

# Quality Diets for Better Health

## Formative Nutrition Report

Assessment of Infant and Young Child Feeding in  
Southern Nations, Nationalities, and Peoples' Region, Ethiopia



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## Abbreviations

|       |  |
|-------|--|
| CF    | Complementary Feeding                                |
| CIP   | International Potato Center                          |
| DHS   | Demographic and Health Survey                        |
| EBF   | Exclusive Breastfeeding                              |
| FGD   | Focus Group Discussion                               |
| HBT   | Healthy Baby Toolkit                                 |
| HEP   | Health Extension Programme                           |
| HEW   | Health Extension Worker                              |
| HLC   | Healthy Living Club                                  |
| IYCF  | Infant and Young Child Feeding                       |
| KII   | Key Informant Interview                              |
| MAD   | Minimum Acceptable Diet                              |
| MIL   | Mother-in-law  |
| MUAC  | Mid-Upper Arm Circumference                          |
| OFSP  | Orange Fleshed Sweetpotato                           |
| PIN   | People in Need                                       |
| PLW   | Pregnant and Lactating Women                         |
| QDBH  | Quality Diets for Better Health (project)            |
| RDA   | Recommended Dietary Allowance                        |
| RE    | Retinol Equivalents                                  |
| SBCC  | Social Behavior Change Communication                 |
| SNNPR | Southern Nations, Nationalities, and Peoples' Region |
| VAD   | Vitamin A Deficiency                                 |
| VAS   | Vitamin A Supplementation                            |

## Executive Summary

### General

Infant and young child feeding in Ethiopia is sub-optimal, and is especially so in the Southern Nations, Nationalities, and Peoples' Region (SNNPR), Ethiopia. The International Potato Center (CIP) and People in Need (PIN) are working with Emory University and local stakeholders to implement the *Quality Diets for Better Health* (QDBH) project. The project aims to improve diets by promoting homestead production of orange-fleshed sweetpotato (OFSP), a bioavailable source of vitamin A, and through community-based nutrition education.

In May through July 2017 Emory University conducted a literature review and qualitative formative research, the goals of which were to:

1. Describe and identify motivators of current infant and young child feeding (IYCF) practices.
2. Identify barriers and facilitators to optimal IYCF behaviors.
3. Understand current knowledge of vitamin A and perceptions of orange-fleshed sweetpotatoes.
4. Assess acceptability of Healthy Living Clubs.
5. Assess acceptability of Healthy Baby Toolkit.

We first conducted a review of literature, and then designed qualitative research to meet these objectives. Focus group discussions (FGDs) were conducted with mothers, fathers, and grandmothers of young children; Key Informant Interviews (KIIs) were conducted with Health Extension Workers and kebele/community leaders. These FGDs and KIIs were conducted in 1 woreda in the Sidama zone and two woredas in the Gedeo zone, both of which are in SNNPR.

### Key Findings

Breastfeeding is common; mothers are both aware of and report following breastfeeding recommendations. Traditional practices are sometimes encouraged by grandmothers, and are a barrier to early initiation of and exclusive breastfeeding for 6 months. Perceived breastmilk insufficiency, often attributed to poor maternal nutrition, is a driver of early introduction of non-breastmilk liquids. Liquids such as water, milk, and traditional teas, as well as thin, grain-based gruels are commonly introduced before 6 months. Other diverse and nutrient dense foods are often not introduced until well after 6 months, in some cases as late as 9 or 12 months. The most common complementary foods include grain- and legume-based gruels and porridges. Somewhat common complementary foods include fruits, and dairy. There is little knowledge of the importance of diverse diets. While reported meal frequencies for infants and young children tend to be appropriate, portion sizes are very small. Caregivers report portion sizes ranging from ½ to 1 Ethiopian coffee cup per meal for infants under 12 months, and 1 to 2 Ethiopian coffee cups per meal for children over 12 months. Ethiopian coffee cups hold volumes of 70 to 75 milliliters.

White-fleshed sweetpotatoes are common, though orange-fleshed varieties are not. Caregivers perceive sweetpotatoes as an important food security crop and an easy and affordable snack or breakfast. However, caregivers also feel sweetpotatoes are a boring food, with no health benefits, and in some cases attribute health problems to sweetpotatoes. In particular, sweetpotatoes are thought to delay speech development and are therefore considered inappropriate for infants and young children.

Caregivers expressed a willingness to introduce OFSP for their children if OFSP have health benefits, if they have access to them, and if they know how to prepare them. Sweetpotato leaves are not consumed by humans, but rather are used as animal feed.

Caregivers expressed willingness to attend Healthy Living Clubs for nutrition and/or agriculture education. Men welcome participation with women, but women indicated a preference for gender-specific meetings to promote open discussion. To encourage attendance, planning and organizing Healthy Living Clubs should be participatory; care should be taken to avoid overlap with social events and to notify participants in advance. Caregivers would be most likely to attend if there is coffee ceremony or if other incentives are provided. All groups interviewed appreciate the Healthy Baby Toolkit and perceive its usefulness. Some caregivers believe that children may become sick if a person with “evil eye” can see the child or his/her food, and therefore transparent bowls are not appropriate.

Health Extension Workers (HEWs) are appreciated as an important resource for health and nutrition information/services. However, HEW have competing priorities and IYCF is not always identified as a top priority. Programs aiming to improve child nutrition often focus on screening for acute malnutrition and strategies for managing positively identified children. Supplemental foods and micronutrient tablets are sometimes provided, but community members feel logistic and supply challenges mean communities and persons in need of these services do not always benefit. Successful programs should ensure appropriate logistical support and focus on long-term supply and sustainability, and should engage local leaders and government workers to most effectively reach communities.

Results of this formative work were used to detail problem and solution trees for key IYCF practices, and to develop key recommendations for the QDBH project, specifically with respect to Healthy Living Club design and curriculum.

## Quality Diets for Better Health

The Quality Diets for Better Health Project (QDBH) is a 54-month project in Southern Nations, Nationalities, and Peoples' Region (SNNPR), Ethiopia that seeks to introduce and promote a reliable, bioavailable source of vitamin A and energy, and to improve the quality of diets of young children and their families. With funding from the European Union, the International Potato Center (CIP) is partnering with People In Need (PIN); Emory University; and local stakeholders to implement the project. In the first year, 780 households in 13 kebeles over two zones will be covered by the project, with scale up to 15,000 direct beneficiaries in 41 kebeles occurring over the course of project implementation. Direct beneficiaries are households participating in Healthy Living Clubs (HLCs) – groups of approximately 30 households which serve as the medium of nutrition education – and who will receive orange-fleshed sweetpotato (OFSP) vines and support for planting, managing, and harvesting, and nutrition education over an 8-months period.

## Background

### Childhood Undernutrition

Nutrition insults in the first 1000 days hamper child growth and development, with both short- and long-term consequences. By their second birthday, nearly half of all children in Ethiopia will be stunted [1] and therefore assume risk of the deleterious health [5], human capital [6, 7], and poor reproductive outcomes [8-10] associated with early life stunting. Stunting is indicative of chronic nutrient inadequacy, due to inadequate nutrient intake and/or heightened, unmet nutrient demand, often resulting from diarrhea or other infections [11]. The accrual of linear growth failure is most rapid between 3 and 24 months of age [12, 13]. During this window, complementary feeding is initiated and young children are particularly susceptible to infection. Complementary feeding practices in SNNPR are sub-optimal; in 2016 only 6.7% consumed a minimally acceptable diet, defined as a diet meeting minimum meal frequency and minimum dietary diversity [14, 15]. The improvement of IYCF must be realized for the assurance of appropriate child growth, development, and health.

### Vitamin A Deficiency, Supplementation, and Intake

In addition to its more overt impact on eye anatomy and vision, vitamin A deficiency (VAD) is associated with increased risk of infection – including diarrhea – and child death [16]. An estimated one in three children worldwide and nearly one in two children in Africa are thought to be vitamin A deficient, defined as having a serum retinol concentration of less than 0.7  $\mu\text{mol/l}$  [16]. Estimates of VAD prevalence in under-5 children in Ethiopia range from 13.9 percent [17] to 46.1 percent [18]. Consumption of vitamin A rich foods is wanting in young children in Ethiopia. Only 38.4% of children 6 to 23 months had consumed a vitamin A-rich food of any kind in the previous 24 hours, though the prevalence was slightly higher in SNNPR at 48.2% [1].

Vitamin A supplementation (VAS) is a well-recognized intervention to reduce all-cause under-5 mortality and diarrheal incidence [19]. The Ethiopian National Nutrition Program II for 2016 to 2020 lists twice-yearly VAS of children 6 to 59 months of age as an initiative to prevent and control VAD [20]. As of 2016, 44.7% of children 6 to 59 months had received VAS in the previous 6 months [1] -- a marked decrease

from 53.1% in 2011 [2]; notably both fall far short of the national goal of 90 percent coverage. Furthermore, supplementation coverage at the national level is lower in rural compared to urban areas – 42.9% versus 59.3% [1]. Rates of VAS in SNNPR are comparable to national rates. Thus, while VAS remains an important and evidence-based initiative, important gaps in coverage and inadequate consumption of vitamin A-rich foods mean children in SNNPR remain vulnerable to VAD and its consequences.

## Orange Fleshed Sweetpotatoes

With 13.1 mg beta-carotene (approximately 1100 retinol activity equivalents (RAE)<sup>1</sup> [21]), an average OFSP root meets or exceeds the Recommended Dietary Allowance (RDA) for children of every age group and for nearly every adult life stage (Table 1). While some vitamin content may be lost in cooking, OFSP retains, on average, over 90% of their carotenoids after being boiled [22]. Complementary foods made from OFSP are a better source of vitamin A than complementary food made from white fleshed sweetpotato or maize-based commercial complementary foods [23]. Notably, vitamin A is a fat-soluble vitamin; therefore, dietary fat is required for the absorption of vitamin A.

Table 1. Recommended Dietary Allowances for vitamin A for different groups, in retinol activity equivalents (RAE)

|                    | Male | Female | Pregnancy | Lactation |
|--------------------|------|--------|-----------|-----------|
| <b>0-6 months</b>  | 400  | 400    |           |           |
| <b>7-12 months</b> | 500  | 500    |           |           |
| <b>1-3 years</b>   | 300  | 300    |           |           |
| <b>4-8 years</b>   | 400  | 400    |           |           |
| <b>9-13 years</b>  | 600  | 600    |           |           |
| <b>14-18 years</b> | 900  | 700    | 750       | 1200      |
| <b>19-50 years</b> | 900  | 700    | 770       | 1300      |
| <b>51+ years</b>   | 900  | 700    |           |           |

Source: <https://ods.od.nih.gov/factsheets/VitaminA-HealthProfessional/>

Researchers first demonstrated that OFSP promotion could increase vitamin A intake in young children in Kenya 1999 [24]. In 2005, van Jaarsveld *et al* demonstrated that giving OFSP to school-aged children in a controlled setting in South Africa improved their vitamin A status [25]. In subsequent years, coordinated projects in sub-Saharan Africa aimed to increase vitamin A intake of young children through nutrition sensitive agricultural approaches. Such approaches increase OFSP supply by supporting OFSP-producing farmers, while simultaneously increasing OFSP *demand* through nutrition education and value chain development. Evaluation of these programs demonstrate improvements in vitamin A intake and status of young children [26-30] as well as reduced morbidity [31]. Interestingly, causal mediation analyses of programs in Uganda and Mozambique suggest that nutrition knowledge seemed to play only a minor role in the realization of increased vitamin A intake [26].

Orange fleshed sweetpotatoes (OFSP), bio-fortified with vitamin A, are a programmatically sustainable, food-based means of combatting VAD in sub-Saharan Africa. Particularly considering the aforementioned gaps in vitamin A supplementation, a food-based strategy for combatting vitamin A deficiency may be an ideal complement.

<sup>1</sup> Assumes a standard conversion rate of 12 µg beta-carotene to 1 RAE [17]



## Healthy Baby Toolkit

The low proportion of children achieving a minimum acceptable diet in Ethiopia is a result of both low dietary diversity and inadequate meal frequency. As such, additional attention is needed beyond increasing access to and consumption of vitamin A-rich foods. Efforts to improve vitamin A status through food-based approaches must emphasize not only the provision of vitamin A-rich foods but also the provision of sufficient consumption of energy and micronutrient dense foods. Achieving sufficient consumption requires attention to strategies that promote adequate volume of food at each meal, appropriate energy density of meals, and a sufficient number of meals each day.

A Healthy Baby Toolkit (HBT), consisting of a marked feeding bowl, slotted spoon, and accompanying counseling card (Figure 1), has been evaluated in Kenya [32], India [33], and Malawi [34]. Results indicate it may be a practical and tangible tool to improve complementary feeding (CF) practices and exclusive breastfeeding (EBF). The feeding bowl includes demarcations and symbols to promote age-specific portion sizes and meal frequency for children 6 to 23 months, and for pregnant and lactating women. The spoon is slotted to promote thicker consistency – and therefore more energy dense – foods. The



Figure 1. The Healthy Baby Toolkit

counseling card reinforces messages of the former two, and uses pictures to promote dietary diversity and hygienic food and water preparation. In user testing and qualitative research in Kenya and India, caregivers, pregnant women, lactating mothers, and mothers of young children perceived improvements in their child's and their own energy and overall health, which they attributed to the toolkit [32, 33]. In a cluster-randomized controlled trial in Malawi, children receiving the toolkit consumed portion sizes increased by more than 20%, and thicker consistency complementary food. They also exhibited less growth failure though the difference was not statistically significant; the study, however, was not powered to detect an effect on child growth [35].

## Health Extension Programme

The government of Ethiopia demonstrates a strong commitment to maternal and child health, leading to marked improvements in child health in recent decades. The Health Extension Programme (HEP), started in 2004, is a “community based strategy to deliver health promotion, disease prevention, and selected curative health services at the community level” [36]. Health Extension Workers (HEW) are selected and trained by the government; more than 38,000 HEWs operate throughout the country. Health Extension Workers are all women with at least a tenth grade education. They complete a one year, government training on 16 health packages that fall into the following four major categories: promotion of hygiene and environmental sanitation, prevention and control of major communicable diseases, promoting and providing family health services, and health education and communication [36]. A minimum of two HEW serve each kebele throughout Ethiopia. To support community nutrition and

health education, the HEP also develops a “Health Development Army” (HDA), a network of volunteers who convene women’s groups to reinforce messages from the HEP under the supervision of HEWs [36].

## Objectives of Formative Work

The goal of the Quality Diets for Better Health formative research is to inform the design of a Social Behavior Change Communication (SBCC) strategy for the promotion of appropriate CF practices that include utilization of OFSP as a vitamin A-rich complementary food.

The objectives of this work include:

1. Describe and identify motivators of current IYCF practices.
2. Identify barriers and facilitators to optimal IYCF practices.
3. Understand current knowledge of vitamin A and perceptions of orange-fleshed sweetpotatoes.
4. Assess acceptability Healthy Living Clubs.
5. Assess acceptability of the Healthy Baby Toolkit.

## Methods

The formative work presented here includes two components: a review of literature and primary qualitative research.

### Review of Literature

Prior to field work, we conducted a review of literature to understand the current state of child nutrition and any previously identified barriers or facilitators of, or characteristics associated with optimal CF practices in Ethiopia. We searched peer-review literature by searing for keywords in PubMed. In addition, programmatic (“grey”) literature and the Ethiopia Demographic and Health Survey reports from the years 2011 and 2016 were reviewed. Alive and Thrive previously conducted formative work in SNNPR prior to implementing and evaluating a nutrition program in SNNPR and other regions; these materials were also highly referenced. Research conducted in SNNPR was prioritized. Findings from other regions in Ethiopia or from neighboring countries were considered where appropriate and necessary for meeting the stated objectives.

### Qualitative Research

#### Design and Participant Selection

Following the completion of the literature review we designed and implemented the second phase of formative research: qualitative research. In determining the design, scope, and participants of the qualitative research, the following were considered:

1. Stated research objectives
2. Gaps in understanding identified during the review of literature
3. The *Guiding Principles for Complementary Feeding the Breastfed Child* [37]

4. Feedback from partners of the QDBH project (namely CIP and PIN)

The QDBH project aims to improve the diets of infants and young children by providing a bioavailable and reliable source of vitamin A. It attempts to achieve these aims by promoting homestead OFSP agriculture and nutrition education emphasizing IYCF. Thus, mothers and other caregivers of young children were identified as the primary audience for the qualitative work.

Focus group discussion (FGD) guides were developed for mothers, fathers, and grandmothers of young children, tailored to their specific roles in child feeding. FGDs with mothers of young children were stratified into three groups based on child age, and questions were targeted to those age groups. The groupings were: mothers with infants under 9 months (focused more on breastfeeding and early CF); mothers of infants 9 to 24 months (focused on CF and continued breastfeeding); and pregnant woman or mother of any child under 2 years (focused on general food norms and other areas relevant to the project).

In total, five FGD guides were developed for the following groups: mothers of infants under 9 months; mothers of infants and young children 9 to 24 months; pregnant women and mothers of children under 2 years; fathers of children under 2 years; and grandmothers of children under 2 years. Dividing the FGDs in this way allowed us to cover a greater range of topics in sufficient detail, while maintaining FGDs at a reasonable length to reduce respondent burden and fatigue. **Error! Reference source not found.** summarizes topics covered with each FGD participant group.

Table 2. Focus Group Discussions Groups and Content.

|  | Mothers           |                   |                           | Fathers | Grandmothers     |
|--|-------------------|-------------------|---------------------------|---------|------------------|
|  | Infants <9 months | Child 9-24 months | Pregnant/child <24 months |         |                  |
| Informed consent, introduction, ground rules | ✓                 | ✓                 | ✓                         | ✓       | ✓                |
| Breastfeeding                                | ✓                 |                   |                           |         | Select Questions |
| Introduction to complementary feeding        | ✓                 |                   |                           |         | Select Questions |
| Latter complementary feeding                 |                   | ✓                 |                           |         | Select Questions |
| Men's roles in family, community             |                   |                   |                           | ✓       |                  |
| Meal and food norms                          |                   |                   | ✓                         | ✓       | ✓                |
| Sources of information                       | ✓                 | ✓                 |                           | ✓       |                  |
| Orange fleshed sweetpotatoes and vitamin A   |                   |                   | ✓                         | ✓       |                  |
| Feeding toolkit                              | ✓                 | ✓                 | ✓                         | ✓       | ✓                |
| Healthy Living Clubs                         |                   |                   | ✓                         | ✓       |                  |

In addition to FGDs with mothers and influencing family members, Key informant interviews (KIIs) were conducted with HEWs and influential community and government leaders. Topics included in the KIIs related to current nutrition programs operating in the communities; sources of information on IYCF; potential for OFSP in the communities; perceptions of the HBT; audience specific questions on creating successful partnerships for nutrition programs (including previous projects’ successes and failures); and appropriateness of the proposed HLC model.

English copies of FGD and KII guides can be found in Appendix A and Appendix B, respectively.

