SUMMARY OF FINDINGS: MARKET RESEARCH REPORT

Understanding Consumer Demand for Nutritious Food in Nyanza District, Rwanda

June 2016

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Summary of Findings:
Market Research Report

Understanding Consumer Demand for Nutritious Food in Nyanza District, Rwanda

A Summary of Marketing Insights from Consumer Interviews
Nov 2015 - Jan 2016

Global Alliance for Improved Nutrition (GAIN)

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ABBREVIATIONS AND ACRONYMS

CHW	Community Health Worker
FES	Focused Ethnographic Study
IYC	Infant and Young Child
MNF	Marketplace for Nutritious Foods, Rwanda
QC/QA	Quality Control/Quality Assurance

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1. Introduction

This summary report presents outcomes from market research interviews conducted with consumers in Nyanza District on behalf of the Marketplace for Nutritious Foods, Rwanda from December 2015 to January 2016. The Marketplace for Nutritious Foods intends to support Rwandan businesses to accelerate their capacity for production and marketing of nutritious foods. The objective of the Nyanza consumer interviews was to complement GAIN's landscaping of the business environment with information on demand-side aspects of the food system – including what foods people are buying, where they are buying them, and what the important factors governing food purchases appear to be.

1.1 Market Research Methodology: For this market research we chose to model our approach partly on a method that has been used by GAIN elsewhere to investigate child feeding behaviours and attitudes, the Focused Ethnographic Study, or FES [Pelto et al 2013; Pelto and Armar-Klemesu 2014]. This involves extended (typically about 3 hour) interviews with a small sample of informants. FES interviews are normally conducted in 2 phases: in the first phase key informants are consulted on a range of questions, including typical feeding behaviours, challenges, the range of foods available, and the way they are prepared and consumed. A second phase then documents actual consumption and attitudes towards a specific list of foods through the prism of select "dimensions" such as food availability, affordability, or healthiness. The power and relevance of phase 2 interviews is sharpened because they are designed around the concerns, behaviours and vocabularies revealed in phase 1.

For our market research interviews, this two-stage methodology was preserved. However, the need to capture respondents' opinions and behaviours as consumers (and not only as mothers or caregivers) and also to produce results quickly to inform the MNF project launch required modifications to the FES methodology, which was shortened and altered in several ways. Phase 1 interviews -- normally performed, recorded and transcribed before being analysed remotely -- were instead analysed in the field daily, without audio recording, based on handwritten notes, allowing phase 2 to commence sooner. And whereas phase 1 interviews are normally restricted to individual key informants, the Nyanza interviews commenced with several focus groups, which allowed a broad picture to be rapidly established before follow-up interviews were arranged with individual key informants. For phase 2, modifications included more in-depth questions on the sourcing of foods, covering opinions about types of vendor, and the procurement of foods secured direct from farmers. Interview topics that we drew from the FES included a 24-hour recall of foods consumed by children; a 7-day recall of foods consumed by the family; and a rating task in which respondents are asked to rate a series of food items on 5-point scale according to specific attributes or "dimensions." The dimensions we employed in our consumer interviews included ones usually used in the FES including *cost*/*affordability*, *availability*, and

healthiness, as well as novel ones identified during key informant interviews, including *safety* and *authenticity*.

1.2 Consumer Sampling Criteria: Nyanza District was selected as the location for the consumer interviews because most of the district has been classified as highly reliant on markets, while at the same time most of the district falls in the middle range on the scale of food insecurity (Government of Rwanda 2012). Sampling was originally intended to encompass only residents of peri-urban Nyanza, on the assumption that this setting would best represent consumers who were participating in the formal economy, but were nevertheless not so wealthy as to be unrepresentative of Rwanda's largely rural population. However this sample was broadened after initial key informant interviews to include a balance of urban dwellers when it became clear that the peri-urban group were purchasing very little of their food from Nyanza's formal sector shops. The final sample consisted of 27 informants in total. 12 interviewees were located in Mukingo Sector (peri-urban) and 15 in Busasamana Sector (urban).

To be selected for interviews respondents needed to meet 2 criteria. First, they had to be caregivers to children between 6 and 59 months old – i.e., children of pre-school age. Second, respondents needed to be from households in either category 3 or category 4 of Rwanda's *Ubudehe* system of social classification. These higher SES households were selected in the expectation that they would help GAIN to understand the role that value-added products play for consumers with some disposable income who might provide an entry point for businesses wishing to introduce more nutritious products on the market. *Ubudehe* category 4 encompasses a particularly wide range of social economic situations, and although it includes genuinely wealthy households, it is also includes all civil servants – itself a diverse group that includes many salaried workers of modest income (see Table 1.1, *ubudehe* classification criteria). 17 of 27 respondents were from *ubudehe* category 3, of whom 10 were urban residents and 10 peri-urban. 10 of 27 were from *ubudehe* category 4, five of whom were urban and five peri-urban residents.

Category 1	Families who do not own a house and can hardly afford basic needs.
Category 2	Those who have a dwelling of their own or are able to rent one but rarely get full time jobs.
Category 3	Those who have a job and farmers who go beyond subsistence farming to produce a surplus which can be sold. The latter also includes those with small and medium enterprises who can provide employment to dozens of people.
Category 4	Salaried public servants, those who own large-scale business, individuals working with international organisations and industries

Table 1.1: Ubudehe Classification Criteria

Sample selection was done with the help of government health workers, who were familiar with the *ubudehe* classification of families in their sector. The interviewer was directed by the health worker to households in categories 3 and 4 who also had children who fit the age

criteria. In each sector, an element of snowball sampling was also employed, with respondents suggesting the names of friends or neighbours who might be take the 3 hours necessary to complete the interview when individuals identified by the health worker were unwilling or unavailable to be interviewed. The respondent occupation data suggest that there was an element of bias related to this. With interviews occurring over the school break, and in the vicinity of several schools, the number of teachers in the sample (8 of 27) is large and the education levels of the urban sample are high, with 8 of 15 educated to university level. Once the high educational attainment of the urban sample became clear, the research team discussed whether to re-interview a group of less educated urban residents instead; however, in light of certain characteristics of the initial sample it was decided not to make alteration. A preliminary review of the interview data indicated that the opinions and consumption of this group showed some surprising features considering its high educational attainment. Essentially (as we discuss below) they did not appear to have established a separate, aspirational style of urban consumption, and as this became apparent it was deemed important to capture this.

Occupation	**Peri-urban**	**Urban**	**Total**
Accountant		1	1
Business owner	1	3	4
Farmer	6		6
Farmer plus other activities		2	2
Hairdresser	1		1
Librarian		2	2
Teacher	3	5	8
University lecturer		1	1
Veterinarian	1		1
Unemployed		1	1
Total	**12**	**15**	**27**

Table 1.2: Respondent Occupation

Education level achieved	**Peri-urban**	**Urban**	**Total**
Did not attend any school	1		1
Did not complete primary school	1		1
Completed primary school	3	1	4
Did not complete secondary school	4	2	6
Completed secondary school	2	2	4
Did not complete university		1	1
Completed undergraduate university	1	8	9
Completed postgraduate university		1	1
Total	**12**	**15**	**27**

Table 1.3: Respondent Education Profile

Select Household Characteristics	Peri urban		Urban	
	no.	%	no.	%
Household consumes water from a safe source*	10	83%	7	47%
Dwelling is connected to piped water source	1	8%	6	40%
Household uses wood or charcoal as main source of cooking fuel	12	100%	15	100%
Household is connected to mains electricity	11	92%	15	100%
Household member owns a radio	11	92%	14	93%
Household member owns a refrigerator	1	8%	0	0%
Household member owns a computer	2	17%	7	47%
Household relies on labour of "house help" not a member of nuclear family	4	33%	11	73%
**Defined as protected spring, protected well, public tap or stand pipe*				

Table 1.4: Select Household Characteristics

1.3 Limitations: As this examination of the context for future business decisions falls into the category of marketing research, we did not seek clearance from an ethical review board. However, we conducted our interviews with tools that have been previously tested in published academic research. At the heart of this type of qualitative work is a trade-off. The use of in-depth interviews in small samples provides more in -depth understanding of respondent concerns, perspectives, and motivations but sacrifices the ability to generalise with confidence to a broader population. Although there is ample evidence that drawing conclusions from a sample of 25 respondents is appropriate for many inquiries, interpreting these data is as much an art as it is a science. The 27 respondents were drawn from two different (urban and peri-urban), areas, potentially reducing the power of this market research. Mindful of this, we have tried to avoid overstating our conclusions and to give nuance and uncertainty their due. Ultimately, however, it is the work of practitioners in the field (surveyors investigating the prevalence of beliefs and practices identified here; health, agriculture, and nutrition sector programmers refining their messages and interventions; and entrepreneurs and producers of nutritious products looking to develop more effective propositions) that will determine the utility of our observations and conclusions.

