5	20	4.47
Maize	2	2	1	6	20	4.29
Instant noodles (Indomie)	3	0	3	4	21	4.29
Alleyaho	2	1	2	8	18	4.25
Beef	2	2	6	5	16	4.00
Cowpea	3	4	3	8	13	3.77

The two tables below display the results of the ranking exercise. Consumers were asked to rank, from most important (5) to least important (1) five ways in which vendors could attract consumers. The average score across all participants is given in the second column, followed by the number of respondents ranking that trait as least and most important. It is important to keep in mind that this exercise took place after foodborne disease and food safety had already been discussed in the interview, perhaps biasing respondents towards rating ‘cleanliness’ highly.

Results of Ranking Exercise for Traits Vendors Can use to Attract Customers, Phase 2

TRAIT	AVG. RANKING	NO. RATING AS LEAST IMPORTANT	NO. RANKING AS MOST IMPORTANT
Vendor allows purchase on credit	1.710	17	0
Vendor’s food looks tasty	2.323	11	2
Vendor is patient with shoppers	2.903	2	1
Vendor’s food is usually priced lowest	3.323	1	4
Vendor’s stall and food is cleanest	4.742	0	24
N	**31**		

Note: One reason for ‘tasty’ not being important is because many felt it was an aspect that emerged with cooking (i.e., cooking made food tasty), not the raw food.

9.5. ANNEX 5. ADDITIONAL FREE LISTING RESULTS

The below tables include analyses from two free listing exercises used in Phase 2: foods that can cause diarrhea and vomiting, and diseases that have diarrhea and vomiting as symptoms.

Results of Free-Listing for 'Foods that Can Cause Diarrhea and Vomiting'

FOOD	FREQUENCY	AVG. RANK	SALIENCE
Vegetable	51.6	2.38	0.362
Beans	51.6	1.94	0.389
Mango	16.1	2	0.128
Soybean cake	12.9	3.5	0.043
Rice	12.9	1.25	0.118
Meat	12.9	1.75	0.097
Okra	9.7	3.67	0.048
Moi-moi	9.7	1.33	0.086
Fish	9.7	2.67	0.054
Jute	6.5	2.5	0.035
Indomie	6.5	2	0.04
Potatoes	6.5	2.5	0.027
Maize	6.5	3.5	0.029
Pepper	6.5	1.5	0.048
Egg	6.5	1	0.065
Fruit	6.5	3	0.027
N	**31**		

Note: items named only once are omitted. 'GLV' includes alleyaho as well as 'leafy greens' or similar and 'vegetables' not otherwise specified. Those foods in bold also appeared in the top ten foods named as being potentially unsafe.

Results of Free-Listing for 'Diseases that Can Cause Diarrhea and Vomiting'

FOOD	FREQUENCY	AVG. RANK	SALIENCE
Malaria	74.2	1.96	0.535
Typhoid	48.4	2.87	0.235
Stomachache	45.2	1.79	0.352
Cholera	41.9	2.08	0.28
Fever	35.5	2.27	0.218
Stomach upset	19.4	1.67	0.153
Ulcer	9.7	3.67	0.044
N	**31**		

Note: items named only once are omitted.