In its first year, the QDBH project will target 13 kebeles in three woredas (two Gedeo zone and one Sidama zone). Because PIN has existing relationships in and familiarity with kebeles, PIN staff were asked to purposefully select five of these 13 kebeles representing variability in agricultural conditions and distance to major markets. Each kebele has a health post with a minimum of two HEW. Table 3 summarizes numbers of kebeles selected and FGDs conducted in each woredas.

Table 3. Numbers of each FGD type in each of the 3 woredas in Sidama and Gedeo zones.

|   | Sidama      | Gedeo      |        | Total |
|---|-------------|------------|--------|-------|
|   | Aleta Chuko | Dila Zuria | Wonago |       |
| <b>Number of Kebeles</b>                          | 2           | 2          | 1      | 5     |
| <b>FGD – Mothers of children &lt;9 mo.</b>        | 1           | 2          | 1      | 4     |
| <b>FGD – Mothers of children 9-24 mo.</b>         | 2           | 2          | 1      | 5     |
| <b>FGD – Pregnant and lactating women</b>         | 2           | 2          | 1      | 5     |
| <b>FGD – fathers of children &lt;24 mo.</b>       | 2           | 2          | 1      | 5     |
| <b>FGD – Grandmothers of children &lt; 24 mo.</b> | 2           | 1          | 1      | 4     |
| <b>Key Informant Interview</b>                    | 3           | 3          | 3      | 9     |

### Training of Enumerators

Four enumerators were hired who either hold or are pursuing a graduate degree in agriculture, nutrition, or a related field, and who are fluent in English, Amharic, and either the local language of Sidama or the local language of Gedeo. All four enumerators completed a 6-day training, which included orientation to the QDBH project; an overview of qualitative research methods; research ethics training; an introduction to the research tools; and translation of informed consent, FGD guides, and KII guides from English to Amharic. Enumerators worked in pairs to ensure accuracy of translation and retention of original meaning. Prior to field work, all enumerators completed and passed with a score of at least 80%, the global health research ethics certification course developed by FHI360.<sup>2</sup>

<sup>2</sup> The online training is available at <https://www.fhi360.org/sites/all/libraries/webpages/fhi-retc2> .

## Data Collection and Analysis

Enumerators completed 1-2 FGDs and/or 1-2 KIIs per day during data collection, working in pairs whenever possible. Enumerators debriefed with research staff daily to discuss major findings and themes, and to re-train as needed.

All FGDs and KIIs were recorded, with the participants permission. As soon as possible after discussions took place, enumerators simultaneously transcribed and translated the recordings from the language of the interview into English. Enumerators were instructed to transcribe and translate verbatim. Transcripts were then input into MAXQDA and coded for themes, with particular focus on barriers and facilitators of major complementary feeding practices.

Based on themes that emerged in coding transcripts, barriers and facilitators were summarized in problem and solution trees for major complementary feeding practices. In addition, behavioral determinants of these major practices were mapped onto Michie's behavior change framework [38].

More specifically, each behavioral determinant was categorized into one of the following categories: capability (physical or psychological), opportunity (physical or social), or motivation (reflective or automatic); this model of behavior change is referred to as Michie's COM-B (Figure 2). Michie defines capability as "the individual's psychological and physical capacity to engage in the activity concerned"; opportunity as "factors that lie outside the individual that make behavior possible or prompt it"; and motivation as "brain processes that energize and direct behavior." [38]

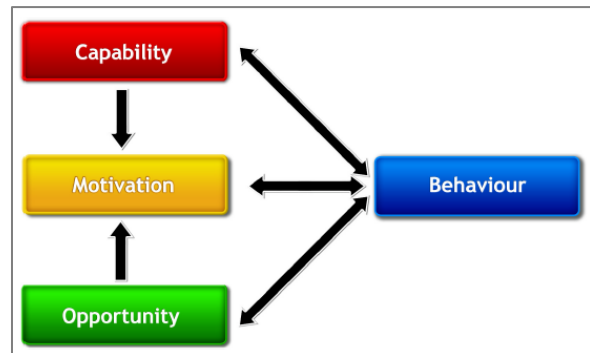


Figure 2. Michie's COM-B Model of Behavior Change.

Next, each determinant was categorized into one of 14 theoretical domain frameworks as defined by Cane *et al* [39]. Lastly, an appropriate intervention function was identified, and we present an example activity to demonstrate how each behavioral determinant might be approached in the QDBH project. Tables of each theoretical domain framework and intervention function, along with their definitions, can be found in Appendix H.

## Ethical Considerations.

The work described here was deemed exempt by Emory University's Institutional Review Board. No identifiable data was purposefully collected; any incidentally collected identifiable data (e.g. names) was deleted during transcription. All participants gave verbal consent prior to participating in data collection.

## Results

We present our results by research phase – presenting first our findings from the literature review followed by findings from our qualitative research.

## Phase 1: Review of Literature

Twenty-one publications, spanning years 2009 to 2017, are included in this review. These publications include both qualitative and quantitative research, and Ethiopian DHS reports from 2016 and 2011. We also relied heavily upon the qualitative research from Alive and Thrive on IYCF practices, published in 2010.

Secular trends in some key child feeding practices in the region are shown in *Figure 3*; timely initiation of complementary feeding is not available at the regional level and therefore national data are presented. Early initiation of breastfeeding, timely introduction of complementary foods, and dietary diversity have generally improved from 2005 to 2016, but the percentage of those meeting minimum meal frequency has declined. And while the percentage of infants and young children consuming a vitamin A-rich food in the previous 24 hours improved, VAS coverage declined somewhat (Panel A). Median duration of exclusive breastfeeding, measured in months, has steadily increased from 2005 to 2016 (Panel B).

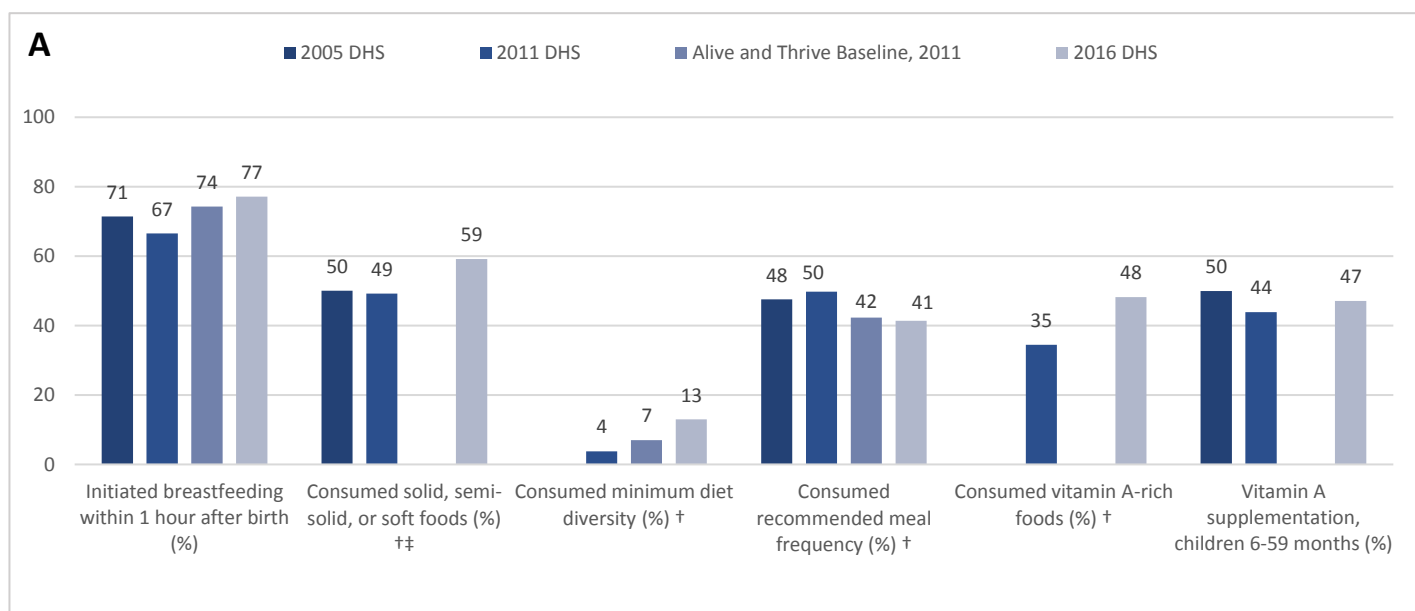
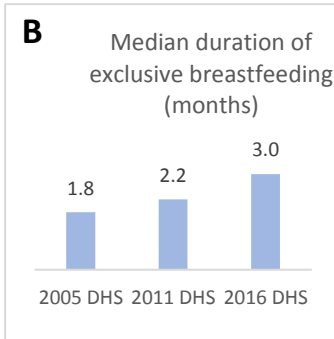


Figure 3. (A) Trends in infant and young child feeding practices in Southern Nations, Nationalities, and Peoples' Region (SNNPR), Ethiopia. † Based on caregiver report of past 24 hours. ‡ National estimate based on percent of infants 6 to 8 months who consumed solid, semi-solid, or soft foods in previous 24 hours. (B) Median duration of breastfeeding, measured in months, over time. [1-4]



### Early Initiation and Duration of Exclusive Breastfeeding

Breastfeeding was nearly universal in SNNPR in 2016, with 97.3% of children ever breastfed. Rates of early initiation of breastfeeding (defined as initiation in the first hour) in SNNPR were among the highest in the nation at 77.1% [1]. Breastfeeding on demand was common [40, 41], and women understood that children should be fed from both breasts [41].

In 2016, the median duration of exclusive breastfeeding was 3.0 months [1], up from the median of 1.8 months in 2005 [3]. However, HEW had effectively communicated the recommendation that women breastfeed exclusively for 6 months [41], suggesting that lack of awareness of the recommendation is not a primary barrier to women practicing exclusive breastfeeding for 6 months. Exclusive breastfeeding was most commonly interrupted by the giving of water, traditional teas, non-human milk (cow and goat milk), other liquids, or thin gruels prior to 6 months [1, 40, 41]. Common reasons for giving foods or liquids other than breastmilk prior to 6 months included traditions or advice from older family members and community members, or a belief that breastmilk alone is insufficient for growth and satiation [41]. In formative work in SNNPR, Alive and Thrive found that mothers reported when water, traditional teas, or linseed water are given, the reasons were medicinal (for example avoiding or treating digestive problems). On the other hand, when cow's milk or thin gruels were given, it was because mothers felt their breastmilk was insufficient [41].

### Timely Introduction of Complementary Foods

From the literature review, we noted that while exclusive breastfeeding for 6 months was not widely practiced, complementary foods were not necessarily introduced in a timely manner. The median duration of *predominant* breastfeeding, defined as either exclusive breastfeeding or breastfeeding with other liquids only, was 6.7 months [1]. Therefore, while caregivers gave water or other liquids early, complementary *foods* were often not introduced until after 6 months. Ayana *et al.* found that 6.5% of caregivers in northern Ethiopia introduced solids or liquids other than breastmilk after 6 months, where only 61.8% introduced solids or liquids other than breastmilk at 6 months [42]. Formative work by Alive and Thrive identified considerable variability in this regard. Some caregivers reported giving fruit or grain-based porridges even in the first few months of life, while others reported waiting as long as one year to introduce such foods. Some caregivers cited lack of economic or physical access to foods; others cited health beliefs for introducing foods either too early or too late. However, caregivers also acknowledged that advice from HEW has been at least somewhat influential in discouraging the early introduction of complementary foods or non-breastmilk liquids [41].

Male gender of the child was found to be associated with timely introduction to complementary foods, in unadjusted analysis [43]. Notably, however, this finding comes from Eastern Ethiopia, which, unlike SNNPR, is a predominantly Muslim region where gender norms may be very different. Three separate studies – all coming from northern Ethiopia – found mothers having had a post-natal checkup as being associated with timely introduction of complementary foods [42, 44, 45]. Other factors associated with timely introduction include: urban residence [42]; both mother and father education level, having had more than one live birth, a mother who does not work outside the home, birth preparedness [44], and institutional delivery [45].

### Common Complementary Foods

Alive and Thrive found that gruels and porridges were the most common complementary foods, with mothers generally stating that porridges should include at least two different cereal grains mixed together; many mothers reported adding lentils. Some mothers reported adding milk, butter, sugar, and/or salt. In interviews, mothers also named foods from a variety of food groups – including cheese, egg, pumpkin, avocado, banana, mango, potato, bread, and sugarcane. However, while mothers reported a variety of foods when asked, observers of actual feeding practices noted a considerably less

varied diet. In opportunistic observations, complementary foods were limited to porridges made from cereals, sometimes with added milk, kale, lentils, fenugreek, and oil [41].

Alive and Thrive additionally found that mothers in SNNPR generally agree that family foods are not appropriate for young children, and thus that separate foods should be prepared for them. Root crops, including potato and sweetpotato, were specifically mentioned as a family food not considered appropriate for infants and young children [41]. Other foods mentioned as inappropriate include kale, meat (including poultry and fish), eggs, kolo<sup>3</sup>, and pumpkin, though pumpkin was not consistently seen as inappropriate. Most mothers felt that children can start to eat family foods at 1 year of age; some fathers and grandmothers stated this should happen at older ages [41].

### Food Thickness and Energy Density

Complementary food thickness and energy density are difficult-to-measure facets of complementary feeding. As such, no estimates are available of what proportion of infants and young children are receiving complementary foods of too thin consistency or of insufficient energy density. In interviews, Alive and Thrive noted that mothers have “some difficulty differentiating between semi-solid and liquid foods”, and that while mothers may report thicker consistency foods, in-home observations revealed that porridges were of very thin consistency [41]. Some mothers said that a porridge of the consistency of a mashed banana is appropriate; others felt thinner consistency would be better. Mothers who prefer thinner foods cite infants’ ability to swallow and/or digest as reasons for giving thinner gruels [41].

Alive and Thrive also noted that mothers used bottles to feed children, necessitating thin gruels that can pass through the nipple of the bottle. Mothers stated that bottles keep food covered, and do not require hand feeding, which mothers perceived as more hygienic. Mothers also noted the ease of feeding with a bottle. For these reasons, bottles were preferred by some mothers [41]. Nationally, in 2016, bottle use was highest among infants 6 to 8 and 9 to 11 months old, with 18.5% and 19.4%, respectively, using a bottle with a nipple [1]. Notably, this is an increase from 2011 when 13.9% and 11.3% of infants of the same ages were fed with a bottle [2]. Bottle use among infants *under* 6 months, however, decreased from 2011 to 2016 [1, 2]. Teshome *et al* found that bottle feeding was associated with stunting in a rural community in northern Ethiopia [46].

Abebe *et al* studied complementary foods supplemented with kidney beans and pumpkin in comparison to traditional recipes in SNNPR. They report that at accepted consistencies, both traditional complementary food as well as those supplemented with kidney beans and pumpkin, ranged in energy density from 0.46 to 0.53 kilocalories per gram (kcal/g) [47]. Note that the recommended minimum energy density for complementary foods is 0.7 to 0.8 kcal/g [37]. Abebe *et al* noted the challenge of achieving adequate energy density, given the gelatinization of starch during the cooking process, and the generally prohibitive cost and poor access to things like oil or sugar, which could increase energy density without the thickening porridges to consistencies perceived as unacceptable. The authors also noted that complementary foods often have insufficient calories from lipids, and suggest avocado as a potential addition to complementary foods to increase lipid and energy content [47].

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<sup>3</sup> Kolo is a snack made from roasted grains and/or lentils, most commonly roasted barley, chickpeas, and/or groundnuts



Abeshu *et al*, on the other hand, found the average energy densities of complementary foods in SNNPR to be 0.92 kcal/gram for 6 to 8 months old children, increasing to 1.24 kcal/g and 1.42 kcal/g for 9 to 11 and 12 to 23 months old children, respectively. However, the authors noted that almost one-in-three children were fed a liquid-consistency food and one-in-four was fed a thin-consistency food at some point in the day [48].

### Meal Frequency and Portion Size

The WHO considers two daily meals to be the minimum standard for infants 6 to 8 months, and three daily meals to be the minimum for 9 to 23 months old children. In SNNPR, 41.4% of children 6 to 23 months met these minimum meal frequency definitions in 2016 [1]. Furthermore, nearly one of every five children 6 and 23 months had *no* solid, semi-solid, or soft food in the previous 24 hours [1]. According to Alive and Thrive's formative work in 2010, most mothers reported in focus groups that they follow minimum meal frequency recommendations. Snacks were not common in SNNPR [41]. It is also noteworthy that this is the only IYCF practice that has not seen an improvement over time in SNNPR (Figure 2).

Nationally, factors associated with improved odds of meeting meal frequency included young age of child, mothers with primary or secondary education (compared to no education); maternal exposure to media (defined as exposure to newspaper, magazine, radio, or television at least one time in a week); and the number of antenatal care visits [49].

Abeshu *et al* found that in 2014-2015, most children 6 to 23 months in SNNPR met meal frequency recommendations and that the amount of food *served* per meal – determined through a weighed food record – tended to be appropriate. However, amount of food *consumed* per meal was below estimates for gastric capacity, and overall energy intake from complementary foods was far below estimated needs [48]. Others have noted that energy intakes of children 6 to 23 months in SNNPR were below the estimated energy needs from complementary foods for breastfed children [40, 50]. The gap between actual energy intake and energy needs from complementary foods tended to decrease or disappear after adjusting for child weight. Nevertheless, intakes likely put children at risk of growth failure and/or fail to support recovery for those with growth faltering [40, 50]. Alive and Thrive found mothers generally struggled to estimate portion sizes or amounts of foods given; the only mother to offer a specific quantity estimated her 10-month old child gets 1½ coffee cups of food per day; note that a typical Ethiopian coffee cup holds 70-75 milliliters.

Alive and Thrive found that mothers were conflicted in their willingness to follow hypothetical advice from a HEW to increase meal frequency. Many mothers expressed a willingness to follow the recommendation, wanting their child to be healthy and strong. Other mothers, however, were resistant. Some cited affordability as their primary concern. Others worried that giving their child more food would cause sickness (vomiting and diarrhea) or “would stimulate the child’s appetite and develop a habit for eating more food than the family can afford” [41].

### Dietary Diversity

Though mothers tended to acknowledge the importance of feeding a variety of foods [41], Ayana *et al* found that in 2015, only 10.7% know the recommendation that children 6 to 23 months receive foods

from at least 4 food groups daily [42]. Furthermore, only 13.0% of children 6 to 23 months in SNNPR consumed four or more food groups in the previous 24 hours [1]. Grains were the most oft-consumed food group, with consumption by 56.1% of breastfed children 6 to 23 months at the national level; followed by vitamin A-rich fruits and vegetables (27.7%); dairy products (25.1%); roots and tubers (23.4%); legumes and nuts (21.3%); eggs (17.0%); other fruits and vegetables (10.1%); and meat (8.0%) [1]. Region specific estimates of food group consumption were not available.