2. What Foods are Consumed and Why

2.1 Nyanza consumers make only limited use of commercial, packaged food products: Neither the 24-hour recall of foods offered to children nor the 7-day recall of the foods consumed by the family revealed much use of commercial packaged products. Consumers in the urban setting do appear more familiar with commercial branded products such as tinned oats, instant cereals, or blended flours -- probably because they see them regularly stocked in the formal sector food stores ("a*limentations*") which are a feature of the urban retail environment; but they do not appear to consume them with any regularity. The only consistently-used commercial processed food products appear to be cooking oil, tomato paste, and small individual-use flavouring sachets and bouillon cubes. The picture provided by dietary recall is consistent with observations and interviews with *alimentation* vendors in Nyanza, which indicate that although the exclusive feature of *alimentations* is their processed (often imported) items, most of their food sales consist not of these items but of perishable refreshments and snack foods prepared on site or locally (see 2.2, below).

***Significance**: Minimal consumption of commercial food products means that the most impactful Marketplace for Nutritious Foods (MNR) interventions may be in addressing barriers to accessing locally produced products like fruits and vegetables, meat, dairy, legumes, nuts and seeds, etc.*

2.2 Some value-added products are purchased by consumers in Nyanza, but they are mainly produced at community level: Although there is little consumption of nationally available value-added commercial foods, consumers nevertheless make use of value-added products that are made closer to home. The same retailers that stock packaged commercial goods also process their own products for sale. For the specialty food shops (*alimentations*) these appear to be the main stock in trade. Common value-added food purchases in Nyanza *alimentations* are fresh yogurt prepared on site, and locally-made snack foods like *mandazi* (fried dough/fritters) and *sambusas* (fried meat in pastry), which may be prepared on site or bought in bulk for resale from another individual. *Alimentations* usually include a small seating area (a few plastic tables and chairs) where these value-added items can be consumed along with other foods like bananas or apples. Value-added products purchased from other types of vendor include locally-blended cereal/legume porridge flours (normally consumed at breakfast by both adults and children) which are sold at market stalls and local kiosks. Kiosks in both the peri-urban and urban settings also stock *mandazi* and *sambusas*, but due to the lack of electricity do not usually sell items like yogurt that require refrigeration.

***Significance:** The alimentation, which combines locally- processed snack foods (for consumption on-site) with industrially-processed foods (for consumption at home), may be*

uniquely Rwandan. The combination may offer opportunities for those marketing either type of food, since customers seeking one type are easily exposed to the other.

2.3 Home processing is an important feature of the food system in Nyanza, and reflects a widespread concern about food adulteration: A consistent theme in consumer narratives was the risk that a food product that was not genuine may be sold by an unscrupulous vendor. Certain foods are more likely than others to convey this risk: Ground cassava leaves (a favourite accompaniment to meat or staple foods) might have other, inferior greens blended into them to maximize profit. Groundnut flour (used to thicken and flavour many sauces) may be diluted with maize flour, which is cheaper. Porridge flours combined from soy, maize and sorghum may not contain these ingredients in the correct ratio; may contain inferior quality ingredients; or may not have been processed carefully by the vendor (e.g., dirt may not have been properly washed off before milling, leading to gritty flour).

Consumers go to considerable lengths to process their own foods, which they believe are less likely to be intentionally or unintentionally adulterated:

"With flour, the vendors are mostly looking for profit. For example, if you want sorghum flour, since they know maize flour is cheaper they mix it and when you buy it you think you are getting pure sorghum. To avoid this issue I mill the sorghum myself." **Respondent no. 12**

"….Like with ugali, when you soak the cassavas for yourself, you know that you put it in a big container, and poured out the water and you know it is clean. But if you buy cassavas at the market, you don't know where they soaked the cassavas. Maybe they never soaked them or maybe they soaked them in water that was used many times. So the ones I soak myself are healthy and clean." **Respondent no. 2**

"Concerning authenticity, I come back to the groundnut flour: as I said, they usually mix it with maize flour to sell [a larger] quantity. And the porridge flour they might add for you cheaper flour, not the one you ask for. The best is to buy the cereals for yourself and take to the mill. That way you will be sure you got the right flour".
Respondent no. 20

Figure 2.1: Home Processing

Procurement strategies reflect these risks, with consumers preferring wherever possible to buy ingredients individually, in their raw unprocessed form, to be certain of their quality, and then process these themselves at community or household level. Significantly, the risk of food adulteration is thought to involve not only the disadvantage of being cheated, but also the hazard to the health of family members.

Significance: *The importance of ingredient quality to consumers means that efforts to market processed products will need to address fears of adulteration if they are to overcome the preference for local and home processing.*

2.4 Consumers may be avoiding commercial processed foods and ingredients out of a concern that they are not sufficiently natural: A recurrent theme in discussions with Nyanza

consumers is the risk associated with foods that are made, as they describe it, "in a factory". Asked to rate a representative basket of foods individually according to their safety, consumers frequently contrasted pre-packaged commercially marketed foods with local produce, stating that the latter is safer. "Factory" foods are deemed risky by some because they could be made with substandard ingredients, whereas with fresh produce grown at home or purchased locally from the market or from other farmers, any limitations are evident. As noted above, a concern with the possibility of food adulteration colours consumer attitudes to vendors, and underlies the preference for home-processing. But the particular concern with factory foods may be slightly different (production under factory conditions could, after all, be considered one way to ensure safe, standardised quality): the more important factor working against commercially processed foods is the perception that they are not "natural". Consumers' language around the hazards of these products sounds almost ideological, and may be related to strictures of the 7th-Day Adventist religion that is prevalent in Nyanza. The consumer interviews did not systematically collect information on interviewee's religion, but several respondents stated that the avoidance of factory foods, as avoidance as well as pork and rabbit, is part of their religion, and even referred to consultations with an "Adventist nutritionist" who sells natural foods and remedies at the Nyanza market.

A consistent theme emerging from the discussion of foods was a resistance to "factory" foods.

"Things that are from the factory, I don't trust them because they remove the nutrients. I like natural stuff. ....If I don't trust factory stuff it is because I believe there are other natural products that have similar nutrients that could be used instead." **Respondent no. 12**

"*Packaged milk from the company is not safe….Instant noodles have passed through a machine; you cannot trust it. [You can't trust] items you cannot say come from a farm……I eat sunflower oil, but even if we eat it you cannot trust it 100% as it is also from a factory".* **Respondent no. 13**

"[Oil] is not very good because it's from a factory and may not have all the nutrients that are needed." **Respondent no. 14**

"…I don't know: [Cerelac] is from a factory. For me, I like things that are original." **Respondent no. 7**

Concerns about "factory" foods are probably a minority view. Even so, consumers who were comfortable with factory foods were also aware of negative sentiment in the community about these products:

"In our church there is a group of people that follow the nutrition of natural foods and try to teach us also that factory food is bad. They are called abarogozi and they have books about it." **Supplementary interview 7**

"Some people don't use the factory foods at all. They use natural food because they have grown eating natural and would not trust factory food. They say it causes sickness". **Supplementary interview 13**

Figure 2.2: Resistance to Factory Foods

Significance: *In this environment, the marketing of nutritious foods that are also packaged commercially would need to find ways to disassociate the natural/unnatural binary from the unpackaged/commercially packaged one, creating a new category of natural packaged foods. In-depth consumer research for product development would be required.*

2.5 The diet of urban consumers does not differ significantly from that of peri-urban populations: The main characteristics of the peri-urban diet are also those of the urban diet. The two populations share a reliance on the same dishes, made from the same ingredients, employing the same preparation processes, with ingredients purchased from the same places. For both populations, the common animal source foods are: milk, beef and *indagara* (small dried fish). The 7-day (Annex 5) recall of family foods shows that urban families may be accessing a slightly wider range of vegetables for use in the common sauces and stews, while the 24-hour recall of childrens' foods indicates that urban children are consuming milk with their porridge, while peri-urban do not; but it appears that apart from milk and *indagara*, neither urban nor peri-urban families are consuming enough in the way of animal source foods to contribute meaningfully to their nutritional needs. Given these commonalities, the diets of the two populations are more similar than they are different, and there is little evidence that the diet currently aspired to by the urban population of Nyanza is qualitatively different than that of their rural counterparts. It may be more accurate to say that for both populations the ideal diet is the same, but that it is more within the reach for the urban consumer (due to her greater purchasing power).

Significance: *Marketing approaches premised on an aspirational, urban class of consumer – one who is eager to leave behind elements of the rural diet-- may struggle to reach an audience in Nyanza.*

3. Where Foods Are Purchased

3.1 Four distinct types of food vendor are available to consumers, each with its particular range of products, its risks and advantages: Both peri-urban and urban consumers are able to access the same four generic types of vendor. These are: local neighbourhood kiosks; the central open-air produce market; the market stalls arrayed around the central market; and the "*alimentation*" stores located in Nyanza town. With the exception of meat, which is purchased from a specialist butcher, and purchases from individuals not involving a fixed vending structure/location (e.g, milk purchased from neighbours) all food purchases described by respondents were from one of these 4 types of vendors. From discussions and rating exercises conducted with consumers, a picture emerges of the considerations that underlie consumers' utilisation of each vendor type.