From household surveys of 417 families with children 6 to 23 months in the Sidama zone, SNNPR in 2015, Dangura *et al* identified several factors associated with improved child dietary diversity scores. Fathers' literacy and involvement in IYCF were both positively associated with dietary diversity [51]. Maternal factors associated with improved dietary diversity included knowledge score, having received IYCF information during a prenatal visit, exposure to IYCF information via mass media in the last month, and having attended a cooking demonstration in the previous 6 months [51]. Household factors associated with improved dietary diversity included homestead production of fruits and/or vegetables and raising livestock [51]. Notably, Gebremedhin *et al* identified several of the same factors associated with dietary diversity in the Amhara region in northern Ethiopia, including maternal knowledge of IYCF, maternal exposure to mass media, father's involvement in child feeding, having a household member attend a cooking demonstration, having a home garden, and owning chickens. In addition to these, maternal education, household food security (compared to moderate or severe food insecurity), household wealth, and recent conversation with a HEW were associated with improved dietary diversity [52].

Nationally, factors directly associated with improved odds of meeting dietary diversity included child age; first birth order (compared with latter birth order); mothers with primary or secondary education (compared to no education); and household wealth [49]. Indeed, mothers cited financial constraints as reasons that many foods are not routinely given to young children [41]. However, mothers expressed a willingness to incorporate diverse foods into their children's diets if they were encouraged to do so [41].

### Consumption of Vitamin A-Rich Foods

Gibson *et al* found that median vitamin A intakes were 0.0 retinol equivalents (RE) and nutrient densities were 0.0 RE per 100 kilocalories in each age group from 6 to 23 months in SNNPR; these data were collected from weighed food records of 93 children in 2006 [40]. On the other hand, Mesfin *et al* (2015) used weighed food records from 64 children, ages 6 to 23 months, and found median intakes of vitamin A were 184 RE, 224 RE, and 90 RE for children 6 to 8, 9 to 11, and 12 to 23 months, respectively. Note that these median intakes met estimated needs for infants 6 to 11 months [53]. The extreme difference in estimated vitamin A intake may, at least partially, be explained by the fact that Gibson *et al* collected data during June, a very food insecure time, where Mesfin *et al* collected data in February and March, which tend to be more food secure months. The latter data collection period also occurred in 2015 versus 2006, so secular changes could account for some of the difference.

In SNNPR in 2016, 48.2% of children 6 to 23 months had consumed a vitamin A-rich food of any kind in the previous 24 hours [1].

## Responsive Feeding

Abebe *et al* explored responsive feeding of children 12 to 23 months in northern Ethiopia. While over 90% of mothers actively encouraged their child during feeding, fewer mothers practiced appropriate *responsive* feeding in other regards. Mothers tended to prematurely terminate feedings, and distractions during feeding were common. For children who refused food at any point, the most common strategies mothers employed were breastfeeding (50%), threatening to harm the child (28%), asking the child why he/she was refusing food (19%), and forcing feeding (17%). Caregivers of non-stunted children were more likely to practice positive responsive feeding. Positive responsive feeding, positive active feeding (actively encouraging), and negative active feeding (force feeding or threatening) were all positively associated with mouthfuls accepted [54]. Baye *et al* also found that positive responsive feeding was associated with increased energy intake among 9 to 11 month old infants in northern Ethiopia [55]. It should be noted, however, that research on responsive feeding is limited.

Alive and Thrive noted considerable variation in mothers' attitudes toward responsive feeding and actions during feeding. Child feeding tended to occur outside of family meal times. Some mothers were interactive and encouraging when feeding; others seemed to stop feeding as soon as the child lost interest or in some cases even when the children seemed to still want to eat. Of note, some mothers suggested that young children are "expected to have a poor appetite." Consistent with Abebe *et al*, mothers were also observed to use aggressive tactics, such as hitting or force-feeding [41].

## Feeding During and After Illness

In 2016, the proportion of children in SNNPR under 5 years who had diarrhea in the previous 2 weeks was 13.9%. Of those, only 28.7% and 21.4% of caregivers gave at least the usual amount of liquid and foods, respectively, during diarrhea [1]. Alive and Thrive noted a variety of responses when asked about the amount of feeding during diarrhea, with some mothers and other caregivers noting an increase in food and liquid, and others noting the opposite is practiced. Advice received from HEW was also conflicting. Furthermore, mothers were resistant when told that it is best practice to give additional fluids during illness, noting more fluids could increase vomiting and diarrhea [41]. Mothers were more receptive to the recommendation to give more fluids and food during *recovery* from illness, with some mothers stating they already followed this practice [41].

## Hygiene

Mothers said that they store food when there are leftovers or when food is prepared in advance. Food that is not consumed is covered and "set aside for future use." When mothers are away from the home they prepare food in advance for another caregiver to feed later. Several caregivers who used bottles for feeding thin gruels cited a belief that bottles are more hygienic than other feeding dishes or utensils because a bottle can keep food covered, and a bottle eliminates hand-feeding [41]. Water only, not soap, was used in washing hands, utensils, and dishes. Observed food preparation and consumption were often in proximity to animals, dirt floors, flies, and other potential sources of pathogens [40, 41].

## Health Extension Program

The existing HEP was well recognized and well established in communities. Alive and Thrive found that most HEWs describe their focus as "environmental sanitation and latrines, immunization, family planning, care of pregnant women, and child feeding in general" [41]. With respect to child feeding,

HEWs said they provide counseling on breastfeeding and “general feeding for children”; a main part of the nutrition focus seems to be on therapeutic feeding for malnourished children [41]. Mothers in northern Ethiopia who reported having received training from a HEW were more likely to accurately answer questions about feeding colostrum, minimum meal frequency, foods and beverages with low nutrient density/consistency, responsive feeding; they were also more likely to practice improved dietary diversity and minimum acceptable diet. These analyses, however, were not adjusted for any covariates [56].

### Sources of Information on IYCF

Mothers are primarily responsible for making decisions about child feeding, preparing food, and feeding the child. Mothers said that HEW are the main and best source of information on child feeding, but women also take cues from their mothers or mothers-in-law, and other women in the community, particularly elderly women or women with experience. Though some women cited their husbands as a source of information, fathers’ influence on child feeding is primarily through the provision of food or money to purchase food. Women did, however, indicate that their ability to adhere to feeding recommendations may depend on their husbands support, particularly with respect to increasing frequency, portion size, and procuring specific foods for the child [41].

Alive and Thrive observed that mothers, fathers, and grandmothers all expressed a broad eagerness to learn more about child feeding and a willingness to follow recommendations. Volunteers and HEW themselves also expressed a desire to learn more about child feeding, and endorsed a hands-on approach to educating women on child feeding, by showing women “what could be prepared from food they already have” and “educat[ing] with examples” as the most effective strategies for this population [41].

### Mass Media

Mass media – such as radio – is often used as a medium to promote behavior change, including for infant and young child feeding. Exposure to mass media was associated with improved dietary diversity in three separate analysis – including one at the national level [49], one in SNNPR [51], and one in northern Ethiopia [52] – and with improved odds of meeting meal frequency nationally [49]. Additionally, in an analysis of the Alive and Thrive intervention, exposure to radio spots was associated with increased odds of meeting minimum dietary diversity and minimum acceptable diet. Furthermore, the effect was strongest among those with exposure to more radio spots [57]. Kim *et al* postulate that radio spots are one mechanism by which the intervention might have improved IYCF practices.

However, in their assessment, Kim *et al* also report that only 31.1% and 30.9% of women heard radio spots with breastfeeding and complementary feeding messages, respectively [57]. In the 2016 Demographic and Health Survey (DHS), exposure to media was generally low, with individuals in rural areas having even less exposure than national averages. Among women in SNNPR, only 8.4% and 13.3% were exposed to television or radio on a weekly basis, respectively. Among men, the proportions were 7.9% and 18.1% having exposure to television and radio, respectively, on a weekly basis. Less than one in four rural households owned a radio [1].

Additionally, Regassa and Stoecker found that radio ownership increased with household wealth and woman's access to radio was inversely associated with household food insecurity and hunger in the Sidama zone, SNNPR [58]. Therefore, mass media may not be an effective method of reaching disadvantaged and/or rural households for the QDBH project.

## Phase 2: Qualitative Research

We conducted 23 FGDs in five kebeles. We additionally conducted five KIIs with HEWs, three with community leaders and one with a government employee from the zonal Bureau of Health. Data collection was done in June and July of 2017.

Our findings on current IYCF practices tended to be consistent with findings from the literature review, particularly with respect to breastfeeding, common complementary foods, meal frequency, and mothers' attitudes toward HEW. However, differences between our findings on IYCF and practices described in the literature were also identified, most notably the practice of and attitudes toward bottle feeding. Furthermore, where little research existed, particularly on portion size, we were able to more fully understand current practices.

We also attempted to go further in exploring determinants of key behaviors. Enumerators were trained on probing in qualitative research, and the FGD guides had several built-in probing questions to understand determinants for current practices. Where caregivers said they believed certain feeding practices to be good or bad, enumerators were instructed to ask where this belief came from (for example, from personal experience, from having been advised by someone else, or from a religious belief). Enumerators posed hypothetical queries (such as "If a Health Extension Worker advised you to give your child 3 coffee cups of food per meal, would you be able to?" with additional probes) to understand how caregivers might respond or react to receiving such advice from a trusted source of information. Caregivers, however, generally had a difficult time responding to such hypothetical advice, more often responding based on advice they *had* received or stating whether or not they had received the advice ("No, we have never been told such things").

In addition to the summaries of findings below, problem trees, solution trees, and analysis of behavioral determinants of major complementary feeding practices can be found in Appendix C through Appendix G.

## Early Initiation of Breastfeeding

Breastfeeding is common and considered the norm. Mothers in all FGDs were familiar with the recommendation to initiate breastfeeding early, and credited HEW for this awareness. Mothers tended to acknowledge that it *used* to be common practice to give boiled water prior to breastfeeding and/or to discard colostrum. In some cases, these practices are still encouraged by "elder women," particularly mothers-in-law (MIL). However, mothers generally reported following HEW advice. Mothers understand this to be best for infant health. One mother in Sidama mentioned health benefits for breastfeeding mothers, explaining that early breastfeeding "help[s] us to quicken the expelling of placenta from our uterus."

### Exclusive Breastfeeding

Consistent with findings from the literature review, we found that mothers clearly understand the recommendation to exclusively breastfeeding for 6 months. Furthermore, they generally understand the “definition” of exclusive breastfeeding, in other words that it precludes the giving of other liquids as well as food (with the exception being prescribed medication). Mothers credit HEW with telling them the benefits and importance of exclusive breastfeeding. Mothers acknowledged community and cultural norms of giving water, cow’s milk, and traditional teas very early (and in some cases before breastfeeding initiation), but stated these things were practiced in the past, prior to their receiving information from HEW. Only a minority of mothers admitted to introducing liquids or foods prior to 6 months.

As with previous findings, the few mothers who disclosed introducing liquids or foods before 6 months said they did so because their breastmilk no longer satiated their child. Enumerators probed on how mothers know that they have insufficient breastmilk, which elicited a variety of responses. Many said infants who receive insufficient breastmilk cry a lot, including during or immediately after breastfeeding, indicating that they were not well fed. Other caregivers said they can “tell by looking” at the child if he/she is thin. Some mothers also said they expect their breast to leak when it has milk, and conversely a breast that is not leaking does not have milk. Many caregivers also said mothers just “know” or can “feel” when their breast does not have milk. Mothers and grandmothers both felt that a mother’s own nutrition status influences her ability to produce enough breastmilk.

Grandmothers were also familiar with the recommendation to breastfeed exclusively. In one FGD in Sidama, however, one grandmother voiced her opinion that giving liquids like water or “hamessa” (a traditional herbal tea) is the same as giving breastmilk, and therefore a woman is considered to still be exclusively breastfeeding if she gives water, hamessa, or other liquids. Other grandmothers in the group, but not all, agreed with this statement. In general, grandmothers were much more likely to voice opinions that dissented from exclusive breastfeeding recommendations, and readily stated that their daughters or daughters-in-law may not practice exclusive breastfeeding. Grandmothers were conflicted when asked about a woman’s ability to exclusively breastfeed if encouraged to do so. Most acknowledged this would be ideal, but impractical given poor maternal nutrition and insufficient breastmilk.

### Timely Introduction to Complementary Foods

Mothers stated they started complementary foods – albeit often very thin gruels – at 6 months. Although no mother stated that they *delayed* introduction to complementary foods, some suggested that they rely on breastfeeding alone during food shortages.

## Consistency

Findings on complementary food thickness reported in the literature review relied primarily on verbal descriptions, which, when contrasted with opportunistic observation, indicated verbal descriptions may be unreliable. To assess current practice and ability to feed adequately energy dense foods, we used photographs of maize-based porridges (Figure 4). For complementary foods from 6 to 8 months, responses varied. Mothers and grandmothers tended to report feeding watery (photograph 1) or thin (photograph 2) complementary foods, with some stating they had been advised to feed thicker porridge, resembling photograph 3. Caregivers differed in the age at which they feed thicker consistency foods. Some caregivers said they progress to thicker consistency (photograph 3 or 4) at 12 months of age, while other stated they thicken porridge at 9 months and give fully solid foods at 12 months.

Caregivers primarily report using a spoon, cup, or their own hand when feeding. In contrast to Alive and Thrive, who reported bottle use was common and perceived as hygienic, only a minority reported bottle-feeding. Those who did say bottle feeding is sometimes done say it generally ends by about 9 months of age. Furthermore, caregivers perceived bottle feeding as *unhygienic*. No caregivers mentioned a child self-feeding.

## Food Quantity

Consistent with previous findings, mother report that infants 6 to 8 months typically receive meals 2 to 4 times per day. Mothers reported that children 9 to 23 months get 3 to 6 meals per day.

As very little was known from previous work on portion sizes, our enumerators carried “buna” cups, traditional Ethiopian coffee cups that typically hold approximately 70 to 75 milliliters. Mothers were asked to estimate portion sizes using this unit of measurement. Most said that infants 6 to 8 months get  $\frac{1}{2}$  to 1 buna cup per meal. For infants 9 to 12 months, portion sizes ranged from  $\frac{1}{2}$  to 1 buna cup per meal as well. Portion sizes for children over 12 months ranged from 1 to 2 buna cups per meal.

The Ethiopian government’s recommendations for how often and how much to feed at different ages are shown in Table 4.

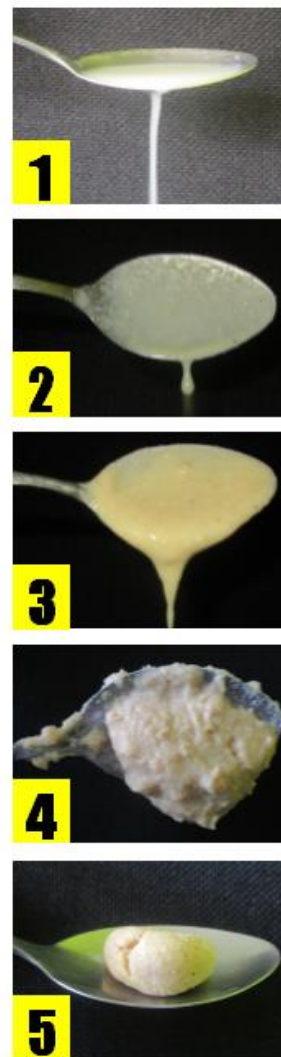


Figure 4. Photographs used for discussing porridge consistency in FGDs.



Table 4. Recommendations from the Infant and Young Child Feeding Quick Reference Book, Ministry of Health Federal Democratic Republic of Ethiopia.

| Age                     | How often?<br>The number of times a child needs to be fed within a day. | How much?<br>The amount of food an average child will eat in a day (in addition to breastmilk) |
|-------------------------|---|--|
| At 6 months             | 2 to 3 times plus frequent breastfeeds                                  | Start with 2 to 3 tablespoons and graduate increase the amount to three coffee cups            |
| From 6 up to 12 months  | 2 to 3 meals plus frequent breastfeeds<br>1 to 2 snacks may be offered  | 3 full coffee cups   |
| From 12 up to 24 months | 3 to 4 meals plus breastfeeds<br>1 to 2 snacks may be offered           | 4 full coffee cups   |

Seasonality strongly affects both meal frequency and portion size. Households are able to feed more often and greater portions during coffee season (approximately October to January) – when households have more money from the sale of cash crops and are also harvesting more food crops. Conversely, they may feed less often and in smaller portions in the winter. Problem and solution trees in **Error! Reference source not found.** more fully outline barriers and motivators of feeding appropriate food quantities.

#### Common Complementary Foods and Dietary Diversity

Consistent with previous work, the most common complementary food cited was porridge, which participants gave various names (“*gunfo*”, “*meten*,” “*atmite*,” and “*muke*”), each having slightly different ingredients and consistencies. *Muke* and *atmite* are used more-or-less synonymously for very thin gruels. *Gunfo* typically refers to thicker porridges. *Meten* refers to porridge prepared from composite flour with more than one grain and/or legume, and is promoted by HEW. Most caregivers said porridges would be prepared from at least 2 cereals (commonly barley, wheat, maize, fenugreek seed, teff, or “mixed” flours purchased at the market) and would sometimes have added cow’s milk, oil, sugar, salt, or other flavorings. Some mothers also mentioned lentils, kale, or egg as additions to porridges to make “enhanced” porridges as is often recommended by HEW. Various fruits – including mango, avocado, and banana – were the next most commonly mentioned complementary foods. Other locally produced foods such as egg, cabbage, kale, potatoes, and other vegetables were also mentioned as being given, but these were especially conditioned on availability. Lastly, some caregivers said they purchase “processed foods” such as biscuits, bread, and fruit juices, when insufficient foods are produced at home (in the winter).

Kocho<sup>4</sup> was mentioned as sometimes given to young children, but it was also mentioned as an inappropriate complementary food by some. By those who consider kocho inappropriate, they believe it is too “hard” for young children to digest.

<sup>4</sup> Kocho is the edible portion of the enset tree, and can be processed into several products, including flour.



Unlike in Alive and Thrive’s qualitative work, caregivers in our FGDs mentioned very few foods as being inappropriate. The exception was with naturally sweet foods – such as sweetpotato, honey, and taro – which caregivers believe delay speech development. When probed for where this belief originates, most said it is considered “common knowledge” or that older women in the community had advised them. Only one mother said it was from the experience of her neighbor, who gave her infant honey and had delayed speech development.

Some caregivers said their HEW had told them about the importance of a diversified diet but spoke in very general terms, where others said they had not been advised on what kinds of foods to give children. Many simply said that they had been advised to give porridge and in some cases fruits starting at 6 months, while offering very few specifics. When asked if they would be able to feed 4 different kinds of foods per day if advised to do so by a HEW, caregivers primarily cited lack of availability and expense as barriers, both of which are subject to seasonal variation.

### Responsive Feeding

When asked about hunger and fullness, most caregivers described general tenets of responsive feeding, but very few specifics. Mothers say they can tell that their child is full if he/she refuses to eat, wants to play, or sleeps; several caregivers in Sidama said they could tell a child is full if he/she burps. Many caregivers said they play with the child to try to encourage them to eat more, or use “cajolery” to make them interested in the food. They also said they will change the food to something the child likes (“prepare sweet foods”) or breastfeed the child.