3.1.1 Neighbourhood kiosks are typically the source for daily, small quantities of foods. They are convenient because they do not require leaving the community, and they sell high-demand food items alongside frequently used non-food products like washing powder or toiletries. They are also the only form of vendor that will reliably provide credit (a necessity for some families) due to the personal relationship that exists between vendor and consumer (who are often neighbours). At the same time, the convenience of kiosks is offset by their prices, which are higher on a unit basis than other vendor types; they have a narrow range of food products for sale; and, whilst their owners are generally considered trustworthy, they are not subject to any form of inspection or regulation, so packaged commercial products (e.g. biscuits or other packages snacks) offered by kiosks are understood by consumers to be at risk of stale-dating.

Figure 3.1: A neighborhood kiosk

3.1.2 The open-air market is characterised by a shifting array of vendors all of whom deal in fresh agricultural produce. Consumers believe the market presents some health risks, due to the exposure of produce to dirt and dust in the open-air setting; at the same time agricultural produce is generally considered safe because it is "natural", and with the exception of semi-processed foods like ground cassava leaves, at low risk for adulteration. 7-day recall revealed that at the time of the interviews, the market was the main source for fresh fruit, with 36 of 41 recorded fruit purchases

originating at the market. Except for vegetables grown for own consumption in kitchen gardens, the market is also the main source for fresh vegetables.

3.1.3 **Market stalls** are similar to kiosks in that they carry a combination of food and non-food items, and foods sold include both perishables and non-perishables. However, the range of products at market stalls is wider than kiosks, and consumers with sufficient means can purchase large quantities at wholesale prices. Cooking oil and agricultural products which have received some processing (e.g, individual or blended cereal flours) are typical purchases made from market stalls. At the same time, processed or semi-processed foods are believed to present some risk of adulteration without the compensatory security of a personal relationship. Market stalls are therefore associated with some risk, which is weighed against their superior pricing by consumers.

3.1.4 **Alimentations** are distinct from the other vendors in several ways. Unlike the kiosks and market stalls, they specialise in food products and carry little in the way of non-food items. They stock a wider range of processed foods, including "higher-end" imported items like mayonnaise, chocolate bars, and powdered milk which are not found at other vendors. They are the only vendor that is connected to the electrical grid, allowing them to sell refrigerated goods like fresh milk or yogurt. *Alimentations* are also the only vendor to sell processed foods intended specifically for IYC (e.g., instant fortified porridges, porridge oats), and infant formula) making them synonymous for many consumers with specialty foods for children. In a rating exercise conducted with consumers, *alimentations* scored 2.4 out of 5 for "affordability" (where 1 is totally unaffordable and 5 is highly affordable) among peri-urban consumers; whereas the market, the kiosk, and the market stall scored 4.6, 4.3, and 3.4 respectively, making *alimentations* the least affordable vendor in the eyes of peri-urban dwellers. And although urban dwellers rated the *alimentation* slightly more affordable, it is clear from the 24 and 7-day recalls that neither group appears to be purchasing much from the alimentation except locally-made yogurt. However, alimentations are described by consumers as safer, due to the fact that they are subject to government inspection, reducing the likelihood of being sold an expired packaged food item.

Figure 3.2: Advertising displayed at a Nyanza "alimentation"

	Local Kiosk	Open Air Market	Market Stall	Alimentation
Typical purchases	Small quantities of items in daily use: Cooking oil; cereal flours; flavour packets or bouillon cubes; dried fish, onions, tomatoes and tomato paste. Some snack foods	Rice; beans; freshly harvested vegetables and fruits; roots & tubers	Bulk quantities of cereal flours, oil, or other large volume staple items	Snack foods including *mandazi*, *sambusas*, Occasional purchase of packaged pasta
Defining features	Highly convenient due to: (i) proximity to home, and (ii) sale of small quantities which allows buyers to select meal ingredients according to cash on hand	Trusted main source of fresh produce, with minimal processing. Food is in its natural state	Better value than kiosks on a per-unit basis, but will not sell in small quantities.	Main vendor of imported processed food items for children, including Cerelac, Quaker oats. Regulation by authorities ensures authenticity of products
Consumer Concerns	No regulation of kiosks , so goods may be expired	Open air setting reduces cleanliness, due to dust, pollutants	Processing performed at this level – e.g., of blended fours – may not be conscientiously performed	Commercially processed foods may not be "natural"

Table 3.1: Vendor Typology

3.2 In addition to purchasing from vendors, some consumers buy food direct from farmers: It would be reasonable to assume that food is sourced either from the vendors described above or (where access exists) from one's own farm or garden. However, our interviews revealed that consumers also source foods directly from the farmers who grow them. We describe elsewhere (see 3.3, below) how urban families buy high-consumption staple foods like beans direct from rural farmers. Whilst this source of staple foods is particularly important for urban households it is not confined to them. Although they have better access to farmland, peri-urban households also engage in direct purchasing from producers. Interestingly, these purchases appear to be mainly from farmers outside their own village environment, possibly because certain crops are more plentiful in other locations or ecologies. The exception to this is milk, which is almost always purchased from neighbours. Presumably, due to the perishability of milk in an environment with little to no refrigeration, consumers are disinclined to travel far to obtain it when only small quantities can be kept on hand. Apart from milk, the most commonly cited direct purchase items for both urban and peri-urban respondents were sweet potatoes, cassavas, cassava flour (used to make ugali), and beans. Urban residents also reported buying some vegetables direct from farmers, including tomatoes, carrots, cabbages, and eggplant.

Significance: *See 3.3, below*

3.3 Urban households maintain direct links to rural producers for access to key staple foods: Urban consumers are not disconnected from the rural economy and the rural diet. Rather, they use their purchasing power and their greater mobility to source the best quality

staple crops at the best price in the farming communities outside the town. For instance, it is common for urban families to buy beans direct from farmers in bulk quantities sufficient to last 6 months. The objective is to economize on an indispensable food product, but also to secure the very best quality crop: some key informants described surveying bean crops in the field with the farmers and specifying the plants to be harvested. Other crops where this type of bulk purchase is common include plantains, cassava, sweet potatoes, maize, soya, sorghum and wheat. As noted above, urban families also take delivery of fresh milk on a regular basis from trusted farmers. Purchases of food direct from the source are not confined to urban families (although the purchase of very large quantities appears to be a more urban phenomenon): peri-urban consumers also describe buying a narrower range of food crops from their neighbours, including cassava and plantain.

Significance: *economizing on foods that make up the foundation of the diet remains important even to consumers of higher socio-economic status. The way that these foods are procured places urban consumers partly outside the formal sector, and makes it harder to reach them with a proposition that offers greater convenience at a higher price.*

3.4 The relationship between consumer and vendor involves a large measure of trust: Because of the adulteration concerns (see above), Nyanza consumers have a relationship with some vendors that is more than purely transactional. By limiting their purchases to a few trusted individuals, consumers attempt to limit the risk of being cheated by an unscrupulous vendor. Vendors, for their part, are obliged to trust those consumers to whom they extend credit, which was relied upon by 67% of respondents. Usually this is an arrangement made with through informal sector vendors in the neighbourhood kiosks. The quantities of food tend to be small – typically the purchase of a few items like dried fish or tomatoes or groundnut powder to complete a meal for which staple ingredients are already available, and repayment is made without interest within a few days. The convenience of this flexibility in an environment where access to cash is often intermittent (e.g. because of dependency on remittances from migrated wage-earners) should not be underestimated. Relationships of trust are not confined to vendors but may be established also with individual farmers such as the owners of dairy cattle, who regularly service some urban households. Urban consumers value and maintain ties with suppliers who they believe can be trusted not to dilute the agreed quantity of milk with water. Significantly, these trust relationships appear to be important mainly within the informal sector. The trustworthiness of formal sector *alimentation* vendors is not in question, since their products are thought to be subject to inspection; at the same time, however, their processed foods are considered either out of reach or undesirable by many consumers.

Significance: *The importance of personal relationships with vendors presents both an opportunity and a challenge. In principle, kiosk vendors are in a strong position to promote new food products, due to the trust they enjoy with consumers; but kiosks are not well served by existing commercial distribution chains and their processed food products are*

considered (for the reasons described above) at risk of expiration. Alimentation owners by contrast are more integrated into distribution networks, but the commercial processed foods they stock are considered too expensive by most.

3.5 Refrigeration does not play a significant role in the food system, either among vendors or consumers: Among the four types of vendor, only the *alimentation* commonly has refrigeration on site. None of the other 3 vendor types has the capacity to keep products cold – which limits them to the sale of either fresh food items that turn over quickly -- e.g., small quantities of vegetables (kiosks, open market), or of items that do not perish – e.g., dried fish and cereal flours (kiosks, market stalls). It is understandable that refrigeration would be considered of limited use in a setting where power cuts are a daily occurrence. Nevertheless it is noteworthy that even specialty food suppliers with the means to afford a generator (including both Nyanza's principal beef butcher and its only egg wholesaler) operate without refrigeration. Mirroring this scant use on the supply side is an absolute lack of refrigeration on the demand side -- in consumers' homes. This is true of both peri-urban and urban population: over half of our urban sample were university –educated, salaried individuals; and although these families possessed a range of consumer goods including, in a third of the sample, computers --, none of them owned a refrigerator.