Some caregivers – including grandmothers – said they used to force children to eat, but that they no longer do so because of the advice given them by HEWs. So, while force feeding was somewhat common in studies cited in the literature review, participants do not acknowledge it as current practice. Some also said they take their child to the clinic if he/she refuses to eat.

*“Before we force the child to eat by putting our hands on the child mouth then we pour the milk/atmite to our hands and we blow on the child nose. But now thanks to our Health Extension Workers we stop doing such things.”*  
- Grandmother in Sidama

### Orange and White Fleshed Sweetpotatoes

White fleshed sweetpotatoes (WFSP) are common and well-known in both Gedeo and Sidama zones. The WFSP known in the communities sometimes have a red peel. A minority of caregivers stated they have seen orange or yellow fleshed sweetpotatoes sometimes mixed with white fleshed varieties at the market. In Gedeo, one mother, who said that she was from a neighboring town, had heard about health benefits of OFSP from her father, who got “the information from the agriculture professionals.” Those mothers who had gotten OFSP mixed with WFSP and consumed them said that they preferred WFSP. Said one mother in Gedeo, “I don’t like to eat [OFSP] because [it] contain more water and the taste is not good for me.”

White-fleshed sweetpotatoes with red peels are both produced at home and/or purchased from the market. In the Andida kebele in Gedeo, fathers suggested that WFSP were less available and that “production [is] not enough, we brought it from the lowland to consume it”; mothers in the same kebele did not cite insufficient production as a concern. Several caregivers in both Gedeo and Sidama cited a

perception that WFSP require “vast” land for homestead production. Households that produce WFSP primarily use the roots for home consumption, mostly as a snack or coffee starter. In the case of excess production, roots may be sold at the market. One father said that defective roots might be used as animal feed. Universally, leaves are used as animal feed – especially for dairy cattle, with the belief that the leaves increase milk production. Participants seemed not to differentiate between leaves and vines, saying that leaves are re-planted, or in rare cases, may be sold. Leaves are not considered appropriate for human consumption – and many participants laughed when asked whether leaves are ever consumed by humans. When probed on the idea of eating sweetpotato leaves, participants referenced that their elders had never eaten sweetpotato leaves, and therefore they would never consider doing so. One mother said “the sweetpotato leaves [are] not edible plant by human beings”; and another said “my mother and father didn’t eat before, we don’t want to eat sweetpotato leaves.”

Sweetpotatoes are considered an important food security crop “during the time of food shortage, it is used to bridge until the harvesting time.” Families that produce WFSP said they were able to sell more maize when roots are available for consumption, thereby increasing household income. Households that purchase WFSP from the market cite their affordability. Further, WFSP are seen as filling, with one father stating “If someone eats sweetpotato and drinks water...he stay longer without any hunger.” Mothers especially appreciated that WFSP can be served as a single-ingredient food, an important attribute when there is no money to buy spices, oil, or other additions for flavor. The natural sweetness of WFSP is sufficient for palatability.

Yet, while WFSP are valued for protecting against food insecurity and hunger, so too are they associated with poverty and food shortage. Sweetpotatoes are generally viewed as an “inferior food”, and a “food of the poor peoples.” Similarly, while mothers appreciate that the WFSP does not require addition of other ingredients, this is also seen as a negative, with several caregivers calling WFSP “boring.” One father said, “Sweetpotato cannot be eaten frequently as it is boring to consume....you can change the form in the case of the Irish potato to make with kale, cabbage, bean flour, and pea flour, [and] if you want you can eat it boiled alone. But sweetpotato cannot be so, it is only eaten in one way.”

Generally, caregivers agreed that WFSP have little or no nutritional benefit above being a filling food. One mother stated “sweetpotato doesn’t contain any health benefits, we eat the sweetpotato when we are hungry.” One father in Sidama even described symptoms of kwashiorkor, which he associated with children who frequently consume WFSP. Generally, Irish potatoes were viewed more favorably than WFSP in terms of health benefits. Some fathers cited WFSP as a “source of heat and energy” or for “body building.”

*“Sweetpotato is not used for health...especially if children consume it frequently, you can see...[t]heir stomach is stretched not proportionally with other parts of the body. Most of the children here in our community seen like this...[the] children look stretched stomach and head but the legs and hands very thin.”*

- Father in Sidama

Beyond seeing no nutritional benefit of WFSP, many caregivers associated health problems with the roots. As previously mentioned, caregivers believe WFSP (as well as other sweet foods) delay speech

development. Participants consistently said WFSP causes heartburn and increased stool production, the latter primarily in reference to children. On two occasions, participants cited WFSP as causing “amoeba” or “worms” in the stomach.

Participants in several FGDs stated that WFSP are inappropriate for young children; yams were also cited as an inappropriate food for children. In Gedeo, participants most commonly cited an increase in stool production as a reason that WFSP are not given to children. Concerns with choking and the WFSP “sticking” in the child’s throat were also cited.

Participants in Sidama believe that WFSP are inappropriate for young children, but cited different reasons. In Sidama, caregivers tended to cite WFSP having little to no nutritive value or being a choking hazard. Delayed speech was rarely mentioned as a perceived side effect of WFSP – or any other food – in Sidama. When pressed on where mothers learned about the inappropriateness of WFSP, responses varied. Some mothers had learned from their own mothers or grandmothers, or neighbors with older children. In some cases, the belief was considered “community knowledge.” In other cases, mothers said they know from their own experiences which foods are appropriate for young children, “because they don’t grow properly when they [are] fed these foods.” In Gedeo in particular, mothers said their beliefs were based less on personal experience and more on information received from others.

Despite concerns with WFSP, caregivers stated a broad willingness to include OFSP in their diet if a HEW so advised and if they are taught how to prepare them.

Findings were similar in Gedeo and Sidama, except where otherwise noted.

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*“We prefer sweetpotatoes for us, for matured family members. But in the case of children, we prefer regular potatoes. Because sweetpotatoes [are] not appropriate food for younger children.”*

- Grandmother in Sidama

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### Healthy Baby Toolkit

Generally, feedback on the Healthy Baby Toolkit (HBT) was very positive. All caregiver groups felt that the images on the counseling card were clear, with the exception of food images, which caregivers felt were too small. When asked which foods should be added to the card, caregivers most commonly recommended mango, avocado, kocho, and enjera. Caregivers recommended omitting fish and OFSP, citing a lack of availability of these foods. Table 5 lists all foods that caregivers recommended either adding or deleting from the counseling card. One father noted that the image of the pregnant woman was “not attractive,” but several participants stated the images of the people were clear and attractive. Notably, in a demonstration of the HBT with HEW and nutrition professionals, many cited the community norm that women are not to eat while they are also breastfeeding, as is shown on the counseling card. This concern was not raised in any FGD with caregivers, however.

Most caregivers felt the bowl would be helpful in assuring appropriate nutrition for pregnant and lactating mothers and young children. Some caregivers felt the bowl was too small for pregnant or lactating women. At the same time, some female caregivers were doubtful that mothers would be able to afford extra food as the feeding bowl suggests; fathers did not express this concern. A majority of female participants felt that the bowl should not be transparent, as there is a cultural belief that children can be made sick if someone with “evil eye” can see the child’s food. As this concern was made apparent early and consistently in the data collection process, enumerators were subsequently instructed to ask whether an orange bowl would be appropriate; in all cases participants felt an orange bowl – or any color that is not transparent – would be acceptable. One mother liked that the bowls were a light color, which would be better for hygiene and keeping the bowls clean. Generally, the material of the bowls was acceptable, though some groups in Sidama preferred not to use plastic, believing that plastic will hasten food spoilage. Another common recommendation is that the bowl should have a cover; caregivers believe a cover would keep the food safe from flies and other debris, and will keep food safe.

Table 5. Recommended foods to add and remove from counseling card.

| Foods to Add   | Foods to Remove |
|----------------|-----------------|
| Avocado        | Fish            |
| Mango          | OFSP            |
| Pineapple      |                 |
| Tomato         |                 |
| Orange         |                 |
| Sweetpotato    |                 |
| Yam            |                 |
| Kocho          |                 |
| Enjera         |                 |
| Pumpkin        |                 |
| Regular potato |                 |
| Chicken        |                 |
| Maize          |                 |
| Sugar cane     |                 |
| Barley         |                 |
| Papaya         |                 |
| Chopped beef   |                 |

Caregivers understood the purpose of the spoon in promoting thick consistency foods. Several commented that they would be unable to serve thin porridge with the spoon. Some mothers appreciate the spoon, as it gives them a more hygienic option than handfeeding.

Mothers overwhelmingly responded that they could use the bowl and spoon in child feeding, provided it is not transparent; in some cases, mothers said they would also need a cover. They felt their husbands and other family members would support their use of the bowl. Fathers and grandmothers stated support for the tool, again provided the bowls are not transparent. In many cases, fathers stated a willingness to purchase at the market for their family to use if the price were affordable, though it is unclear what price they would consider affordable.

*“Mostly we feed thin porridge, it can pass in the spoon holes, especially under 9 months age children.”*  
 - Mother in Sidama

### Father’s Roles

Fathers are seen as providers for their family. They are considered to be “good” fathers when their children are “well mannered” and they provide financially for their families (either with money or with sufficient food, land, etc.). When asked how “good” fathers care for their wives during pregnancy and lactation, fathers most commonly cite giving them food, taking them to the health post, and ensuring they rest (“not carry heavy loads”) and follow health provider advice. Similarly, “good” fathers of infants

and young children are those who provide enough food and take them to the health post as needed. Only a few fathers mentioned having direct roles in child health, with specific roles in cleaning or feeding the children.

### Food Production and Purchasing

Coffee is the most important cash crop in Gedeo; both coffee and chat are important cash crops in Sidama. Enset is an important food security crop, as it is drought resistant and can be harvested at any time during the year.

Table 6 outlines other crops produced at home, including whether they are primarily consumed at home, sold, or purchased from the market. Note that, aside from these cash crops, the most common crops produced at home and sold are fruits (avocado, mango, banana and pineapple). In some cases, fruits (particularly pineapple) are referred to as cash crops, as they are commonly produced in large volumes and sold, but only in some kebeles. Other fruits (mangoes, bananas, and avocados) may be sold by women in small amounts, with women having control of the small profits for buying food from the market.

*Table 6. Foods produced and mostly eaten at home; produced at home and mostly sold; and foods purchased from market.*

|   | Produced at Home  |   | Purchased from Market  |
|---|---|---|--|
|   | Eaten   | Sold                                    |  |
| <b>Staples</b>                              | Enset / kocho<br>Wheat<br>Sweetpotato<br>Taro<br>Maize<br>Potatoes<br>Sorghum |   | Flour (single or mixed cereals)  |
| <b>Pulses</b>                               | Haricot beans   |   |  |
| <b>Vitamin A-rich fruits and vegetables</b> | Pumpkin<br>Kale<br>Carrot   | Mango<br>Papaya                         |  |
| <b>Other fruits and vegetables</b>          | Cabbage<br>Pepper<br>Beetroot   | Avocado<br>Banana<br>Pineapple (Sidama) |  |
| <b>Other</b>                                |   | Sugar cane                              | Fruit juices / drinks<br>Biscuits<br>Meat (rare)<br>Spices<br>Oil<br>Onion |
| <b>Cash crops</b>                           |   | Coffee<br>Chat (Sidama)                 |  |

FGD participants say that season, family size, amounts of crops produced, perishability of crops, and current prices all influence how much of a particular harvest is kept at home and how much is sold. In some families, fathers make this decision, where in other households, mothers and fathers decide together. Fathers say that mothers tend to advocate on behalf of keeping enough foods for the family while the fathers tend to focus more on income-generation, with one father even saying that sometimes women “hide a portion of the harvest from us.”

“...we discuss with the wives. There may be disagreement because of our different concerns. Men’s concern is to get money from the sale and women’s concern is to put the highest portion of the harvest for consumption.”  
- Father in Sidama

Caregivers almost universally agreed that women are responsible for going to the market to purchase foods. In fact, the suggestion that men might purchase foods from the market often elicited laughter. The responsibility usually falls to the mother or an older daughter in the household. The exception is for meat or expensive purchases, in which case the father may be responsible and have more “bargaining power.” Women are said to “ask” for a certain amount of money from their spouse for purchasing food; fathers may provide it if they have money available or they may discuss the amount between husband and wife. Particularly when the amount spent at the market is high, fathers may be more involved in the decision and purchasing of such items.

Female participants almost exclusively walk to the market, and sometimes laughed when asked if they use other forms of transportation. Walking times ranged from 5 minutes to 60 minutes. Participants may rely on motorbike or bus for transportation to larger markets further away from the home.

### Meal Norms

A variety of meal norms were described by FGD participants. Women – be they mothers, older daughters, or grandmothers – are responsible for tasks related to meals, including deciding which foods to prepare, purchasing food, preparing, serving, and feeding the youngest children. Some caregivers say that children are served first, while others say the children are served last.

Often, household members are segregated by age and/or gender at meal times. Generally, infants and very young children are said to eat alone and with their own plate; food is prepared separately for them. In some cases, fathers eat either alone (in which case they are served first, and have their own cultural plate called a “tilite”). In other households, fathers may eat with their wife and/or older children. Children usually eat separately from older children/parents from a shared plate. Some FGD participants report that only older sons eat with their father, while older daughters are forbidden from sharing a plate with their fathers. In other cases, meals are strictly separated by gender.

Several caregivers acknowledged the concern of their youngest children eating from a shared plate if they are unable to “compete” for adequate food. One father said that children eat with other adults at the age that “they are able to consume enough relative to their elders.”

Most participants say food is prepared 2 to 3 times per day. Uneaten food is stored for one-half hour up to 24 hours, though generally for less time for young children. Participants say they reheat foods that have been stored – in some cases saying food is reheated “many times.” This is done both for palatability as well as for food safety. Participants believe that failure to reheat stored foods may cause malaria, intestinal worms, and gastritis. A minority say uneaten foods would be given to animals.

### Fasting Practices

Fasting – from food altogether or from particular kinds of food – is common in Ethiopia for religious purposes, though specific fasting practices may vary by geographic location, by religion, and may also be influenced by local traditions. Sidama zone participants generally stated that fasting in their communities is not common.

In Gedeo, fasting is more common. Some participants fast from animal products on Wednesday and Fridays, while others abstain from any food or drink until mid-afternoon on the same days. Some participants fast only on Friday. Most FGD participants say that infants and young children are exempt from fasting. Religions that practice any form of fasting in Gedeo may include Protestants (most common in Gedeo), Ethiopian Orthodox, and Muslims. When probed, some caregivers acknowledge that the young child’s diet may be impacted by the older household members’ fasting. Most said children are 12 to 18 years when they start fasting, but some say as young as 7 years. In other cases, caregivers say children start fasting when they are able to decide for themselves that they want to fast.

### Healthy Living Clubs

The HLC proposed in the QDBH project share similarities with Women’s Development Army groups (sometimes called Health Development Army or One-to-Five Network). Generally, FGD participants were familiar with the Women’s Development Army, but almost universally said the groups were not strong or were not operating to any extent in their community. Some participants cited poor leadership of HEW in establishing and maintaining groups; others said they had simply never been invited to participate. However, both mothers and fathers were supportive of the idea of groups for learning about agriculture and child nutrition, and universally expressed willingness to participate in such groups. Factors foreseen to potentially interfere with household members’ ability to attend included social events, like funerals or weddings, or family illness, which were cited by both men and women. Men also cited fieldwork as potentially interfering. When asked what might facilitate their ability to participate, respondents mostly mentioned organization. They said that members of their own community should help organize and notify participants, and that they should have advanced notice of the day and time of meetings.

When asked about meeting logistics – day of week, time of day, and location – FGDs were generally able to reach a consensus within the group, though that consensus varied by caregiver type and kebele. Some FGD groups preferred to meet on Saturday, while others preferred weekdays. Sundays would be inappropriate, as would be market days. The most common time suggested for meeting was 9:00 AM. The kebele health post was deemed the most appropriate location in all female FGD as well as some male FGDs. One father suggested a school. There was no clear preference on organization of the HLCs; mothers and fathers both suggested organization at the village level and kebele level approximately equally.



Fathers universally accepted attending HLC sessions with women. Fathers also expressed willingness to attend HLC sessions led by a female facilitator. However, it should be noted that in the Sidama zone, one group of fathers refused to enter the health post grounds for the FGD, saying that it was a place for women; the fathers instead met at the nearby Farmer Training Center.

Conversely, mothers almost universally said that they would prefer to meet without men, and that they would be less likely to attend a group with men. Only two mothers endorsed the idea of men and women attending together, with one saying, *“I think it might become better when both men and women meet together, because....in the case of agricultural issues, men are more responsible and in the case of nutrition women are more responsible.”* Most women said they would feel more comfortable meeting only with other women, citing cultural norms and *“values that, in the presence of men, women are not to speak freely.”*

*“I want to participate with women because I [am] shy to speak about child nutrition around the men.”*

- Mother in Gedeo

Kebele officials and HEW said that HEW would be the most appropriate person to lead HLCs, and said that providing coffee ceremony, transportation reimbursement, t-shirts, or other incentives would increase participation.

### Health Extension Workers

Similar to Alive and Thrive’s qualitative work in 2010 in the region [41], this study found that caregivers trust their HEWs, and see them as accessible and knowledgeable. Caregivers appreciate that HEW speak the local language and are from the communities that they serve. Community leaders and health professionals (including HEW) view the Health Extension Programme as being successful, in some cases stating that *“100% of mothers...follow the advice”* and often suggesting that problems – such as non-exclusive breastfeeding in the first 6 months, women giving birth at home, and suboptimal complementary feeding practices – are eliminated in their kebele. Most agree that HEW’s advice is accepted. It should be noted, however, that HEW, who are employed by the government, may not be forthcoming with criticism of the Health Extension Programme and may exaggerate its successes.

*“Before we came in to these society moms give birth at home, most moms died while giving birth, no follow up were there, the death rate of infant children was high, but after the introduction of this health post these all problems are really solved”*

- HEW in Gedeo

It is reportedly uncommon that a father or grandmother would reject a HEW’s advice, but in such cases, participants concede that a father’s word may have ultimate authority, or that a grandmother’s advice may be followed out of respect or because she is seen as having *“experience.”* In some cases, HEW say they will hold *“family meetings”* when a woman is pregnant, so the family can discuss and decide how best to support the health of pregnant women and/or infants. Health Extension Workers generally feel most comfortable talking with younger mothers. Conversely, HEW expect more resistance from fathers and older women, and say that they must be particularly respectful with these household members.



When HLCs were described to kebele managers and community leaders, including HEW themselves, most said that HEW were the best person to lead such groups.

Health Extension Workers generally felt confident and capable, both in their relationships with community members and in their technical knowledge. When probed, many said they wished they had additional trainings in complementary feeding, performing cooking demonstrations, or in other health packages – namely mental health and health insurance.

*"I were feeling that I had an adequate knowledge, but I know that I need more further practical trainings on nutrition, and processing or cooking diversity of foods. To teach moms I should act as if I were a chef not only a health extension worker."*

- HEW in Gedeo

### Current Programs Supporting Health and Nutrition

When asked to identify the main challenges facing their kebeles, kebele leaders and HEW tended to respond with the following:

1. Malnutrition of pregnant and lactating women (PLW) and young children
2. Lack of clean water / other hygiene issues
3. Lack of electrical power

Widely, the Health Extension Programme is seen as the main activity countering problems of malnutrition among PLW and young children. The Health Extension Programme also promotes antenatal care, safe delivery practices, immunization campaigns, micronutrient supplementation, hygiene, and breastfeeding. Feeding of young children was also commonly mentioned, though when probed, interviewees tended to describe programs that screen for and manage moderate or severe acute malnutrition. Plumpy Nut, unspecified flour, and oil were all mentioned as given to households with PLW or young children identified through screening via mid-upper arm circumference (MUAC) or by the presence of edema. Micronutrient initiatives mentioned included iron-folic acid supplements for pregnant women, vitamin A supplementation for children under 5 years, and zinc supplementation for children with diarrhea. However, many interviewees mentioned logistical problems, particularly supply shortages for supplemental foods and for vitamin A supplements.

The majority agreed that most programs serving PLW and young children are government programs. Kebele leaders and HEW were unclear about the role of NGOs in supporting their ongoing activities, sometimes stating that NGOs drop off supplies but do not return. Kebele leaders and HEW see woreda health offices as directing all health activities in the kebele, and providing supplies.

### Characteristics of and Recommendations for Successful Nutrition Projects

Community leaders and health workers emphasized the importance of working closely with kebele administration and existing Health Extension Programme for the success of projects like QDBH. Kebele leaders and HEW say they have rapport with members of their community and a good understanding of the unique circumstances of their kebele; therefore, they should be the conduit for information and

facilitation of program activities. Interview subjects also suggested collaboration between the Bureaus of Health and Agriculture, but offered few specifics for how to bring the two Bureaus together.

Interview subjects also identified shortage of materials and inadequate logistic support as barriers – such as lack of supplemental foods, lack of transportation for community members, lack of electricity to refrigerate therapeutic foods, and so on. Therefore, ensuring appropriate logistic support and materials available would support project success.

Most interviewees expressed a desire to see sustainable projects, and identified all aforementioned criteria as the keys for sustainability.

## Strengths and Limitations

Our work had several limitations. Topics addressed in FGDs covered a wide scope of complementary feeding practices and their determinants and queried several components of the QDBH project. As such, we may have missed opportunities to understand some topics in greater depth. We tried to remedy this fact by creating three separate FGD guides for mothers, each focusing on a smaller range of topics. Nevertheless, FGDs tended to run more than 2 hours and thus participants may have become fatigued and data quality may have suffered.

Focus groups were conducted in two distinct zones, with two different local languages. Group facilitators spoke local languages fluently. However, in translating recorded FGDs and KIIs from the local language to English, details may have been lost, and enumerators tended to “summarize” recordings rather than transcribe, despite repeated trainings.

Participants were assured of their anonymity and interviews took place in private, however respondents may not have been entirely forthcoming. Criticism of projects or programs, particularly those coming from the government, runs counter to social norms. Thus respondents may have shied away from constructive criticism and honest feedback.

Lastly, caregivers struggled to consider how they might react if presented with hypothetical advice on child feeding or with some project components (e.g. OFSP). Instead, caregivers tended to express a willingness to try or to do the hypothetical advice being offered. Thus, where knowledge gaps exist, it is difficult to identify other determinants of behavior. Similarly, because food insecurity and poverty are such prohibitive factors for many feeding practices, caregivers often struggled to identify and discuss other factors that might influence child feeding.

Despite these limitations, several strengths are noted. In designing the formative work presented, we first conducted a thorough literature review, including peer-reviewed literature as well as programmatic and national reports, prior to drafting FGD and KII guides. Our goal was to build upon existing literature rather than replicate it. We sought to not only understand current behaviors and their determinants or potential facilitators, but also sought to explore social factors – such as meal norms and gender roles – that are inextricably linked with infant and young child feeding.

We used trained and qualified female enumerators to lead mother and grandmother focus groups, and a trained and qualified male enumerator to lead father focus groups in local dialects to maximize participant comfort. All focus groups and interviews were recorded – with participant(s)'s permission – for a reliable record of the discussion.

## Implications for QDBH

Findings from this formative work will be helpful in designing a Social Behavior Change Communication (SBCC) strategy uniquely tailored to these communities.

Key recommendations based on these findings include:

1. Organization of HLC sessions should be participatory. Most FGD groups were able to agree on a day, time, and location within their FGD and kebele, but their proposals differed by FGD and kebele. Therefore a one-size-fits-all approach would be inappropriate. Participants should be involved in decision-making from the beginning.
2. Most participants – both of FGDs and KILs – agree that HEW are the most appropriate leaders for the Healthy Living Clubs described to them. However, QDBH proposes HDA for this role, for reasons related to sustainability and scalability. HEW are trusted and appreciated for their technical knowledge, fluency in local language, and general approachability. If HLCs cannot be led by HEW for the stated reasons, then HEW support, visibility, and assistance with promoting HLCs may encourage participation and give credibility to HDA.
3. HLC should have at least some gender-specific components, including time for discussion, so women feel comfortable to fully participate and ask questions.
4. The transparency of the feeding bowl in the HBT is a major barrier to use; the HBT should be opaque. Orange was suggested by project partners to reinforce OFSP, and caregivers agree that this would be appropriate.
5. Cooking demonstrations are an evidence-based strategy [41, 51, 52] for promoting age-appropriate child feeding and introducing new foods.
6. Recipes should be made from locally available and affordable ingredients and should also be palatable
7. To overcome the unfavorable view of WFSP and beliefs that they are harmful for child health, differences between orange and white fleshed sweetpotatoes should be emphasized. Whatever a caregiver believes about WFSP, they should be made to see the health benefits of orange fleshed varieties for all household members, *especially* infants and young children.
8. Food insecurity and access are significant barriers for many families when it comes to meeting feeding recommendations. HLC leaders and curricula should not set unrealistic goals for food insecure families.

## Appendix A: Focus Group Discussion Guides

**Note:** Begin this page ONLY after you have turned on the recorder (if participants give permission) and obtained verbal consent from all participants.

**Note:** Not all questions in this guide will be asked of every focus group; sections and/or individual questions indicate for which group(s) they should be asked.

**GROUP A – Pregnant women or mothers of children <8-9 months**

**GROUP B – Mothers of children 9-24 months**

**GROUP C – Pregnant and lactating women**

**GROUP D – Fathers of young children**

**GROUP E – Grandmothers of young children**

### INTRODUCTION

Before we begin, we ask that you respect one another's privacy and not repeat what you hear during the discussion to others outside of this group. We cannot guarantee that what you say will not be repeated by others participating in this group and so you do not need to share your own personal experiences if you do not wish. I'd like to remind you that I am just a moderator and not an expert on anything we discuss today, rather your views and opinions are most important to us!

Do you have any questions about what I've discussed so far?

#### Setting Ground Rules

*Facilitator Notes: Facilitator should discuss ground rules with the participants and encourage them to develop their own. Some ground rules that the facilitators should mention:*

- Put their phones on silent. If participant needs to answer the phone, they should quietly leave the room.
- Speak one at a time
- Be aware that their participation is voluntary. If they need/choose to leave at any point for any reason, that is allowed but to please do so quietly so as not to disrupt the group.
- There is no right or wrong answer. This is a participatory exercise and all are encouraged to participate.
- Protect confidentiality. All responses shared in the FGD should not be shared with anyone outside of the group.

*Facilitator Notes: The facilitator can ask people to contribute their own ground rules to the group as well. Ask if people have any questions before beginning.*

First, let's all introduce ourselves by telling a bit about ourselves, for example about your children and family. [Go around and introduce – Notetaker should take detailed notes on how they describe themselves, without capturing names]

**I. Breastfeeding and Introduction to Complementary Feeding (GROUP A, select questions for GROUP E):**

First, I'd like for us to talk through the first days and months of a child's life. Let's start at birth.

- 1) How is the baby fed on its first day of life?
- 2) What have you heard about "exclusive breastfeeding"? **(GROUP E)**
  - a. What does it mean for an infant to be "exclusively breastfed"?
  - b. If an infant is breastfed but also given water or other liquids, is this considered "exclusive breastfeeding" by women in the community?
  - c. How long do you think infants should be exclusively breastfed? Why?

As your child gets older, let's talk about the introduction of foods and liquids.

- 3) What are the first liquids/foods other than breastmilk that are given?
  - a. At what age would this food be given?  
*(note: participants may use timeline or tell age in months) When do you start giving these foods or liquids other than breastmilk?*
    - i. *Facilitator note: clarify that infants are receiving only breastmilk up to this age*
  - b. *Facilitator: see questions in box*

**For every food mentioned:**

- What are the ingredients?
- How is the food prepared?
- Describe the thickness of the food (use photographs)
- How it is fed or served (bottle, cup, spoon, hand)?
- Is this food regularly given? Every day? Several times per day? Every week? Less often?
- Why are these foods given?

- 4) If a Health Extension Worker advised mothers in this community to wait until an infant is 6 months to give solids and liquids other than breastmilk, would they be able to? **(GROUP E)**
  - a. What would make it difficult to follow this recommendation?
    - i. *[If insufficient breastmilk is cited]* How do women know if they have insufficient breastmilk?
  - b. What would help mothers follow this advice to wait until 6 months to give liquids or foods other than breastmilk?
- 5) What are some reasons that mothers might introduce liquids and/or foods other than breastmilk before 6 months?
- 6) What are some reasons that mothers might wait until after 6 months to introduce liquids and/or foods other than breastmilk?

Thank you for that information. *[Facilitator: summarize what you have discussed, for example "we have talked about the very first foods and liquids that are given to babies and some of the challenges women would have if they were told to only breastfeed for 6 months.]* Now, I would like to continue along our timeline and talk about how older infants and child are fed.

7) What are some common foods given to infants at this stage, around 6-8 months? [*Point to sitting baby on timeline*]

a. *Facilitator: see questions in box*

8) [*If participants mention bottle feeding*] What are some reasons mothers use bottles?

- a. Are there any reasons a mother might not choose to use bottles?
- b. For how long do women use bottles to feed infants?
- c. If mothers were told not to use bottles for feeding foods, would they be able to?

**For every food mentioned:**

- What are the ingredients?
- How is the food prepared?
- Describe the thickness of the food (use photographs)
- How it is fed or served (bottle, cup, spoon, hand)?
- Is this food regularly given? Every day? Several times per day? Every week? Less often?
- Why are these foods given?

9) [Show porridge photographs] Which picture looks most like porridge served to children in this community? Why do mothers prepare porridge this way?

a. Advantages of this practice? Disadvantages of this practice?

10) If a Health Extension Worker advised mothers in this community to give thicker porridge (show photograph #3) to children 6 months and older, would they be able to? **(GROUP E)**

- a. What would make it difficult to follow this recommendation?
- b. What would help mothers follow this recommendation?
- c. Are there positive or negative consequences for the child?

11) Are there any foods that are not appropriate for infants 6-8 months? If so, what are they and why are they not appropriate? **(GROUP E)**

- a. *Facilitator: ask caregivers to be specific about where these beliefs come from (personal experience, common knowledge, etc)*
- b. Are these foods ever given anyway?

12) How many times per day are infants 6-8 months provided with food other than breastmilk?

- a. How much food is given each time? [*Facilitator: show coffee cup and ask women to use this as a reference when describing quantity of food (for example, 1 coffee cup per meal)*]
- b. How can a mother tell that her child is full?
- c. How does a mother decide if she needs to give her child more or less food?

13) If a Health Extension Worker advised women in this community to feed 6-8 month old infants (3 coffee cups) at least 3 times per day, would they be able to? **(GROUP E)**

- a. What would make it difficult to follow this recommendation?
  - i. Probe: food cost; food availability; fuel and water availability; time
- b. What would make it easier to follow this recommendation?
- c. Are there positive or negative consequences for the child?

## II. Latter Complementary Feeding, 9-24 months (GROUP B, GROUP E)

I'd like for us to talk through child feeding starting around 9 months of age.

- 1) What are common foods or drinks that infants take from 9-24 months?
  - a. *Facilitator: See questions in box*
  - b. At what age do children begin eating family foods?
- 2) [*Only if participants mention bottle feeding*] What are some reasons mothers use bottles?
  - a. At what age do women stop using bottles to feed children?
  - b. If mothers were told not to use bottles for feeding foods, what difficulties would they have?

### For every food mentioned:

- What are the ingredients?
- How is the food prepared?
- Describe the thickness of the food (use photographs)
- How it is fed or served (bottle, cup, spoon, hand)?
- Is this food regularly given? Every day? Several times per day? Every week? Less often?
- Why are these foods given?

- 3) [*If caregivers mention foods that are thin or watery (photographs 1 or 2 of the porridge)*] What are some reasons that mothers might offer food of this thickness?
  - a. If a Health Extension Worker advised mothers to give foods with a thicker consistency (photograph #3), would they be able to?
- 4) Are there any foods that are not appropriate for children at this age? What are they and why are they not appropriate?
  - a. If caregivers say these foods make children sick or are too hard to digest, probe for more details. What kind of illnesses? What caused the child to become sick? Is this belief based on personal experience or something they have heard from others?
  - b. Are these foods ever given anyway? If so, why?
- 5) *Facilitator: if any food groups have not been mentioned at all (meat, fish, dairy, eggs, fruit, vegetables and/or leafy green vegetables) ask specifically about these food groups.*
  - a. Are these foods considered appropriate? If not, why?
  - b. What would make you consider including these foods in your child's diet?
- 6) How many times per day are infants and young children provided with food other breastmilk?
  - a. [*Facilitator note: probe for 9-12 months and then 12-24 months*]
  - b. How much food is given per meal? [*Facilitator: show coffee cup and ask women to use this as a reference when describing quantity of food (for example, 1 coffee cup per meal)*]
- 7) How can a mother tell that her child is full? **(GROUP E)**
  - a. How does a mother decide if she needs to give her child more food?
  - b. What would you do if your child did not want to eat?
    - i. Probe → How can caregivers encourage their children to eat? Do caregivers ever force the child to eat?
- 8) If a Health Extension Worker advised women in this community to feed young children ages 9-24 months at least (4 coffee cups) 4 times per day, would they be able to? **(GROUP E)**

- a. What would make it difficult to follow this recommendation?
    - i. Probe: food cost; food availability; fuel and water availability; time
  - b. What would make it easier to follow this recommendation?
  - c. Are there positive or negative consequences for the child?
- 9) If a Health Extension Worker advised women in this community to feed young children ages 9-24 months at least 4 different kinds of foods per day – for example porridge, eggs, avocado, and sweetpotato – would they be able to? *[Facilitator: these are just examples; focus on feeding a variety of different kinds of foods, not on these examples in particular]* **(GROUP E)**
- a. What would make it difficult to follow this recommendation?
  - b. What would make it easier to follow this recommendation?
  - c. Are there positive or negative consequences for the child?
- 10) Are there any differences in how sons and daughters are fed in this community? If so, what are they and why?
- 11) Are there variations by season in what foods are available?
- a. How do these variations affect child feeding? What do you do differently during months where there is less food available?
    - i. Probe → fewer meals per day, less food per meal, add water to meals

*Facilitator's Note: Summarize what the mothers have said regarding complementary feeding of children 9-24 months, including common foods, consistency, frequency, and quantity. Ask if you have summarized correctly or if they have anything to add.*

### **III. Men's Roles in the Community (GROUP D)**

Let's start our discussion today by talking about men's role in the community and in their households.

- 1) What characteristics come to mind when you think of a "good father"
- a. What skills do "good fathers" have?
  - b. Of the characteristics which do you think are most valued by the family? / by the community?
  - c. What are the characteristics of **children** who have "good fathers"? *[spend less time on this if they have mentioned them earlier]*

I'd like you to tell me about a father's responsibilities in taking care of his family.

- 2) What do fathers do to care for their wives when they are pregnant/lactating?
- a. What do "good fathers" do? Probe → food
- 3) What are fathers' responsibilities when the child is born? In the first few weeks of life? First few months?
- 4) What kind of decisions do fathers make in his household? For his pregnant wife?
- a. For his first child? For his other children?



- b. Young sons? Young daughters?
- 5) What times do fathers spend with their children?
  - 6) What role do fathers play in making sure his child is fed?
    - a. Feeding the child, buying, growing food

#### **IV. MEAL AND FOOD NORMS (GROUP C, GROUP D, GROUP E)**

The information you shared with us was very valuable regarding how children are fed in this community. Now, we would like to discuss where families in this community get food and how they eat their meals.

- 1) How are meals typically taken in households in this community?
  - a. Do all members eat together or separately from each other? Why?
  - b. Is there a common plate or does everyone have their own plate?
  - c. At what age do children start eating from the family plate?
    - i. Do mothers make any changes to family foods that are given to infants or young children? What are the changes? Why?
  - d. What kinds of utensils do small children use?
    - i. If the following are not mentioned, ask specifically: spoons, bottles, cups, bowls, mother's hand
  - e. Who is served first? Who is served last? Who does the serving?
  - f. Who decides how food is distributed to household members?
  - g. Who else feeds infants or young children in the family, for example if mother goes to work?
- 2) Who decides what will be prepared each day?
  - a. When is food typically prepared during the day? How often is food prepared?
  - b. Is food ever stored after it is prepared?
    - i. If so, how is it stored and for how long?
    - ii. Is food reheated before it is served?
- 3) On days or during periods of fasting, how would the diet of children from 6 to 24 months change?
  - a. At what age do children begin fasting with other family members?
  - b. If a child is not fasting but the family is, how would the child's diet be affected? Would the foods prepared for the child change? Would the amount of food given to the child change?
- 4) How does your family decide which foods to purchase at the market?
  - a. Who in the household goes to the market to purchase food?
  - b. Who decides which foods to purchase?
  - c. Who decides how much money is to be spent at the market
  - d. How long does it take to get to the market from your home? How do you get there (walk, taxi, donkey, bicycle, etc)
- 5) Tell me about the foods your family grows at your home to sell and to consume?
  - a. How do you decide how much of this food to keep at home and how much to sell? Who makes these decisions?

- 6) Are there variations by season in what foods are available?
  - a. How do these variations affect child feeding? What do you do differently during months where there is less food available?
    - i. Probe → fewer meals per day, less food per meal, add water to meals

#### **V. SOURCES OF INFORMATION ON INFANT AND YOUNG CHILD FEEDING (GROUP A, GROUP B, GROUP D)**

**WOMEN ONLY (GROUP A, GROUP B):** Thank you for that information! Now, we would like to discuss from whom women in this community typically get information regarding how to feed their children.

**MEN ONLY (GROUP D):** Thank you for that information! Now, we would like to discuss where people in this community get information about nutrition and feeding young children.