Significance: *the near-complete absence of refrigeration in the homes of highly educated, salaried consumers rules out certain types of high-value, highly perishable products as a basis for Marketplace for Nutritious Foods interventions – probably for as long as the electrical power grid remains unreliable.*

4. Consumer Knowledge and Preferences

4.1 The healthy qualities of fruit are well understood by consumers, but consumption is confined mainly to children: Consumers consistently rated fruit among the healthiest foods. Two fruits were included among the foods in the ratings exercise (Annex 1). The exercise placed tree tomato among the healthiest foods at 4.6 on a scale of 5, and banana slightly lower, at 3.9). Many informants explained that fruits were "protective" of child health and appetite – opinions that appear to have been shaped by the local CHWs. More than half of the children who consumed fruit received it in the form of a mixture combining two or three fruits. Mixing and mashing fruits into a soft food for easy consumption by IYC also appears to originate with CHWs. The family diet, by contrast, shows less reliance on fruit. For example, tree tomatoes are among the most commonly available and popular fruits in Nyanza, with "blood-building" qualities ascribed to them by many informants; but whereas they appeared in the diet of 9 out of 27 children over 24 hours, they appear in the family diet at less than a tenth of this frequency. Fruits were rated among the more expensive food items by consumers, and follow-up interviews determined that certain fruits undergo considerable price swings due to seasonal scarcity; families seem to be limiting fruit consumption to children, who they believe can benefit most from its healthy qualities.

Significance: *the market for fruit might be expanded if consumers could be persuaded that fruit is important for the health of adults and not only children. However, the perception that fruit is costly presents an obstacle. A more systematic and in-depth examination of fruit as a category, including all fruits available and known to consumers, could identify which individual fruits hold the most promise. There is some evidence, for instance, that avocados are an underused and comparatively affordable fruit.*

Some assertions about the hazards of particular foods – especially meat and oil – seem to echo concerns heard in more developed countries about the Western diet:

"Meat often causes different types of diseases – bone inflammation, allergies... meat is not very good. It can cause bone marrow diseases"
Respondent no. **14**

"Beef and rabbit are different. I like the rabbit more because white meat are better and do not cause disease of bone marrow….Beans are even before other foods – even before meat. Beans and soya they have proteins and are natural….If you eat meat you may find that it [the cow] was sick, but beans don't get sick"
Respondent no. 12

"He has not eaten [oil] yet…..I can't let anyone cook it for him, it causes heart diseases."
Respondent no. 3

"I don't give her oil now; I feel I will give it to her when she is two years. It makes the intestines slippery. The child's body is still young"
Respondent no. 15

Figure 4.1: Hazards of Meat and Oil

4.2 Consumers' ideas about the nutritional attributes of specific foods are mostly accurate, probably due to the efforts of local health workers: Asked to rate foods according to the

healthiness, Nyanza consumers tend to position foods in a manner consistent with nutritional science. A review of the healthiness ratings (Annex 1) indicates that they rate processed foods like biscuits, bread, and instant noodles low on the healthiness scale; they rate protein-rich foods like milk, meat and fish as well as pulses, leafy vegetables and fruit high on the scale; and they rate cereals and starchy staple foods like plantain and potato somewhere in the middle. Furthermore, in their elaborations on the healthiness ratings they frequently employed descriptive categories that would be familiar to a nutrition educator: "this one is a "body-builder", "this is protective" or "provides energy". The consistency of this knowledge across the sample is testament to the efforts of CHWs. Interestingly, some opinions expressed about IYC feeding echo concerns heard in more industrialized countries about specific elements in the Western diet. For example, although the dietary recall shows that older children are consuming cooking oil, respondents were at pains to explain that they were vigilant about limiting the oil eaten by the youngest children, because they were aware of risks associated with oil, especially its effect on the cardio-vascular health (see Figure 4.4). Without a detailed assessment of consumption of other fats including breastmilk it is impossible to judge whether the adoption of restrictive practices like this is appropriate or not.

Significance: *The Nyanza consumer has a comparatively sophisticated understanding of nutrition concepts and vocabulary, and the marketing and promotion of healthy foods can take advantage of this*

4.3 Convenience of the sort provided by modern processed foods is not highly prized by Nyanza consumers; but other forms of convenience may have more appeal: As noted above, Nyanza consumers place a high value on the provision of healthy foods made from home-processed ingredients which they know to be safe, and which represent unadulterated value-for-money. Furthermore, they have concerns about the degree to which packaged, processed foods are "natural", and they appear content to invest the time and effort required to provide these natural foods to their families. In this context it may not be appealing to propose to consumers that they trade the increased cost of processed foods against time saved in preparation. Nevertheless, consumers with the means to afford it do seek convenience in other forms. Examples include (i) paying a premium for *indagara* (dried fish) that have been dried carefully, as opposed to the less expensive Tanzanian *indagara* which contain sand that needs to be removed by soaking before use; and (ii) purchasing yogurt made by the *alimentation.* Although yogurt is made at home by some households, the risk of a failed batch due to imperfect hygiene or temperature is considerable. There is also the inconvenience of locating starter culture to maximize quality. These examples suggest that convenience does have meaning for Nyanza consumers.

Significance: *Whilst convenience is valued by consumers, it is sought more often in locally processed or semi-processed foods than in packaged commercial foods.*

5. Observations on Dietary Composition

Interviews with the core sample of 27 consumers included a recall of all foods consumed by the index child during the preceding 24 hours. The general picture is of a diet heavily reliant on cereals, roots, tubers, and pulses, with a limited consumption animal source foods, but reasonable availability of fresh fruits and vegetables. The range of specific foods that appear in the 24 hour recall is shown by food category in Table 5.1, below. This conveys the range of products but not the amounts or relative frequency of consumption.

FOOD Group	Foods present in 24-hour recall of child consumption
Grains and cereal products	Maize, rice, sorghum, millet, maize meal, porridges, bread, macaroni, biscuits and fried dough (*amandazi*)
Roots and tubers	Cassava, sweet potatoes, Irish potatoes
Animal foods	Beef, small dried fish, eggs, fresh milk, yoghurt
Vegetables	Amaranth leaves, cassava leaves, spinach, plantain, tomatoes, carrots, cabbage, eggplant, sweet pepper, celery, beetroot, onions
Fruits	Banana, avocado, mango, passion fruit, orange, apple
Legumes and nuts	Beans, peas, soybean, groundnuts
Fats and oils	Cooking oil, margarine (blue band)
Other	Sugar, commercial spices (*asante*, *onja*, maggi cubes), herbs, beverages (fanta, tea with or without milk)

Table 5.1: Range of foods present in 24hr recall

Figure 5.1: A Rwanda-made blended porridge flour combining rice, soy, groundnut, and maize flours. Blended porridges are consumed daily by adults as well as children.

Within the range of foods consumed by children, some have a far more central place in the diet than others. This is evident from the more detailed picture in Annexes 2 and 3. Annex 3 is organized around feeding episodes (meals or snacks), and indicates for each child what foods were consumed and how these different foods are combined in the form of meals or dishes. Annex 2 is organized around individual foods and ingredients, recording the number of children who consumed each. These ingredient data are presented both in aggregate form for the overall sample, and disaggregated for children 6-23 months vs. children 24-59 months. This offers some insight into how the diet changes, as semi-solid foods intended specifically for children are eventually replaced or supplemented by dishes consumed by the rest of the family. Among the

conclusions that may be drawn from an analysis of the recall data are the following:

5.1 Blended cereal porridges are the single most consistently consumed dish among children, and continue to be eaten into adulthood: A wide variety of cereal or cereal/legume blends is in use. Almost all of these involve a combination of 3 or 4 different flours. Sorghum is invariably one of them, with the combination of sorghum, soya and maize ("SoSoMa)" being the most frequently consumed. But millet or wheat flour can be added to or substituted for the other ingredients. Annex 3 shows that one or another of these blends was consumed by 74% of children in the preceding 24 hours. Consumption was high in both the under 2- years and the over 2-years groups. The recall of family foods indicated that 66% of families also consumed blended cereal porridges, making this a remarkably stable and important feature of the diet in Nyanza and one in which even small improvements in nutritional quality might have significant impact.

5.2 Locally-processed yogurt, although well represented in the family-food recall, makes no appearance in the diet of children: Discussions with consumers indicated that locally-made yoghurt (*ikivuguto*) is consumed by adults and represents probably the most frequently sold single item from the urban alimentation stores. However, consumers rated these yogurts unsuitable for children (owing to its sour taste, or because it was felt to lose nutrients during the fermentation process). By contrast, commercial, single-serving flavoured pot yogurts are widely considered to be a children's food; but they are considered expensive -- only one child consumed this form of yogurt on the day before interview.