- 1) **MEN AND WOMEN (GROUP A, GROUP B, GROUP D):** Who do women in this community talk to about how to feed their young children?
  - a. Probe: husbands, female relatives (sisters, aunts), neighbors, family members (mothers in-law), health extension workers, health development army; nurses
  - b. What advice do they give?
  - c. Of these, whose advice are women most likely to follow? Why?
- 2) **MEN ONLY (GROUP D):** What advice do you give women about what foods to give to children?
- 3) **MEN AND WOMEN (GROUP A, GROUP B, GROUP D):** Where else might families learn about how to feed their young children?
  - a. Probe if not mentioned → health extension workers, health development army, radio, schools, church, TV, other
  - b. What is the best way for families to learn about feeding infants and young children? Why is this preferred?
  - c. What are the least preferable ways for families to learn about feeding infants and young children? Why is this not preferred?

#### **VI. ORANGE FLESHED SWEETPOTATO & VITAMIN A (GROUP C, GROUP D, GROUP E)**

- 1) Do people in this community grow sweetpotatoes?
  - a. If so, what color is the flesh?
    - i. Probe → white, yellow, orange

*Facilitator: the remaining questions should address whichever type of sweetpotato is currently grown in the community*

- 2) What do people use sweetpotatoes for in this community?
  - a. Root
    - i. Probe → Sell them, eat them, feed them to animals? Why?
  - b. Leaves
    - i. Probe → Sell them, eat them, feed them to animals? Why?

- 3) What do you like about sweetpotatoes?
  - a. In what ways do you prefer sweetpotatoes to regular (Irish) potatoes?
- 4) What do you not like about sweetpotatoes?
  - a. In what ways do you prefer regular (Irish) potatoes to sweetpotatoes?
- 5) Have you heard anything about health benefits of sweetpotatoes? If so, what have you heard?
- 6) Have you heard of orange-fleshed sweetpotatoes?
  - a. If so, what have you heard?
  - b. Where did you hear about orange-fleshed sweetpotatoes?
- 7) If a Health Extension Worker told you that orange-fleshed sweetpotatoes provide important nutrition for your children, would you include them in your family's diet?
  - a. Why or why not?
  - b. If they were available at the market?
  - c. If your family could grow orange-fleshed sweetpotatoes?
- 8) What concerns would you have about feeding orange-fleshed sweetpotatoes to your children or other family members?
  - a. What might make it easier for you to be able to feed orange-fleshed sweetpotatoes to your children or other family members?
- 9) Have you heard of vitamin A?
  - a. If so, what have you heard?
  - b. Where have you heard about vitamin A?
- 10) Do children in this community receive vitamin A supplements?
  - a. From where do they get this supplement?
    - i. Probe → Health Extension Worker, doctor, nurse?

## **VII. FEEDING TOOLKIT (GROUP A, GROUP B, GROUP C, GROUP E)**

Thank you for that very informative discussion. We have learned a great deal about how infants in this community are fed. I would now like to show you a bowl and spoon that we think might help mothers and their babies eat better in this and other communities in Ethiopia.

I would like to begin by showing this counseling card [*pass out counseling card*]. Please take a few minutes to look over the card and think about the message the card is trying to tell you.

- 1) What do you think this counseling card is about?
  - a. What is easy to understand?
  - b. What is confusing?
- 2) What do you think about the images on the card?
  - a. Probe: the people? the symbols?

- b. Probe: Are the symbols and images clear? Large enough? Do they tell the message clearly?
- 3) What do you think about the colors used?
    - a. Probe: Are they pleasing? Appropriate for the topic? Is the food in the bowl the right color?
  - 4) What do you think about the foods shown on the card?
    - a. Are there other foods we should include?
    - b. Are there foods we should remove?

*Show the bowl and spoon; using the counseling card, describe how the bowl and spoon are to be used through pregnancy, breastfeeding and then from 6-24 months for the baby for ensuring optimal nutrition*

- 5) Now that I've explained the card and the bowl and spoon, what other changes would you recommend to the card to make it easier for families in this community to understand?

I would now like to ask you some questions specifically about the bowl and spoon. Please have a look at an example of the bowl and spoon [*pass it around and let people look and feel it*]

- 6) What is your opinion about a bowl with measurements in improving mother and child nutrition in a community like yours?
  - a. For woman who is pregnant?
  - b. What about a mother who is breastfeeding?
  - c. For a family with children 6-24 months of age?
- 7) How helpful do you think the spoon is for mother and child feeding?
  - a. Thickness of the food?
- 8) What do you think about the appearance of the bowl and spoon?
  - a. Probe: size, color, material and shape?
    - i. Probe: symbols – are they clear? Are they acceptable?
  - b. What changes would you recommend to the bowl and spoon so they are more acceptable?
- 9) What challenges do you think women and children would have if they were to use the bowls and spoons while pregnant and breastfeeding and for feeding their children 6-24 months?
  - a. What would mothers-in-law and other family members think about using the bowl and spoon?
  - b. Would anyone oppose of using the bowl and spoon?
    - i. Probe: family members, neighbors, etc

#### **VIII. FEEDING TOOLKIT (GROUP D)**

Thank you for that very informative discussion. We have learned a great deal about how infants in this community are fed. I would now like to show you a bowl and spoon that we think might help mothers and their babies eat better in this and other communities in Ethiopia. [*Show the bowl, slotted spoon, and counseling card and explain how they are to be used*]

- 1) What is your opinion about this bowl with measurements for improving mother and child nutrition in a community like yours?
  - a. For a woman who is pregnant?
  - b. What about a mother who is breastfeeding?
  - c. For a family with children 6-24 months of age?
- 2) Do you think a bowl like this could be used in your household?
  - a. Why? Why not?
  - b. How helpful do you think the bowl and spoon is for mother and child feeding?
- 3) Would you support your wife if she wanted to use this bowl to feed your child? Herself?
  - a. Why? Why not?

#### **IX. HEALTHY LIVING CLUBS (GROUP C, GROUP D)**

Thank you for your opinions on the bowl and spoon.

- 1) Are there Women's Development Groups in this community?
  - a. Have you ever participated?
  - b. What do you like about the groups?
  - c. How do you think the groups could be improved?

The International Potato Center and People in Need are considering starting Health Development Groups for agriculture and child nutrition in this community.

- 2) Would you be interested in participating in a group that meets about once a month to learn about agriculture and child nutrition?
  - a. Why or why not?
- 3) What would make it easier for you attend group sessions like this?
  - a. What would make it more difficult for you to attend?
  - b. What time of day would be best for attending group sessions?
  - c. What day of the week would work best for you to attend these group sessions?
  - d. Where should these group sessions be held?
  - e. How should the groups be organized? (village level, cluster level, kebele level, etc)
- 4) Do you think it is appropriate in this community for men and women to attend group sessions together to learn about agriculture and nutrition?
- 5) **WOMEN ONLY (GROUP C):** Would you be more or less likely to attend these groups if men were also present?
  - a. Why? Why not?
- 6) **MEN ONLY (GROUP D):** Would you be more or less likely to attend these groups if women were also present?
  - a. Why? Why not?

- 7) **MEN ONLY (GROUP D):** Would you be more or less likely to attend these groups if a woman were giving you information about child nutrition

#### **X. CONCLUDING QUESTIONS (ALL GROUPS)**

We have covered a lot of important and useful topics today thanks for all your input. Before we close, is there anything else you want to discuss that we haven't been able to cover so far with regards to this discussion?

This is all very useful and all your input is greatly appreciated. Thank you for your time and we hope to work together to effectively address malnutrition among infants and young children in this community.

## Appendix B: Key Informant Interview Guides

**Note:** Begin this page ONLY after you have turned on the recorder (if interviewee gives permission to be recorded) and obtained verbal consent from all participants.

| PART 1 – DEMOGRAPHIC AND BASIC INFORMATION (For transcript label) |  |
|---|--|
| A01. Researcher name:   |  |
| A02. Date (dd/mm/yy):<br>____/____/____                           | A03. Start time ____: ____ am/pm<br><br>A04. End time ____: ____ am/pm         |
| A05. Designation/title of Respondent interviewed:                 |  |
| A06. Number of years under this designation:<br> _ _  years       | A07. Respondents' Gender (circle one):<br><br>Male                      Female |
| A08. Respondents' age:<br> _ _  years                             | A09. Woreda or Zone:<br>_____  |

| Opening Section  |   |
|--|---|
| 1. To begin with, please tell us about your roles and responsibilities in your community.  | <ul style="list-style-type: none"> <li>a. Probe for responsibilities related to health, nutrition, food security, women’s health, agriculture</li> <li>b. What do you think community members see as your responsibilities?</li> <li>c. Roles and relationships with NGOs, partners, government, community groups</li> </ul>  |
| 2. What do you see as the most important issues facing your zone/woreda/kebele?  | <ul style="list-style-type: none"> <li>a. What about for issues related to maternal and child nutrition and health, food security?</li> </ul>   |
| Nutrition Programs in Community  |   |
| I’d like to talk specifically about any current nutrition or health services in this community.  |   |
| 1. What can you tell me about current services that support: <ul style="list-style-type: none"> <li>- Pregnant women in the community?</li> <li>- Women who have just had a baby and are breastfeeding?</li> <li>- Infants and young children (&lt;2 years)</li> </ul> | For each service mentioned: <ul style="list-style-type: none"> <li>a. What are the main goals of the program or service?</li> <li>b. Which groups or organizations provide or support this service (government, NGO, other?)</li> <li>c. In what ways has the program been successful?</li> <li>d. What do you think has contributed to the successes of the program?</li> <li>e. In what ways has the program not been successful?</li> <li>f. How do you think it could be improved?</li> </ul>   |
| 2. Are there programs or services that provide supplementation for pregnant women or young children in this kebele/woreda/zone?  | <ul style="list-style-type: none"> <li>a. Iron / folic acid supplementation for pregnant women?</li> <li>b. Vitamin A supplementation?</li> <li>c. Other vitamin/mineral supplementation?</li> <li>d. Supplemental food programs for pregnant women or young children (such as Plumpy ‘Nut)?</li> <li>e. Are there criteria to qualify for these services? If so, what are they?</li> <li>f. Are these services widely utilized?</li> <li>g. Are the services accessible? If not, what makes them inaccessible? (Income, distance, religion, language, education, etc)</li> </ul> |
| Sources of Information / Influences on Infant and Young Child Feeding  |   |



|   |  |
|---|--|
| <p>Thanks for that information! Now I would like to discuss from whom women in this community typically get information regarding how to feed their children.</p> |  |
| <p>1. What recommendations do you give pregnant women about feeding their children?</p>   | <p>a. Are these recommendations followed? Why or why not?</p> <p>b. Different recommendations for children aged: 0-6 months, 6-9 months, 9-12 months and 12-24 months</p>  |
| <p>2. Who else in the home or community advises women on how they should feed their children?</p>   | <p>a. What advice do they give?</p> <p>b. What happens if there are disagreements within the home about how to feed the children? Whose recommendations will be followed? (father, mother, grandmother)</p> <p>c. What happens if family members disagree with the advice of Health Extension Workers or doctors/nurses? Whose recommendations are likely to be followed?</p>  |
| <p>3. In your opinion, whose advice do women typically follow?</p>  | <p>a. Why?</p>   |
| <p>4. What are common beliefs around breastfeeding and infant care practices in this community?</p>   | <p>a. Beliefs- Colostrum Is colostrum fed to babies? What do people think about colostrum?</p> <p>b. Beliefs-skin to skin care: Is baby given to mother directly after birth? Why? Why not?</p> <p>a. Beliefs-washing breast before baby nurses</p> <p>b. Beliefs- first feeding should baby be given anything (honey, water, medicine, tea etc) before nursing for the first time?</p> <p>c. Beliefs-Feeding in first days of life?, What should children eat in first few days of life?</p> <p>d. Beliefs-feeding in first weeks of life?-</p> <p>e. Insufficient milk- How common is insufficient milk?</p> <p>f. Beliefs-insufficient milk: Why do mothers think they have insufficient milk? What may be causing mothers to think that they have insufficient milk?</p> <p>g. Beliefs-exclusive breastfeeding: Do they think mother would be able to only give breastmilk for the first 6 months? What would mothers need to be able to do this?</p> <p>h. Attractiveness-breasts falling because of breastfeeding?</p> |

|  |  |
|--|--|
|  | <ul style="list-style-type: none"> <li>i. Age-Do certain aged people feel differently about breastfeeding? (teen mothers)</li> <li>j. Time/Availability-Are mothers available to breastfeed their child? Why? Why not?</li> <li>k. Perceived positive consequences-may think that giving other foods (water, tea, etc) may be beneficial to child health</li> <li>l. Perceived negative consequences-May not be viewed as serious not to feed child other foods</li> </ul>   |
| <p>5. In your opinion, which breastfeeding recommendations are hardest for women to follow?</p>          | <ul style="list-style-type: none"> <li>a. Why?</li> </ul>  |
| <p>6. In your view what influences the uptake of practices pertaining to IYCF? Hygiene related IYCF?</p> | <ul style="list-style-type: none"> <li>b. Knowledge-what to feed child? How much? When? Diversity?</li> <li>c. Beliefs- water: When should water be introduced?</li> <li>c. Beliefs-animal milks: When should animal milks first be introduced?</li> <li>d. Beliefs-porridge: When should porridge first be introduced? What should the consistency of porridge be? How is it fed (spoon, bottle, cup)</li> <li>e. Attitudes-</li> <li>f. Social cultural beliefs-what foods are needed when and why? What makes it possible for women to give food when they do and why?</li> <li>g. Affordability-cost too much</li> <li>h. Availability-might not be available at certain times (though not too much variation)</li> <li>i. Accessibility-may not be able to access because it is too far, not allowed to go to market, etc.</li> <li>j. Lack of ability-other person buys food or controls \$, decides what food to buy</li> <li>k. Perceived positive and negative consequences-supposed to give a certain amount,</li> <li>l. Hygiene-drying rack? Water for cooking? Soap for washing dishes (available and affordable)? Does not know how to clean/store dishes or food in hygienic manner? Does not know how to prepare or introduce foods in hygienic manner?</li> </ul> |

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|--|--|
|  | <p>Handwashing station? (where and what is used for handwashing?)</p> <p>m. Access to water</p> <p>n. Community support, institutional support</p> <p>o. What changes in practice have been observed in the last two years for pregnant mothers? Mothers of children below 2 years? What has contributed to the change?</p> <p>p. What challenges are experienced in caring for pregnant mothers? Mothers of children below 2 years?</p> |
| 7. In your opinion, which complementary feeding recommendation is hardest for women to follow?   | d. Why?  |
| <b>Orange Fleshed Sweetpotatoes &amp; Vitamin A</b>  |  |
| 1. Are sweetpotatoes grown in this kebele/woreda/zone?   | <p>a. If so, what color is their flesh (white, yellow, orange)?</p> <p>b. What do people in this community think of sweetpotatoes?</p>   |
| 2. If orange fleshed sweetpotatoes were available in this community, do you think people would eat them?   | <p>a. Why or why not?</p> <p>b. What would be the best way to encourage people to eat orange fleshed sweetpotatoes?</p>  |
| <b>Toolkit</b>   |  |
| <p>Thank you for that very informative discussion. I would now like to show you a bowl and spoon that we think might help mothers and their babies eat better in this and other communities in Ethiopia.</p> <p><i>[Explain feeding toolkit]</i></p> |  |
| 1. What are your impressions of the bowl?  | a. Would women be able to include it in their feeding practices? Why or why not?   |
| 2. What are your impressions of the spoon?   | <p>a. Do you think women would be able to use this spoon to thicken their children's food? Why or why not?</p> <p>b. Is it common in this community for women to use spoons to feed young children?</p>  |
| 3. What challenges do you think women and children would have if they were to use the bowls and spoons while pregnant and  |  |

|  |  |
|--|--|
| breastfeeding and for feeding their children 6-24 months?  |  |
| 4. What are your impressions of the counseling card?   | <ul style="list-style-type: none"> <li>a. What is easy to understand?</li> <li>b. What is confusing?</li> <li>c. Are the foods shown on the card appropriate? What would be good foods to include?</li> </ul>  |
| 5. What do you think about the images on the card?   | <ul style="list-style-type: none"> <li>a. The people? the symbols?</li> <li>b. Are the symbols and images clear? Large enough? Do they tell the message clearly?</li> </ul>  |
| 6. What do you think about the colors used?  | <ul style="list-style-type: none"> <li>a. Are they pleasing?</li> <li>b. Appropriate for the topic? Is the food in the bowl the right color?</li> </ul>  |
| <b>Health Extension Workers ONLY</b>   |  |
| Next, I would like to talk about the Health Extension Program.                                       |  |
| 1. What are the main concerns of families in your kebele?  | <ul style="list-style-type: none"> <li>a. Probe for issues related to health, nutrition, and/or food insecurity</li> </ul>   |
| 2. Which packages included in the Health Extension Program do you see as most needed in this kebele? | <ul style="list-style-type: none"> <li>a.</li> </ul>   |
| 3. Do you feel that your training adequately prepared you to teach families about child nutrition?   | <ul style="list-style-type: none"> <li>a. <i>Probe for individual topics: breastfeeding, timing of introduction to complementary foods, dietary diversity, meal frequency, food thickness, food quantity, responsive feeding</i></li> <li>b. Are there any topics on which you wish you had more training?</li> </ul>            |
| 4. Would you feel comfortable talking to men and women together about health and nutrition?          | <ul style="list-style-type: none"> <li>a. Do you feel comfortable talking to women about health and nutrition?</li> <li>b. Do you feel comfortable talking to men about health and nutrition?</li> <li>c. If you were talking to men/women who were older than you, would that change how you feel? Younger than you?</li> </ul> |

|   |  |
|---|--|
|   | d. [If respondent indicates she is not comfortable in any of the above scenarios] Why?   |
| 5. How would you describe the role of the Health Development Army?  | a. What is your relationship with the Health Development Army?   |
| <b>Bureau of Health Employees ONLY</b>  |  |
| 1. What health or nutrition issues does the Bureau of Health see as the main priorities in this kebele/woreda/zone? | a. Why?  |
| 2. How can NGOs working in this community most effectively work with the Bureau of Health?                          |  |
| 3. In what ways do the Bureaus of Health and Agriculture work together well?  | a. What are some common goals of the Bureau of Health and the Bureau of Agriculture?<br>b. How might the working relationship between the two Bureaus be improved?   |
| <b>Community Leaders ONLY</b>   |  |
| 1. How can NGOs be most effective and appropriate when designing programs in this kebele/woreda/zone?               | a. How can an NGO ensure a good relationship with the community?<br>b. What kind of relationship would you like to have with an NGO that operates in this kebele/woreda/zone?  |
| <b>Healthy Living Clubs</b>   |  |
| 1. [ <i>Explain Healthy Living Clubs</i> ] Does this seem like something that would work in this community?         | a. Why or why not?<br>b. Would you suggest any changes?<br>c. Who is the best person to lead group sessions to teach about nutrition<br>- Probe → Health Extension Worker, Health Development Army<br>d. Do you think people in this community would be interested / want to participate?<br>e. What do you think is the best way to tell people about these groups are?<br>f. How do you think we should encourage people to come to these clubs?<br>g. |

| Concluding Question  |  |
|--|--|
| 1. What do you recommend for a project to be successful in promoting good nutrition of mothers while pregnant and breastfeeding? | a. Who would such programs need to target? |

## CONCLUSION

We have covered a lot of important and useful topics today, and we thank you for sharing your views. Before we close, is there anything else you want to discuss that we haven't been able to cover so far with regards to this discussion?