5.3 Cow's milk is a core IYC food that is introduced early and maintained in children's diets after transition to family foods: A remarkable 81% (22 out of 27) of children consumed milk on the day before the interview. The presence of milk in the diet was evenly distributed between the younger and older age groups (69% vs 64% respectively). Location (urban vs. peri-urban) does not appear to affect milk consumption. The most common way to consume milk was as a drink, after boiling (16 children), followed by milk in porridges (12 children) and milk in tea (3 children).

5.4 Small dried fish (*indagara*) are a well-accepted, affordable source of animal protein for children, but they are introduced late, and in small quantities: Next to milk, *indagara* are the second most widely consumed animal protein in Nyanza. The 24-hour recall data show that 32% of children consumed them the previous day, while a separate recall exercise conducted around family foods indicated that in the previous week, 53% percent of families used *indagara* to prepare food that was also consumed by children. *Indagara* are usually mixed with groundnut powder or vegetables to make sauces eaten with staples as family foods. Not reflected in the recall data, but reported by consumers in our interviews, is the use of *indagara* together with vegetables and potato or plantain in the pureed mixture known locally as *imvange* – sometimes made specifically for children who are too young to consume

"hard" family foods. However, neither the recall data nor the interviews offer any indication that *indagara* are ever added to the food most consistently consumed by both children and adults – multi-grain porridges. This, despite the fact that consumers rated *indagara* among the most nutritious foods for children. Indeed, it appears that the only ingredients considered suitable for combining with porridge are milk and sugar.

5.5 Groundnut powder plays an important role in family foods but, like fish, is not being offered to children as early as it could be: One third of households consumed foods containing groundnuts in the previous week; but the 24-hour recall shows that among children, consumption is nil among the younger age group (6-23 months). As noted above, caregivers are unaccustomed to adding anything except milk or sugar to porridge, so groundnuts (which are generally pounded into flour and added to sauces and stews) only enter the diet once a child starts to consume family foods. They are not included in the boiled/mashed foods made specifically for children.

Figure 5.2: A typical daily kiosk purchase: groundnut flour, *indagara* (in cellophane bags), and tomatoes to make a sauce.

5.6 Green leafy vegetables are being frequently consumed, but the benefits may not be fully realized: After onions, which are used in practically every family meal, amaranths (known locally as *dodo*) are the most important vegetable in the Nyanza diet. The 24-recall shows that 67% percent of children consumed foods in which amaranths were an ingredient, while 85% of families reported consuming *dodo* in the preceding week. Vegetables do not form the basis of meals in Nyanza. Instead, they are mixed with other ingredients (e.g. groundnut powder, small dried fish, spices) to make stews or sauces that complement staples like potatoes, plantain or ugali. Although *dodo* are available daily for purchase in the main Nyanza market, at the time of our interviews *dodo* were rarely bought but instead were harvested from kitchen gardens (that also yield carrots, eggplant, spinach, onions, beetroots and sweet peppers) – even by the urban households. However, consumer descriptions of preparation and cooking techniques suggest that existing practices – which involve prolonged soaking or (especially where groundnuts are also part of the recipe) prolonged cooking, may be leading to loss of water-soluble nutrients.

5.7 Maize flour is an increasingly popular staple: Young children do not appear to consume maize flour, but it registers in the 24 hour recall data for older children (5 out of 14 children), and is among the most frequently consumed items according to the 7-day recall of family foods, where 15 of 27 families reported cooking it in the previous week -- more than the number of families that consumed plantain or whole cassava, but less than those consuming Irish potatoes or cassava ugali. Maize ugali (*kaunga*) is described as a less desirable but more affordable option than traditional cassava ugali. If it is displacing other staples in the diet of poorer families, the feasibility of fortifying maize flour may be worth investigating.

5.8 Some foods are accessible, but withheld from children: Especially where younger children are concerned, narrative data collected through the interviews provide an additional perspective on the recall data. The narratives indicate that the absence of some foods from the recall is partly due to caregivers' belief that these are not safe to consume. We have noted elsewhere (5.5, above) that groundnuts are not consumed until children graduate to the family diet. Peri-urban consumers clearly distinguished between the healthiness of groundnuts, (which they rated high) and their safety (which they rated low). Narrative data collected through the interviews indicate that the main reason for this is the belief that groundnuts will cause diarrhoea in young children unless they are very well cooked. Cooking oil, although it tops the list of items in 24 hour recall (Annex 2) is deliberately withheld from the youngest children, who are restricted to a diet of boiled and mashed foods until they begin to consume fried family foods (Annex 3). The narratives indicate widespread concern about the possible negative effects of cooking oil, mainly related to cardiovascular health (see Figure 4.1). Sweet potato is a frequently consumed item in the 7 day family food recall (14 of 27 families), but is almost completely absent from the 24 recall of children under 5 years (Annex 2). The narratives show that this is due to a widely-held belief that sweet potatoes cause stomach aches, with most respondents explaining that sweet potatoes give children intestinal worms, while others felt it was because sweet potatoes are too "hard" for children to digest.

6. Conclusions and Recommendations

6.1 Packaged *and* natural: The picture emerging from interviews with consumers indicates that branded, value-added products have only a minor role at present in Nyanza's food system. Except for cooking oil and small flavouring sachets or bouillon cubes, commercially processed products are not frequently consumed. Processed foods are considered by Nyanza consumers to be among the most expensive, so cost is probably a significant barrier. However, consumers also appear to aspire to these foods. They place a high value on meals and ingredients that they consider "natural" and -- in a move that recalls the natural foods movement that swept industrial economies beginning in the 1970s – some of them appear to conceive of "factory foods" in contradistinction to these. Foods produced in an industrial setting for national consumption, no matter how nutritious, will stand a better chance of adoption as part of an effort to establish a third category of packaged, but natural foods – resolving the natural food/factory food dichotomy.

6.2 Rural ideals and rural technology shape the urban diet: Also significant for the marketing of nutritious products is the apparent similarity of the urban and peri-urban diets. The difference in consumption between these two populations seems to be mainly quantitative, not qualitative. Wealthier urban consumers have the purchasing power to consume animal source foods a little more frequently, but the overall range of ingredients which they use to feed their families is the same as that available to less well-off peri-urban households. Discussions with urban dwellers offer little sign of the emergence of an aspirational class of urban consumer eager to shed consumption habits connected to their rural past. They want to provide the same traditional foods to their families and they maintain important direct ties to rural or peri-urban producers to secure the best ingredients at the best price. With no refrigeration, and with all cooking taking place over wood or charcoal fires despite all but one informant living in electrified homes (table 1.4), urban families still organise meals around the same principles as rural households and in this context, the appeal of "convenience" foods is reduced.

The demographic make-up of Nyanza households is another factor that could be mitigating against demand for processed foods. To the extent that urban mothers are apt to be absent from the home, working salaried jobs, one might naturally expect them to be making greater use of value-added foods that permit more rapid meal preparation. But the reliance on domestic help in many families (73 % of urban and 33% of peri-urban households in our sample) may be obviating the need for this convenience. Much of the time consuming shopping, food preparation, and cleaning as well as some simple cooking, in these homes is probably being done not by mothers, but by others remaining in the house while she is at work (young relatives from the village, guards, gardeners, or house-help). In this context the time-crunch experienced by working mothers may not necessarily create greater demand for commercial processed foods.

6.3 Locating Convenience: To observe that the proposition of modern convenience (quicker, simplified preparation in return for higher cost processed foods) is not meaningful is not to say that convenience has no place Nyanza. Convenience does appear to inform consumer decisions, but mainly within the category of locally processed and semi-processed food products. For instance, although factory sealed pot yogurts are not attractive, many consumers do buy yogurt made in daily batches by local vendors, which is more convenient than making yogurt at home with its requirement for controlled conditions. This intermediate level of processing is one place that the Marketplace for Nutritious Foods may seek opportunities. Some of the convenience-related entry-points with high potential for nutrition that may be worth further exploration include the following:

6.3.1 **Bean flour:** Common beans were the single most frequently consumed family food item among our interviewees. However, dry bean preparation requires considerable cooking time and cooking fuel. One convenience consumers might appreciate is a bean flour which can serve some of the same purposes as dried bean, but cook far more quickly, saving caregivers time and fuel. This could not substitute for whole dried beans in all their uses, but with promotion/demonstration by CHWs and other trusted local agents, might find acceptance as a healthy, flavourful thickening ingredient in stews and sauces -- and could be easily incorporated into cereal porridge flours (something that is already being done by some caregivers). If such a product gained acceptance it might then be worth exploring its feasibility as a vehicle for bio-fortification.

6.3.2 **Yogurt**: as noted above, yogurt is consumed in a variety of forms, and given its broad acceptability and cost represents (along with milk and *indagara*) one of the only animal-source foods consumed with any frequency. Both (i) locally-made yogurt (*ikivuguto*) sold by volume from jerricans at *alimentation* shops in Nyanza town and (ii) home-made versions are preferred to flavoured commercial pot yogurts, partly because they are felt to be suitable for all ages, while pot yogurts are identified mainly as a children's food. For rural or peri-urban households, buying yogurt from the relatively distant *alimentation* involves some inconvenience, and it appears some families instead allow milk to sour over several days and consume the uncultured results due to the difficulty of obtaining yogurt culture. This is a less healthy and less safe option than yogurt (which, through the introduction of benign bacterial cultures reduces the opportunity for development of harmful ones). It is worth exploring whether demand exists for a system that could address the current inconvenience by making yogurt starter culture more readily available at community level.

6.3.3 **Groundnut Processing:** Along with *indagara*, groundnuts are a constant element of the diet. Consumers purchase groundnuts crushed into a powder or flour that is used both for its flavour and for its quality as a thickener in numerous soups, stews, and

sauces. Despite its highly nutritious qualities, groundnut flour is rated low for safety and reliability by consumers, because it may contain inferior ingredients intentionally or unintentionally mixed into it. Consumer concerns dovetail here with broader scientific and QA/QC concerns about the risks in groundnuts of aflatoxin contamination. Rwanda's East and Southern African neighbours increasingly have to address public concerns about aflatoxins in the food system, and given the evident suspicion about food adulteration in Nyanza it would seem to be a matter of time before groundnuts become a matter of greater concern for Rwandans. Since groundnuts are an ingredient in the most frequently consumed stews and sauces, this would represent no small problem. A commercial groundnut flour that could assure consumers of both its purity *and* its safety might be a form of convenience that consumers appreciate, and one that could make an important public health nutrition contribution at the same time (although offering this at price point that puts it within reach of the average consumer is likely to be a challenge).

6.3.4 ***Indagara*** **(small dried fish):** Like groundnut flour, *indgara* are used as a base for sauces and stews and are a constant element of the family diet – although they are probably consumed in sub-optimal amounts. Several types of *indagara* of varying price and quality are available. The least costly of these (described as Tanzanian) is most commonly consumed, and its low price reflects the need to cleanse the product at home of sand (said to result from the fact that it is dried directly on the ground by the producers) before use in cooking. *Indagara* that do not require this additional step are available, but at a much higher price. A dried fish product that could combine the affordability of "lower end" *indagara* with the security of a clean (pre-processed?) product might be the kind of convenience that would appeal to consumers.

6.3.5 **Fortification Opportunities and Barriers:** the dietary recall information collected in Nyanza points to several potential opportunities for food fortification. Cooking Oil, flavour/spice sachets or cubes, maize flour, and blended cereals are among the products that are both (a) frequently consumed, and (b) vehicles with which industry either has some fortification experience, or is currently experimenting with. Significantly, although there are international brands of all these foods available on the market, there are also locally or regionally manufactured versions --- making more local fortification an attractive possibility: a variety of packaged 3-flour porridge blends made in Rwanda or Uganda are found on the shelves of Nyanza *alimentations*; and spice mixtures like *Onja, Tayari,* and *Asante* are commonly purchased alternatives to the more widely known Maggi cubes. But while fortification of these commodities holds promise from a technical standpoint, their acceptability from a consumer standpoint is less certain. Given the strength of feeling about natural foods, and the concerns surrounding "factory" foods, fortified products could

struggle to disassociate themselves from the general, category of artificial products that is distrusted by some consumers.

At the same time, it stands to reason that this association might be less of a barrier to some products than to others: for instance, Maggi cubes and other flavouring mixtures are already perceived as artificial and of little nutritional value, yet they are still routinely used to enhance the flavour of family foods. Arguably, the addition of fortificants to an already "artificial" product such as bouillon cubes could present less of an obstacle to consumption than the addition of these same fortificants to a product like blended cereals, which hold a central place in the family diet, and which consumers will go to considerable lengths to procure unadulterated. Further qualitative research with consumers that focuses specifically on the concept of fortification could explore some of these questions. The application of a quantitative tool could meanwhile help to illuminate whether the concerns about commercial processed foods documented here are as significant a barrier as their pricing. The fundamental take-away from our interviews, however, is that efforts to market nutritious foods cannot assume that fortification will automatically be viewed by consumers as an attractive asset.

6.4 In addition to market-related interventions that could be supported by the project, consumer interviews reveal potential areas of high-impact for BCC and nutrition education. Interviews with consumers indicate that several areas of sub-optimal feeding practices may be limiting the consumption of important nutrients by children. These are areas where, despite the generally good level of understanding that exists among consumers, local perceptions of the risk to children from specific foods are at odds with contemporary best-practice. As they are not reliant in an improvement in household means to overcome them, they represent potentially high-impact areas for targeted messaging. These messages following messages could be introduced either in tandem with supply-side efforts to make nutritious products more available, or independently:

6.4.1 Yogurt is safe for children, and even more nutritious than milk: We have noted already that yogurt, whilst widely consumed by adults, is thought to be unsuitable for children – a belief that may be depriving children of important nutritional benefits. In addition, the ratings exercise conducted with consumers indicates that compared to plain milk, yogurt is believed to be less nutritious – a perception that, if corrected, might make dairy products available to children in both greater quantities and more varied forms.

6.4.2 Sweet potato can be safely consumed by children: When asked directly if there are any foods that should not be offered to children, consumers invariably mentioned sweet potato. Different problems with sweet potato were identified by different

respondents, among them intestinal worms, diarrhoea, and gastric discomfort – the common element being the location of the problem in the child's stomach. Unlike the other food items listed above, the unimproved variety of sweet potato currently being consumed in Nyanza is not an indispensable source of nutrients; however, the improved, orange flesh variety of sweet potato is now being introduced in other districts of Rwanda, and its full beneficial potential could remain unrealised if existing misconceptions about sweet potato continue to restrict its consumption by children.

6.4.3 Groundnuts flour can safely be added to young children's porridge: While fears about groundnuts were not as pronounced as the avoidance of oil, the narrative data and the safety ratings assigned to groundnut flour (Annex 1) reflect ambivalence about their suitability for the youngest children. Older children consume groundnuts in the common stews and sauces eaten by the family in Nyanza, but consumers (especially in the peri-urban setting) expressed concern that groundnuts would cause diarrhoea in young children). There is the promise of significant positive nutritional impact if caregivers can be persuaded to mix groundnuts (or for that matter other nutritious, available and affordable foods sources such as *indagara* or avocado) into the cereal porridges and the boiled, mashed vegetable *imvange* being consumed during the 6-24 month period.

6.4.4 The effects of restricting the consumption of cooking oil in young children are not clear: the tendency to limit the use of cooking oil was described by consumers but not verified by observation. The bad effect of oil on the body (especially the heart) was one of the most consistent themes to emerge from the interviews. The ratings data (Annex 1) also indicate that oil was considered among the least healthy foods for children. It is admirable that Rwanda is making efforts to avoid the ill-effects of the dietary transition characteristic of modernity; however, fats added to cooked foods may not be as valid a health risk for younger children, and complete restriction of added fats to young child diets may not be advisable as fat is necessary to support the absorption of fat-soluble nutrients, and may assist some young children in reaching their daily energy requirements if diets are otherwise calorie-poor.

7. REFERENCES

Government of Rwanda 2012. Comprehensive Food Security and Vulnerability Analysis and Nutrition Survey. [Powerpoint Slide Presentation dated 18 Oct., 2012]

Pelto GH, Armar-Klemesu M, Seikmann J, Schofield D. 2013. The focused ethnographic study "assessing the behavioral and local market environment for improving the diets of young children 6 to 23 months old" and its use in three countries. Maternal and Child Nutrition; 9 (suppl 1): 35-46

Pelto G.H. and Armar-Klemesu, M. 2014. Focused Ethnographic Study of Infant and Young Child Feeding 6–23 Months: Behaviors, Beliefs, Contexts and Environments (Manual on Conducting the Study, Analyzing Results and Writing a Report). Available at: http://www.hftag.org/resource/1-fes-manual-v1-feb-2014-pdf/.