This is all very useful and all your input is greatly appreciated. Thank you so much for your time.

## Appendix C: Problem and Solution Trees, Behavioral Determinants of Exclusive Breastfeeding

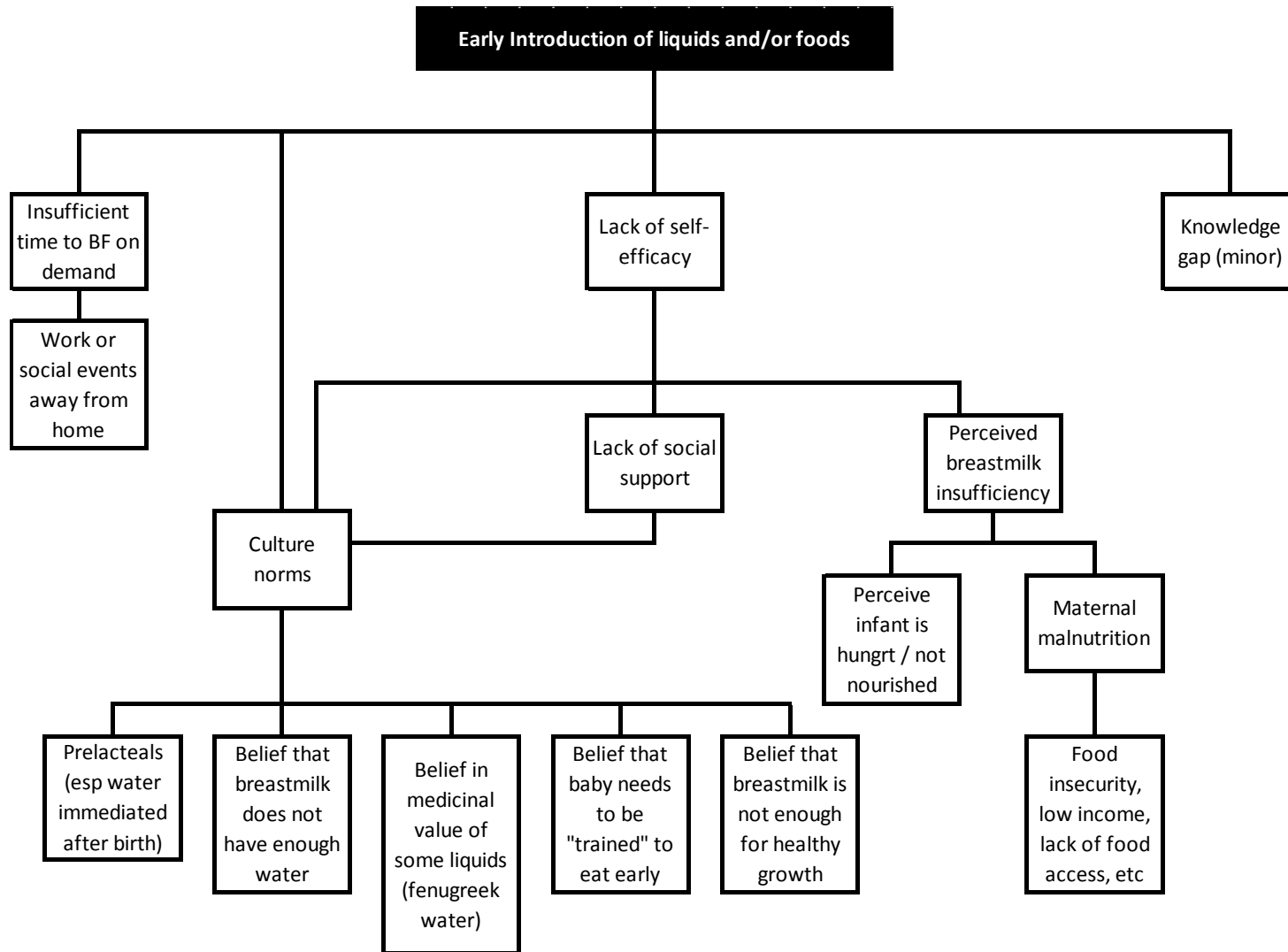


Figure 5. Problem tree – early introduction of non-breastmilk liquids and solids.

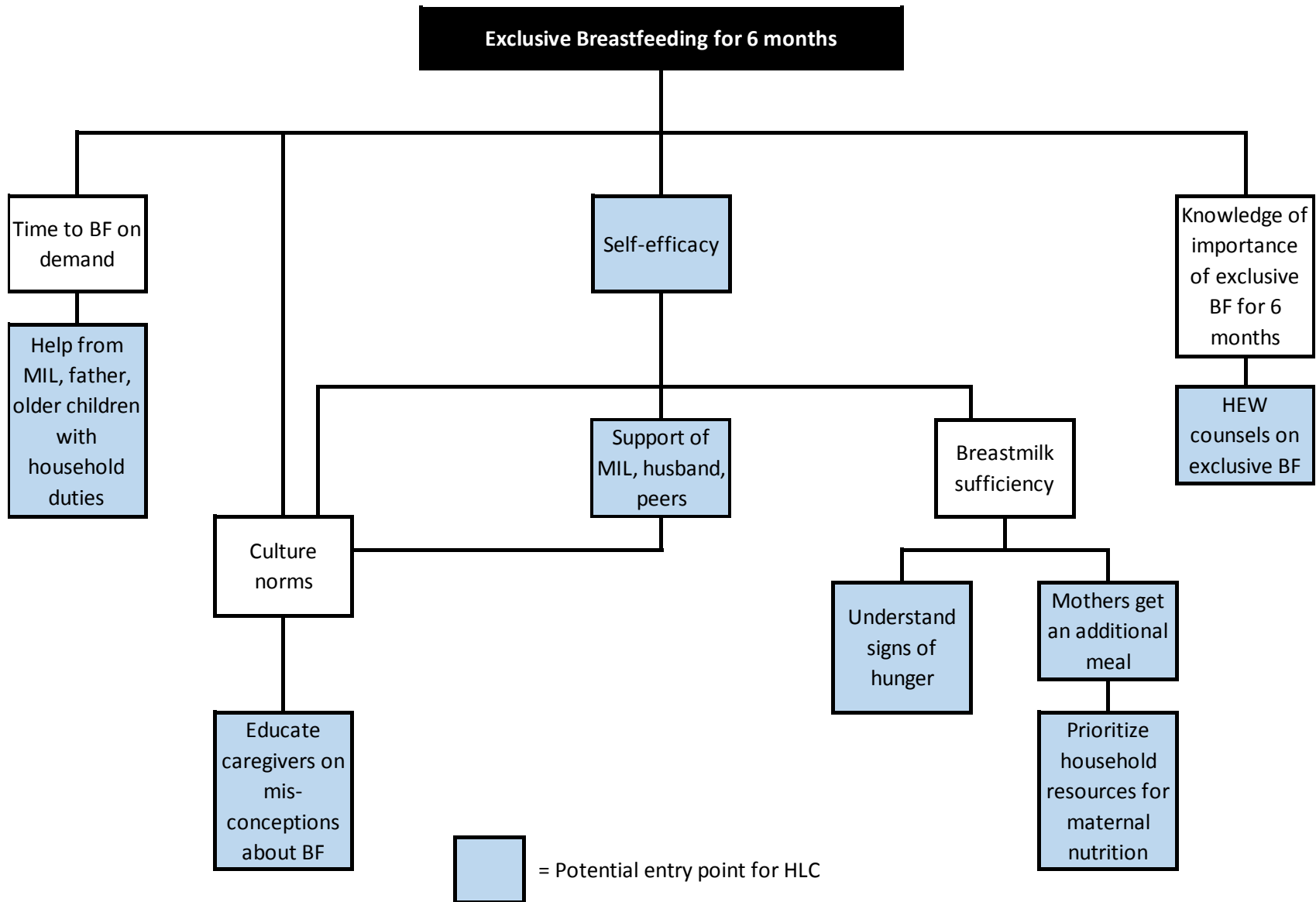


Figure 6. Solution tree – exclusive breastfeeding for 6 months.



Table 7. Analysis of behavioral determinants of exclusive breastfeeding for 6 months based on Michie domains.

| Exclusive Breastfeeding   |   |                          |                                  |                               |  |
|---|---|--------------------------|----------------------------------|-------------------------------|--|
| Outcomes  | Determinants  | Michie COM-B Domains     | Theoretical Domain Framework     | Intervention Function         | Example Activity   |
| Mothers have time to breastfeed on demand   | Other family members (MIL, husband, other children) help with household chores; freedom from social obligations | Physical Opportunity     | Environmental context, resources | Environmental restructuring   | Group sessions with MIL and fathers, inclusion of local religious leaders, community leaders; didactic session |
|   |   | Social Opportunity       | Social influence                 | Environmental restructuring   |  |
| Mothers do not introduce water, fenugreek, cow's milk, or other liquids before 6 months | Mothers understand the importance of providing only breastmilk for 6 months                                     | Reflective motivation    | Beliefs about consequences       | Education<br>Persuasion       | Didactic session, drawing on personal experiences  |
|   | Support from MIL in choosing not to introduce other liquids before 6 months                                     | Social Opportunity       | Social influence                 | Environmental restructuring   |  |
| Mothers do not introduce cow's milk or thin gruels prior to 6 months                    | Mothers understand hunger cues and basic information about milk production                                      | Psychological Capability | Knowledge                        | Education                     | Didactic session, encourage mother to drink cow's milk or thin gruels for herself                              |
|   | Mothers produce sufficient breastmilk   | Physical Opportunity     | Environmental context, resources | Environmental restructuring   | Support for mothers getting additional meal per day (see below)  |
| Mothers get one additional meal per day   | Support from husband in allocating household resources to ensure enough foods are available                     | Social Opportunity       | Social influence                 | Environmental restructuring   | Group sessions with MIL and fathers, inclusion of local religious leaders, community leaders; didactic session |
|   |   | Reflective motivation    | Goals<br>Intentions              | Persuasion<br>Incentivization | Goal setting   |

## Appendix D: Problem and Solution Trees, Behavior Determinants of Timely Introduction of Complementary Foods

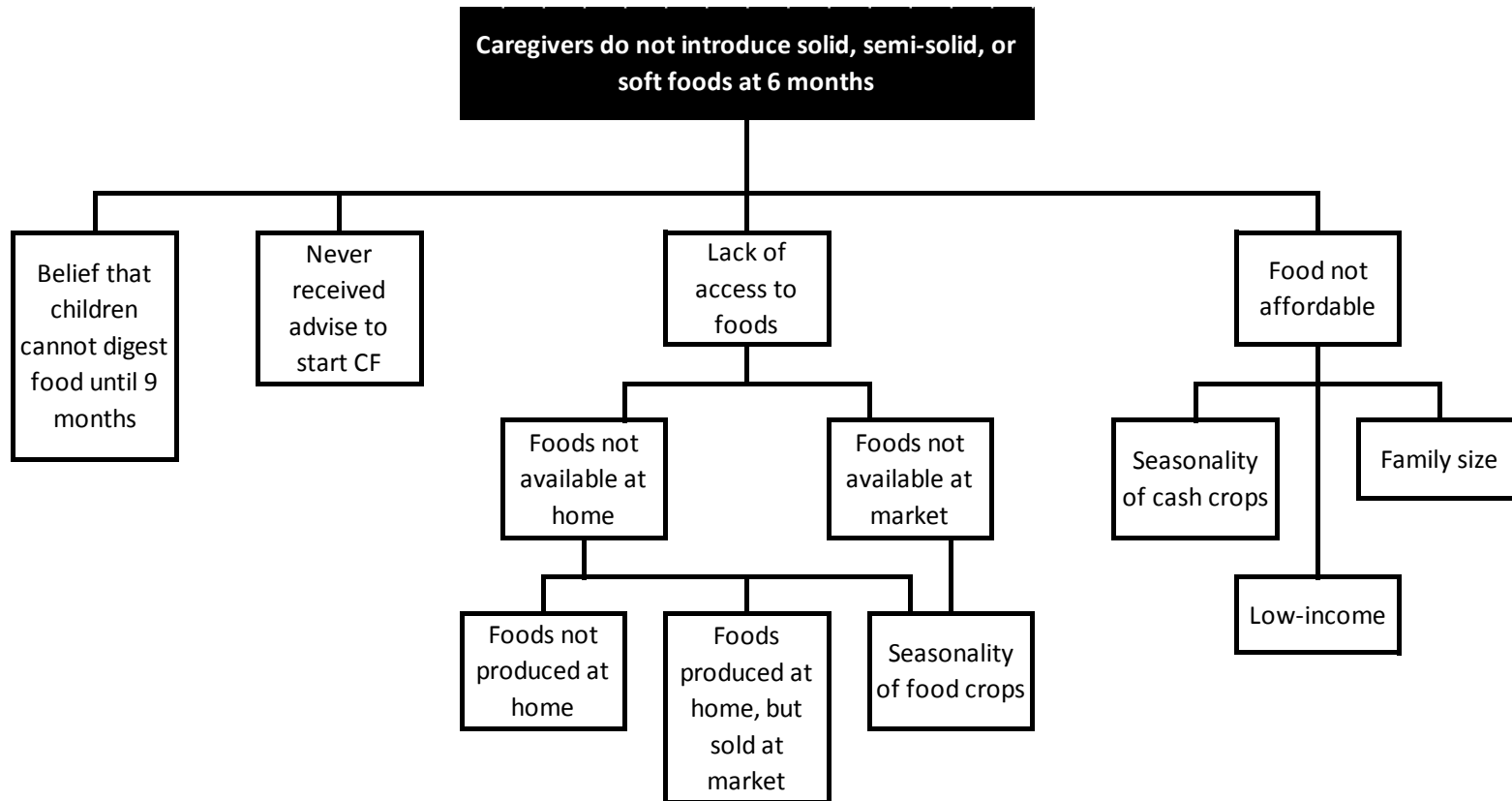


Figure 7. Problem tree – delayed introduction of solid, semi-solid, or soft foods beyond 6 months.

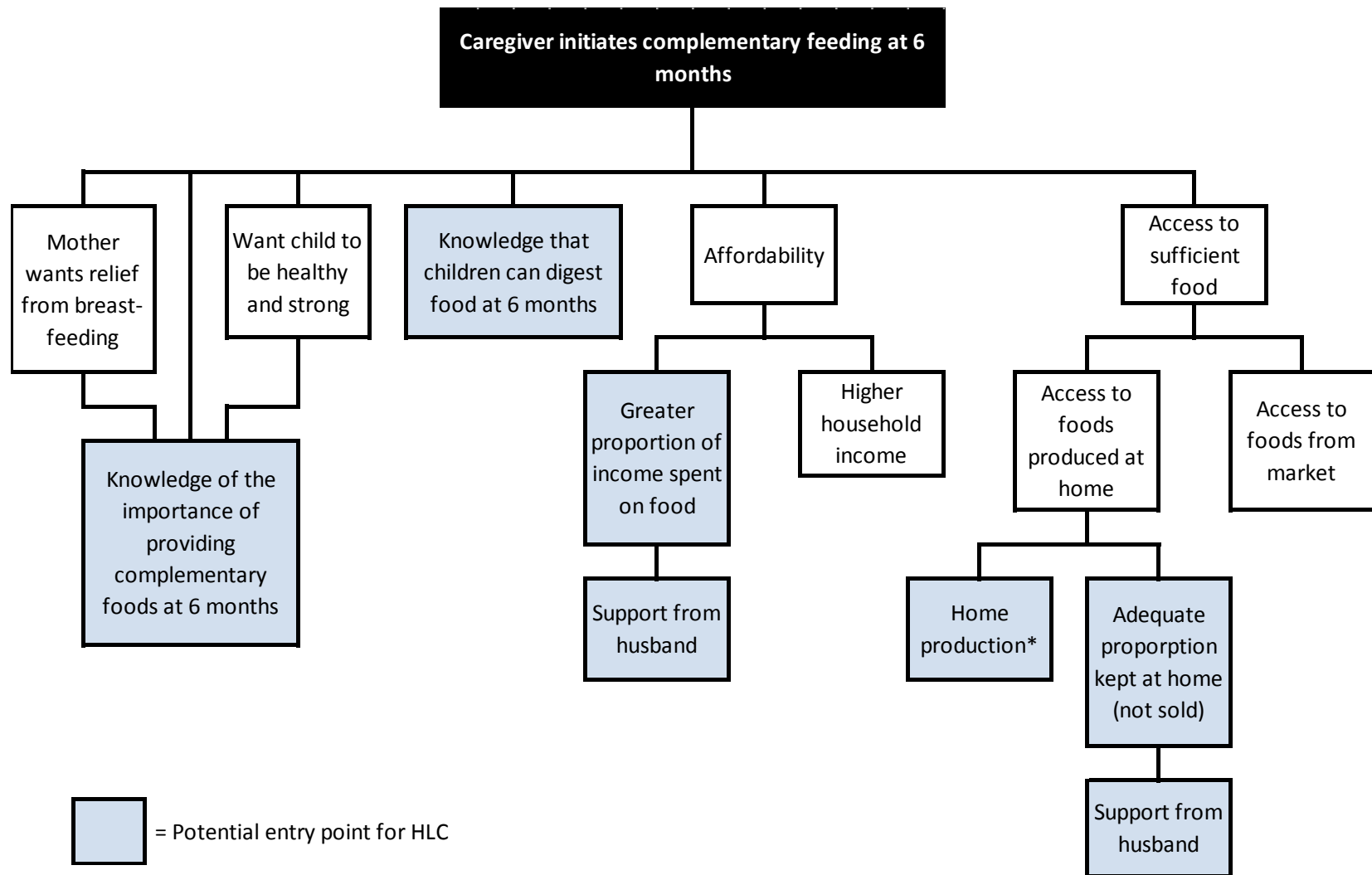


Figure 8. Solution tree – timely introduction of complementary feeding.