8. ANNEXES

ANNEX 1: Summary of Food Dimension Ratings

		Milk	Yogurt	Dagaa	Groundnuts	Beef	Rabbit meat	Eggs	Beans	Cassava leaves	Dodo	Instant noodles	Oats	Cerelac	Mixed porridge	Oil	Maggi	Banana	Tree tomato	Bread	Potatoes	Biscuits	Sweet potatoes	Cassava	Plantain
Safety	Peri-Urban	4.4	4.5	4.8	2.9	3.3	2.4	4.8	4.4	3.6	4.7	3.4	3.5	3.5	3.6	4	3.2	4.8	4.8	4.8	4.1	4.8	3.6	4.3	4.7
	Urban	3.9	4.4	4.5	3.7	3.9	3.6	4.5	4.3	3.7	4.3	4.1	4.2	4.2	4.1	3.9	4.1	4.5	4.5	4.4	4.5	4.5	4.2	4.5	4.5
	Aggregate	**4.2**	**4.5**	**4.7**	**3.3**	**3.6**	**3.0**	**4.7**	**4.4**	**3.7**	**4.5**	**3.8**	**3.9**	**3.9**	**3.9**	**4**	**3.7**	**4.7**	**4.7**	**4.6**	**4.3**	**4.7**	**3.9**	**4.4**	**4.6**
Availability	Peri-Urban	4.9	5	5	4.9	4.1	1.4	4.8	4.8	4.8	5	3.4	1.8	1.7	4.1	5	4.7	4.9	4.4	5	4.9	4.8	4.7	4.4	4.4
	Urban	4.9	4.9	4.4	4.9	3.1	3.1	4.7	4.9	4.5	4.9	3.9	4	4	4.8	4.9	5	4.5	4.1	4.9	4.9	4.8	4.5	4.4	4.5
	Aggregate	**4.9**	**4.9**	**4.7**	**4.9**	**3.6**	**2.3**	**4.8**	**4.9**	**4.7**	**4.9**	**3.7**	**2.9**	**2.9**	**4.5**	**4.9**	**4.8**	**4.7**	**4.3**	**4.9**	**4.9**	**4.8**	**4.6**	**4.4**	**4.5**
Affordability	Peri-Urban	4.4	3.8	4.7	4.8	2.8	1.9	4.1	4.8	4.9	5	3.4	2.2	2.1	4.5	4.6	4.5	4.1	4.1	4.6	4.5	4.4	4.9	4.4	4
	Urban	4.8	4.5	4.4	4.6	3.9	3.3	4.4	4.7	4.7	4.7	3.8	3.4	3.4	4.7	4.7	4.7	4.3	4.3	4.3	4.7	4.7	4.9	4.5	4.2
	Aggregate	**4.6**	**4.2**	**4.6**	**4.7**	**3.4**	**2.6**	**4.3**	**4.8**	**4.8**	**4.9**	**3.6**	**2.8**	**2.8**	**4.6**	**4.7**	**4.6**	**4.2**	**4.2**	**4.5**	**4.6**	**4.6**	**4.9**	**4.5**	**4.1**
Authenticity	Peri-Urban	4.6	3.0	4.8	3.0	4.6	3.3	4.8	5.0	4.8	4.8	3.5	3.8	3.7	4.3	4.1	4.3	5.0	4.8	4.4	4.9	4.3	4.9	4.9	4.7
	Urban	4.3	3.7	4.7	3.3	4.0	4.4	4.9	4.9	4.5	4.7	4.2	3.9	3.9	4.5	4.2	4.4	4.8	4.9	4.3	4.7	4.7	5.0	4.6	4.8
	Aggregate	**4.4**	**3.4**	**4.8**	**3.2**	**4.3**	**3.9**	**4.9**	**4.9**	**3.7**	**4.7**	**3.9**	**3.9**	**3.8**	**4.3**	**4.2**	**4.4**	**4.9**	**4.9**	**4.4**	**4.8**	**4.5**	**4.9**	**4.8**	**4.8**
Healthiness	Peri-Urban	4.8	4.1	4.9	4	4.8	3.4	4.8	4.7	4.5	4.8	3.4	3.4	3.5	4.9	2.9	2.4	3.9	4.6	2.9	3.6	3.4	3.4	3.3	3.7
	Urban	4.6	3.5	4.9	4.1	3.5	4.1	4.5	4.9	4.6	4.6	3.3	3.7	4.1	4.5	2.3	2.8	4.3	4.5	3.4	3.6	3.1	3.7	3.6	3.4
	Aggregate	**4.6**	**3.8**	**4.8**	**4.1**	**4.1**	**3.8**	**4.5**	**4.8**	**4.3**	**4.7**	**3.3**	**3.6**	**3.9**	**4.8**	**2.7**	**2.4**	**4.1**	**4.5**	**3.2**	**3.5**	**3.2**	**3.6**	**3.4**	**3.6**

Annex 2: Consumption of Individual Food Items
(Data from the 24-hour recall for children 6-59 months)

Foods	Number of IYC receiving the food		
	6-23 months (n= 13)	24-59 months (n= 14)	Total (n=27)
Cooking oil	8	14	22
Onions	8	13	21
Porridge (mixed flour)	9	11	20
Fresh milk (boiled)	9	9	18
Amaranths (dodo)	8	10	18
Beans	5	12	17
Irish potatoes	8	7	15
Tomatoes	2	13	15
Carrots	4	9	13
Rice	3	8	11
Cassava ugali	3	8	11
Porridge + milk	4	6	10
Banana	6	4	10
Tree tomato	5	4	9
Small dried fish (*indagara*)	3	6	9
Biscuits	2	7	9
Bread	3	5	8
Eggplant	2	6	8
Plantain	2	5	7
Sweet pepper	2	5	7
Maize meal	1	5	6
Groundnut powder	0	5	5
Beetroots	2	3	5
Mangoes	1	3	4
Garlic	1	3	4
Passion fruits	2	1	3
Tea with milk	0	3	3
Vegetables (not specified)	1	2	3
Sweet potatoes	0	2	2
Meat sauce	2	0	2
Egg	1	1	2
Mixed vetable soup	2	0	2
Black tea	0	2	2
Tomato paste	0	2	2
Celeri	0	2	2
Bread with margarine	0	1	1
Orange	1	0	1
Fermented milk	1	0	1
Yoghurt	0	1	1
Meat	0	1	1
Fish sauce	0	1	1
Chicken bouillon	1	0	1

Water	1	0	1
Apple	1	0	1
Omelet	1	0	1
Cake	1	0	1
Banana juice	0	1	1
Cassava	1	0	1
Chicken soup	1	0	1
Papaya	1	0	1
Orange	1	0	1
Youghurt	0	1	1
Cabbage	0	1	1
Any juice	0	1	1
Spinach	0	1	1
Peas	1	0	1
Spices	0	1	1
Fried dough (*amandazi*)	0	1	1
Carrot juice	1	0	1

Annex 3: Food Consumed by Feeding Occasion
(Data from 24-hour recall of foods consumed by children 6-59 months)

ID NO	Location	Age (in months)	BF status	Feed 1	Feed 2	Feed 3	Feed 4	Feed 5	Feed 6	Feed 7	Feed 8
28	Urban	6	Yes	Fresh milk (boiled)	Crushed biscuit mixed with milk	Fresh milk (boiled)					
26	Peri-urban	7	Yes	Fresh milk (boiled)	Fruit salad (Tree tomato + banana)						
20	Urban	7,5	Yes	Fruits (banana and orange). Orange juice squeezed on top of banana.	Porridge (sorghum, maize, millet, rice) plus honey	Fruit (tree tomato)	Mixed vegetable soup (Irish potatoes, spinach, tomatoes, carrots plus little salt)	Fleshly prepared porridge (sorghum, millet, maize, rice, soya).	Fruit (orange)		
23	Peri-urban	10	Yes	Porridge (soya, sorghum, maize and beans flour) with milk	Fresh milk (boiled)	Mashed potatoes mixed with dodo and onions + milk	Fruit salad (banana + passion fruits), mashed				
27	Urban	10	Yes	Porridge (sorghum mixed with pre-packed porridge flour) with milk	Carrot juice	Rice, maize meal, fried meat, meat sauce, potatoes + porridge (leftover)					
3	Peri-urban	11	Yes	Fresh milk (boiled)	bread	Potatoes mixed with amaranths, spinach, beans and					

						beetroots; mashed			
7	Peri-urban	11	Yes	Fruit (mango)	Porridge (sosoma from alimentation)	Omelet (3 eggs + sweet pepper)	Potatoes (boiled) mixed with amaranths, beans, small dried fish, eggplant, peeled tomatoes, carrots + milk	Cake + milk	Rice (boiled) paired with beans (fried), amaranths, carrots, some beetroots, spices, onions, sweet pepper and celery
6	Peri-urban	16	Yes	Porridge(sorghum, maize, soya) + small amount of sugar	Tree tomato	Potatoes (boiled) paired with green beans, beetroot, onions and amaranths	Fresh milk	Cassava ugali paired with beans (fried) + amaranths	
11	Peri-urban	17	Yes	Rice (boiled) paired with amaranths (fried) + small dried fish and onions	Fresh milk	Cassava boiled with beans, then beans removed and child ate cassava only			
8	Peri-urban	19	No	Porridge (sorghum, maize and wheat) + sugar + biscuit	Cassava ugali paired with beans (fried)+amaranths+onions	Potatoes + beans (fried) with amaranths + onions	Porridge (sorghum, maize and wheat)		

15	Urban	19	No	Chicken soup plus bread	Plantain mixed with amaranths, eggplant and carrots (soft mixture)	Porridge (sorghum, maize, soya, wheat, millet) with milk + small amount of sugar	Porridge (leftover)	Fruits salad (banana, papaya and tree tomato)	Meat sauce (meat, onions, sweet pepper, garlic, salt), boiled		
1	Peri-urban	22	Yes	Porridge (Sorghum, maize, wheat, soya) with milk + bread	Mixed fruits (tree tomato, passion fruits, banana)	Apple	Plantain mixed with amaranths, small dried fish, egg	banana	Mixed vegetable soup (potatoes, amaranths, spinach, carrots and onions)		
5	Peri-urban	22	Yes	Porridge (sorghum) + sugar	Potatoes (fried and mixed with beans) + fresh milk	Cassava ugali paired with beans (fried) + amaranths + onions					
21	Urban	28	No	Plantain mixed with amaranths, carrots, onions and tomatoes plus cooking oil	Fresh milk (boiled) mixed with biscuit	Fruits salad (papaya, passion fruits, tree tomato and banana)	Potatoes mixed with carrots and amaranths, beans (fried) mixed with onions, tomatoes, sweet pepper	Porridge (sorghum, millet, maize, soya) plus milk	Youghurt	Fish soup (boiled) + onions, sweet pepper and tomatoes	
24	Urban	29	No	Porridge (sorghum, maize, soya)	Potatoes (boiled), mixed with amaranths, beans and tomatoes plus cooking oil and salt	Fresh milk (boiled)	Rice (boiled) + beans, fried and mixed with eggplant and onions	Fresh milk (boiled)	Potatoes (boiled) mixed with amaranths, beans and tomatoes, + cooking oil + salt	Potatoes (boiled), paired with amaranths mixed with eggplant, beans (fried) with onions	Porridge (maize) with milk

2	Peri-urban	30	No	Porridge (sorghum, maize, soya) with milk + biscuit	Cassava ugali + beans + small dried fish+amaranths	Mango	Rice (boiled)+beans fried with carrots and cabbages	Black tea +sugar			
12	Peri-urban	30	No	Porridge (sorghum, soya , wheat and maize) with milk + sugar + bread	Potaoes (fried with small amount of oil) + amaranths, carrots, onions, tomatoes and fish broth	Fresh milk (boiled)	Fruits (tree tomato, passion fruits, papaya and banana)	Porridge (leftover)	Maize meal paired with amaranths (fried)+carrots + onions + fish broth	Biscuits	
13	Peri-urban	30	No	Biscuits	Porridge (pre-packed sosoma flour) + milk + sugar + doughnut	Rice (boiled) paried with sauce (groundnut flour + amaranths + carrots + sweet pepper + garlic + tomatoes)	Maize meal paired with beans (fried) + eggplant + sweet pepper	Mango + tree tomato	Bread	Fresh milk (boiled)	Casava ugali plus vegetable soup (eggplant + carrots + celery + tomatoes and onions)
10	Peri-urban	31	No	Plantain (fried) with beans, amaranths, onions and carrots + Porridge (sorghum, maize, soya) + sugar	Rice (boiled) + beans (fried) mixed with eggplant, tomatoes, and onions	Cassava ugali paired with groundnuts sauce with carrots, eggplant, onions and tomatoes					
4	Peri-urban	32	No	Potatoes (fried) + onions + milk	Sweet potatoes (peeled and boiled) + beans (fried) with amaranths + onions + beetroot + tomatoes	Casava ugali paired with vegetables (fried) + onions + groundnuts + small					

						dried fish + beetroots			
14	Urban	34	No	Porridge (soya, millet, sorghum, maize) + sugar + bread	Rice (boiled) paired with amaranths (fried) + carrots + onions + sweet pepper and tomatoes plus milk	Plantain (fried) mixed with amaranths, onions groundnuts flounr and tomatoes + milk			
16	Urban	34	No	Porridge (Sorghum, maize, wheat, soya) + bread	Plantain mixed with amaranths, carrots, onions, tomatoes added oil on top	Rice (boiled) paired with amaranths (fried) + carrots + onions + tomatoes	Maize meal paired with beans (fried) + small dried fish + onions + tomatoes	Tea with milk + sugar	
9	Peri-urban	35	No	Porridge (soya, sorghum, maize, wheat) + sugar	Rice (boiled) + beans (fried) mixed with eggplant, amaranths, tomatoes, sweet pepper and onions	banana + banana juice	Maize meal paired with beans (fried) + amaranths + tomatoes + onions + celery	Biscuits	Plantain (fried) mixed with amaranths and beans
22	Urban	37	No	Porridge (sorghum, maize, millet) + sugar + bread	Fruit (banana)	Rice (boiled) paired with fresh beans mixed with carrots, onions, eggplant, tomatoes and garlic + fresh milk	Porridge (sorghum, maize and millet) mixed with milk	Maize meal (added salt and onions) paired with fried carrots, tomato paste (salsa) and dodo , beans (fried) with sunflower oil plus tea	

						(boiled)		(plus spices) with milk
19	Urban	40	No	Porridge (sorghum) mixed with milk + biscuits + sugar	Juice (mixed fruits) from alimentation	Potatoes mixed with spinach, carrots and tomato paste plus cooking oil. Meat (fried) with tomatoes, onions, celery, sweet pepper, garlic, maggi cube + salt. Maize meal	Fresh milk (boiled) + banana	Cassava ugali paired with small dried fish sauce + groundnuts flour + tomatoes + onions + cooking oil + beans (fried)
17	Urban	47	No	Black tea + sugar	Sweet potatoes (boiled) paired with beans (fried) + tomatoes + onions	Black tea (freshly prepared)	cassava ugali paired with beans (fried) + onions + tomatoes	
18	Urban	47	No	Tea with milk + sugar + lemonade grass	Potatoes mixed with amaranths, onions and tomatoes plus cooking oil	Cassava ugali paired with groundnuts sauce + eggplant + tomatoes and onions	Fresh milk (boiled)	

Annex 4: Urban vs. Peri Urban Diet: 24-hour Recall of Foods Consumed by Children 6-59 Months

Food consumed	# children receiving the food		
	Peri-urban (n=12)	Urban (n=15)	Total (n=27)
Cooking oil	9	13	22
Onions	9	12	21
Porridge (mixed flour)	8	12	20
Fresh milk (boiled)	8	10	18
Amaranths (dodo)	9	9	18
Beans	9	8	17
Irish potatoes	6	9	15
Tomatoes	4	11	15
Carrots	4	9	13
Rice	5	6	11
Cassava ugali	6	5	11
Porridge + milk	0	10	10
Banana	4	6	10
Tree tomato	3	6	9
Small dried fish (indagara)	5	4	9
Biscuits	3	6	9
Bread	2	6	8
Eggplant	3	5	8
Plantain	3	4	7
Sweet pepper	2	5	7
Maize meal	1	5	6
Groundnut powder	1	4	5
Beetroots	3	2	5
Mangoes	2	2	4
Garlic	0	4	4
Passion fruits	1	2	3
Tea with milk	0	3	3
Vegetables (not specified)	2	1	3
Meat sauce	0	2	2
Egg	1	1	2
Mixed vetable soup	1	1	2
Black tea	1	1	2
Tomato paste	0	2	2
Celery	0	2	2
Bread with margarine	0	1	1
Orange	0	1	1
Fermented milk	1	0	1
Yoghurt	0	1	1
Meat	0	1	1
Fish sauce	0	1	1

Chicken bouillon	0	1	1
Water	1	0	1
Apple	1	0	1
Omelete	1	0	1
Cake	1	0	1
Banana juice	1	0	1
Cassava	1	0	1
Chicken soup	0	1	1
Papaya	0	1	1
Orange4	0	1	1
Cabbage	1	0	1
Any juice	0	1	1
Spinach	0	1	1
Peas	1	0	1
Spices	1	0	1
Fried dough (amandazi)	0	1	1
Carrot juice	0	1	1

Annex 5: Urban vs. Peri-Urban Diet – 7-day Recall of Family Foods

Component of the diet	Frequency of consumption		
	Peri urban	Urban	Total
Beans	11	16	27
Amaranths (dodo)	10	14	24
Irish potatoes	9	14	23
Porridge (mixed)	10	9	19
Rice	8	11	19
Cassava ugali	9	9	18
Maize meal	6	10	16
Sweet potatoes	5	10	15
Small dried fish	8	7	15
Plantain	3	9	12
Banana	4	8	12
Groundnut powder	7	2	9
Cassava	4	5	9
Vegetables (not specified)	0	7	7
Black tea	2	4	6
Cassava leaves	3	3	6
Imvange	3	3	6
Tree tomato	2	3	5
Tea with milk	1	4	5
Pineapple	2	3	5
Orange	0	4	4
Meat	3	1	4
Mangoes	0	4	4
Passion fruits	1	2	3
Fresh milk (inshyushyu)	2	1	3
Meat sauce	1	2	3
Avocado	2	1	3
Bread	0	2	2
Apple	1	1	2
Papaya	1	1	2
Small fresh fish	0	2	2
Doughuts	0	2	2
Chips	1	1	2
Porridge (with milk)	1	0	1
Bread with margarine	0	1	1
Fruits (not specified)	1	0	1
Fermented milk	0	1	1
Biscuits	0	1	1
Omelet	1	0	1
Carrots	0	1	1
Beetroots	0	1	1
Sweet pepper	1	0	1

Celery	1	0	1
Fresh beans	0	1	1
Macaroni	0	1	1
Sugarcane	1	0	1
Sorghum drink (non alcoholic)	1	0	1
Meat stew	1	0	1