Table 8. Analysis of behavioral determinants of timely introduction to complementary foods based on Michie domains.

| Timely Introduction to Complementary Foods                         |  |                          |                                  |                             |   |
|--|--|--------------------------|----------------------------------|-----------------------------|---|
| Outcomes   | Determinants   | Michie COM-B Domains     | Theoretical Domain Framework     | Intervention Function       | Example Activity  |
| Caregivers have access to sufficient quantities and types of foods | Home production of nutritious foods  | Physical Opportunity     | Environmental context, resources | Enablement (OFSP)           | Vine acquisition from CIP; ongoing work with agriculture DAs to successfully grow and harvest OFSP roots and leaves |
|  | Retention of greater proportion of harvest for household consumption (rather than selling at market) | Reflective Motivation    | Goals Intentions                 | Persuasion Incentivization  | Goal setting with fathers and mothers together  |
|  | Dedicate adequate income to purchase foods from the market   | Reflective Motivation    | Goals Intentions                 | Persuasion Incentivization  |   |
|  | Support from and involvement of husband  | Social Opportunity       | Social influence                 | Environmental Restructuring | Discussion with fathers about their role in family health   |
| Caregivers provide complementary foods started at 6 months         | Knowledge / understanding of the importance of introducing complementary foods at 6 months           | Psychological Capability | Knowledge                        | Education                   | Didactic session; ceremonial giving of feeding spoon to caregivers with a child 5-6 months of age                   |
|  | Knowledge that children are capable of digesting foods at 6 months                                   | Psychological Capability | Knowledge                        | Education                   |   |

## Appendix E: Problem and Solution Trees, Behavior Determinants of Complementary Food Thickness

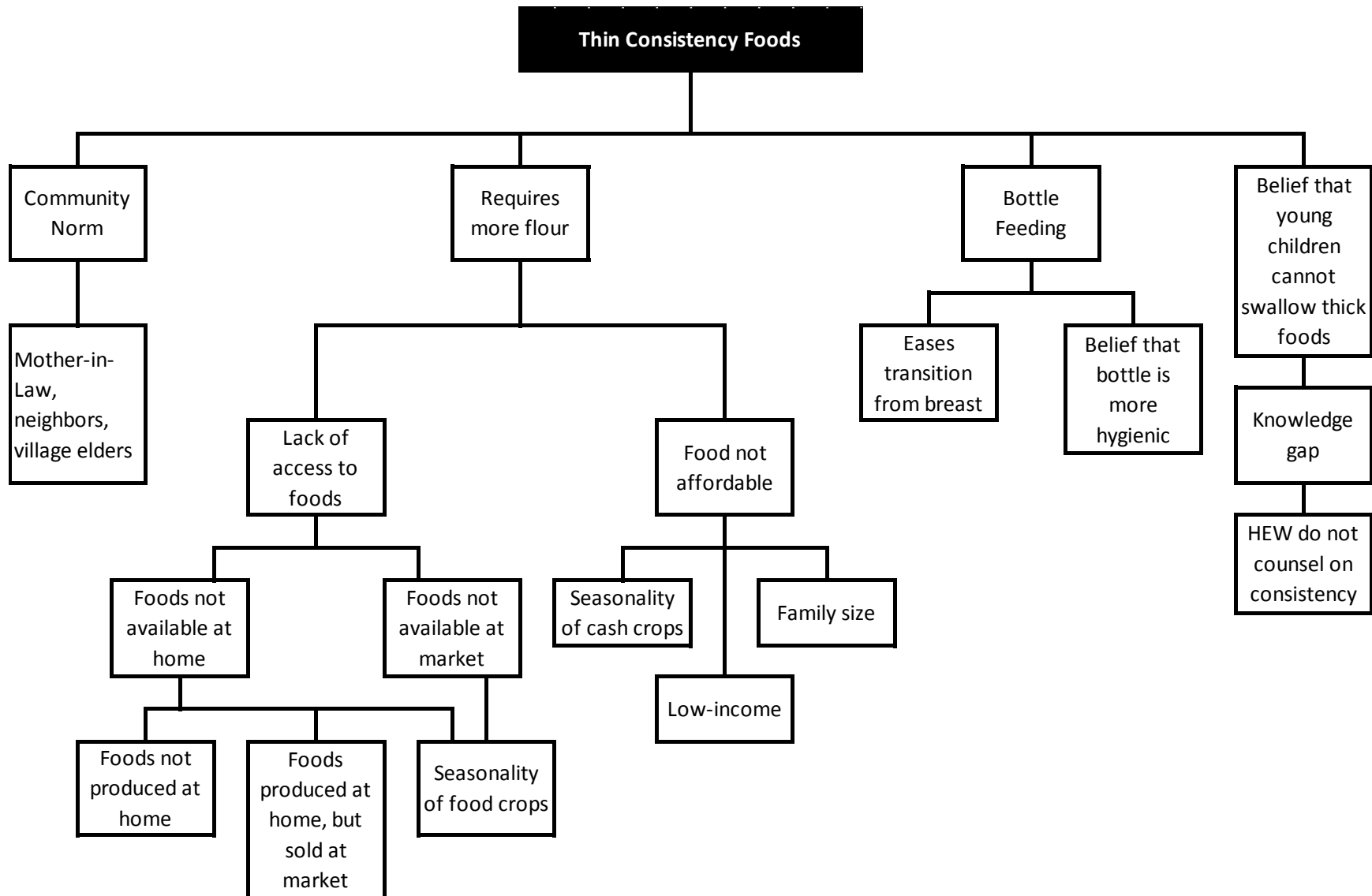


Figure 9. Problem tree – feeding thin (low energy dense) complementary foods.

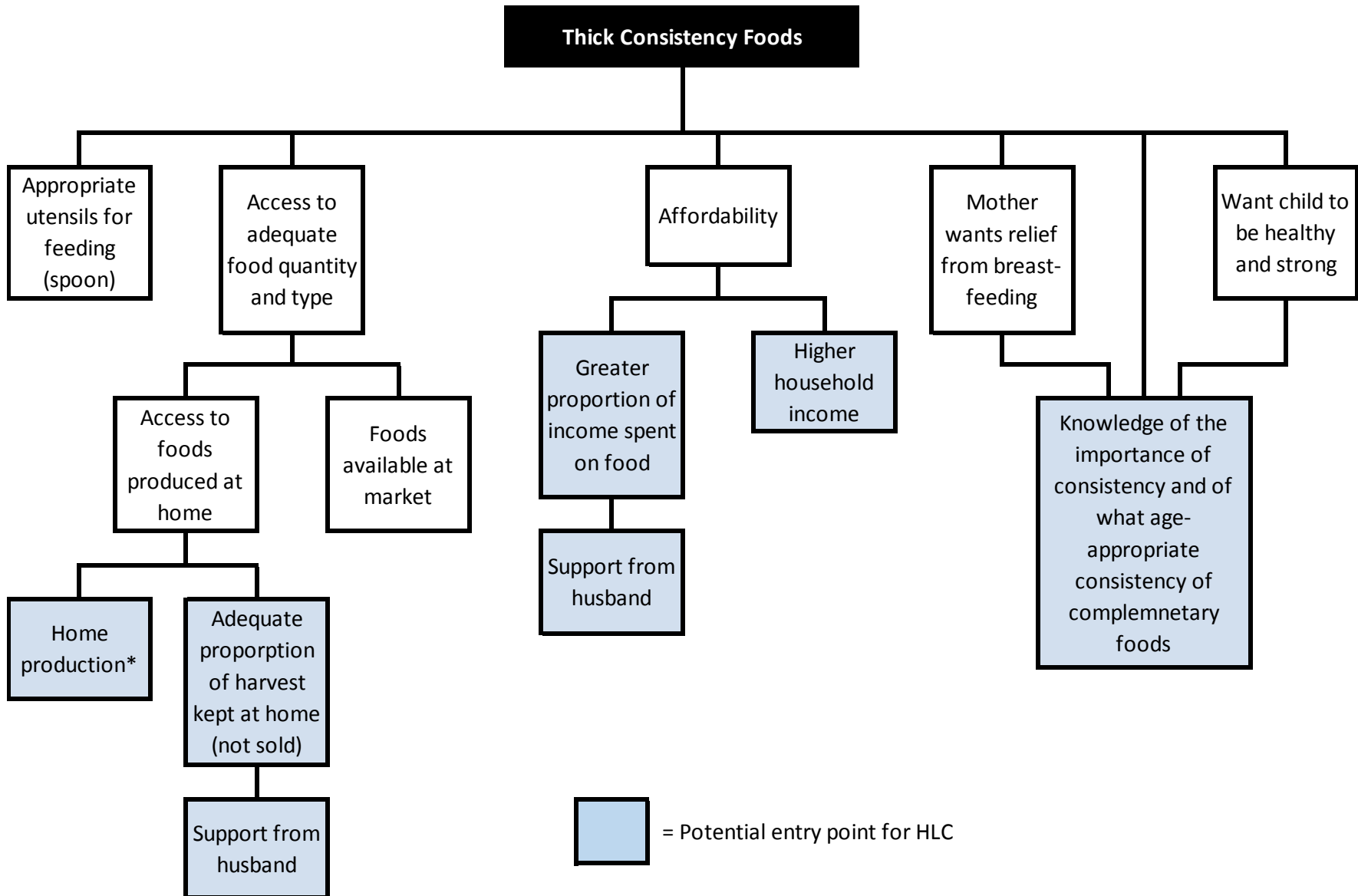
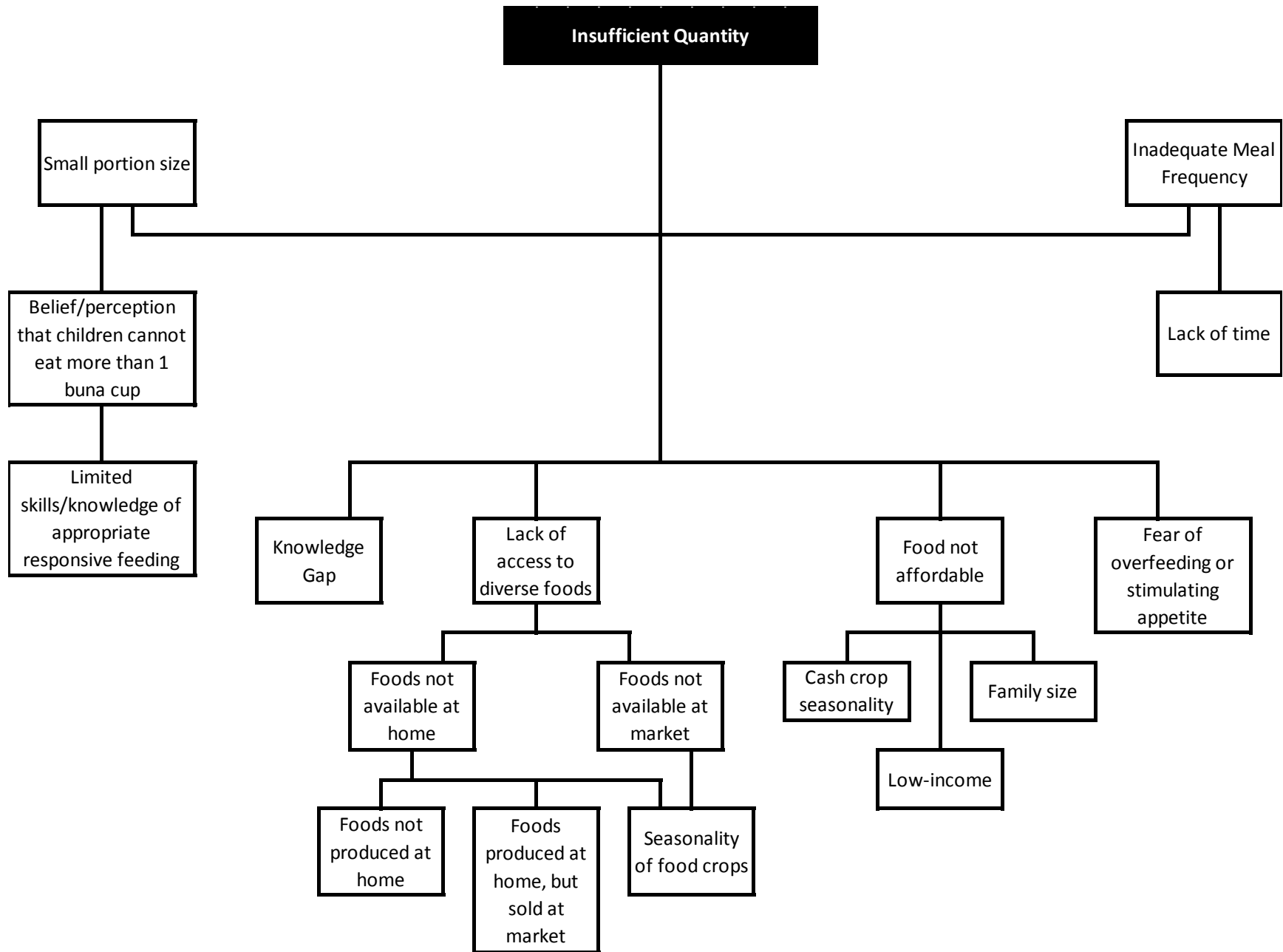


Figure 10. Solution tree – feeding thick (energy dense) complementary foods.

Table 9. Analysis of behavioral determinants of complementary food consistency based on Michie domains.

| Food Consistency   |  |                          |                                  |                             |   |
|--|--|--------------------------|----------------------------------|-----------------------------|---|
| Outcomes   | Determinants   | Michie COM-B Domains     | Theoretical Domain Framework     | Intervention Function       | Example Activity  |
| Caregivers have access to sufficient quantities and types of foods | Home production of energy dense foods  | Physical Opportunity     | Environmental context, resources | Enablement (OFSP)           | Vine acquisition from CIP; ongoing work with agriculture DAs to successfully grow and harvest OFSP roots and leaves |
|  | Retention of greater proportion of harvest for household consumption (rather than selling at market) | Reflective Motivation    | Goals Intentions                 | Persuasion Incentivization  | Goal setting with fathers and mothers together  |
|  | Dedicate adequate income to purchase foods from the market   | Reflective Motivation    | Goals Intentions                 | Persuasion Incentivization  | Goal setting with fathers and mothers together  |
|  | Support from and involvement of husband  | Social Opportunity       | Social influence                 | Environmental Restructuring | Discussion with fathers about their role in family health   |
| Children are fed thick foods                                       | Caregivers' knowledge of the importance of food thickness  | Psychological Capability | Knowledge                        | Education                   | Didactic session using analogy of filling a basket at the market  |
|  |  | Reflective Motivation    | Beliefs about consequences       | Education                   | Didactic session using analogy of filling a basket at the market  |
|  | Caregivers know what appropriate food thickness is   | Physical Capability      | Physical Skill                   | Training Modeling           | Cooking demonstration and taste testing   |
|  | Caregiver has appropriate utensils for feeding thick consistency                                     | Physical Opportunity     | Environmental context, resources | Enablement (spoon)          | Feeding spoon   |
| Feeding thick porridge is considered the norm                      | Support from husbands, MIL   | Social Opportunity       | Social Influence                 | Environmental Restructuring | Group sessions with MIL and fathers, inclusion of local religious leaders, community leaders; didactic session      |

## Appendix F. Problem and Solution Trees, Behavioral Determinants for Food Quantity





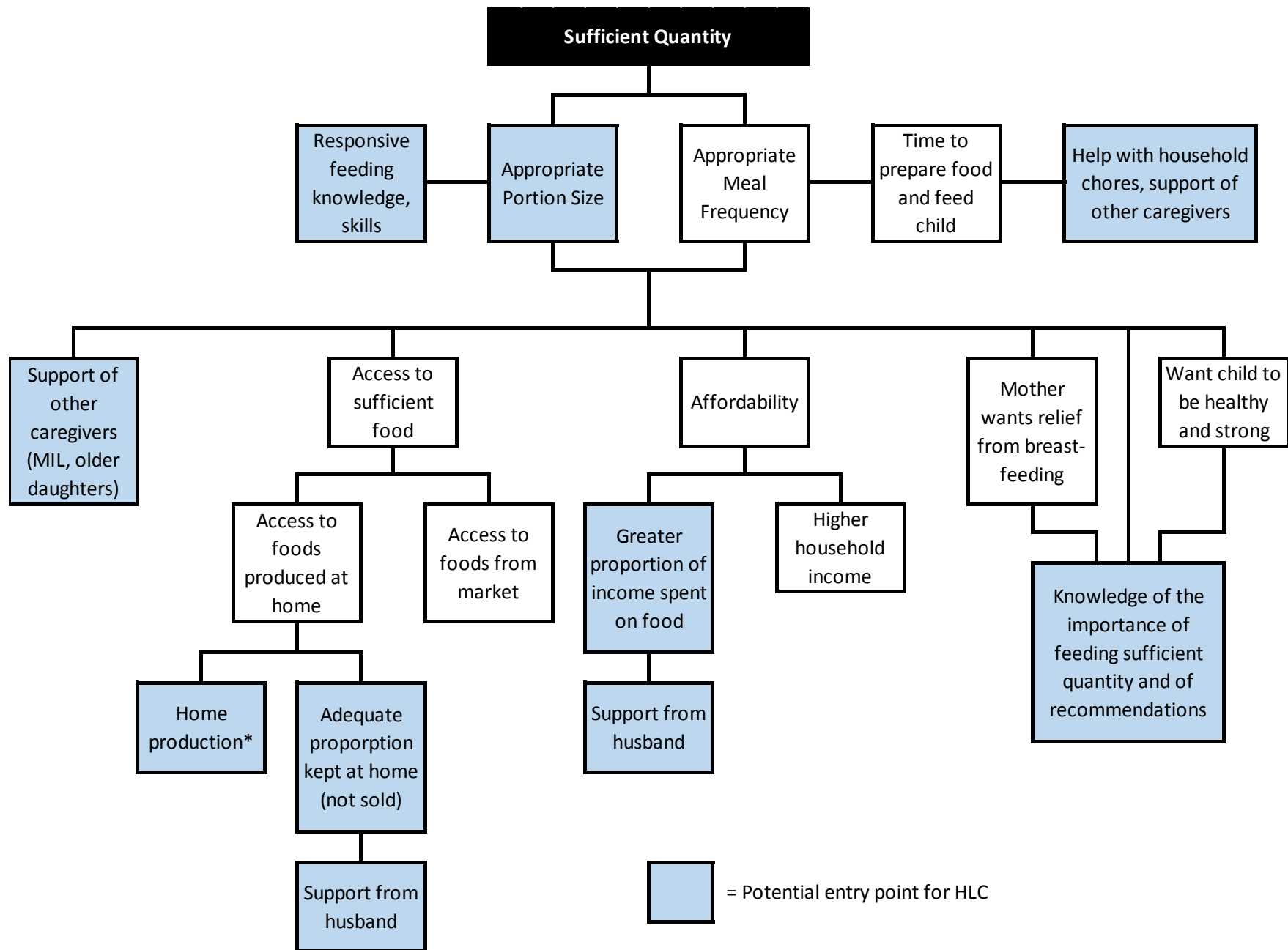


Figure 12. Solution tree – feeding sufficient quantity of complementary food.

Table 10. Analysis of behavioral determinants of quantity of complementary foods based on Michie domains.

| Feeding Sufficient Quantity  |  |                          |                                  |                             |   |
|--|--|--------------------------|----------------------------------|-----------------------------|---|
| Outcomes   | Determinants   | Michie COM-B Domain      | Theoretical Domain Framework     | Intervention Function       | Example Activity  |
| Caregivers have access to sufficient quantities and types of foods | Home production of nutritious foods  | Physical Opportunity     | Environmental context, resources | Enablement (OFSP)           | Vine acquisition from CIP; ongoing work with agriculture DAs to successfully grow and harvest OFSP roots and leaves                           |
|  | Retention of greater proportion of harvest for household consumption (rather than selling at market) | Reflective Motivation    | Goals Intentions                 | Persuasion Incentivization  | Goal setting with fathers and mothers together  |
|  | Dedicate adequate income to purchase foods from the market   | Reflective Motivation    | Goals Intentions                 | Persuasion Incentivization  |   |
|  | Support from and involvement of husband  | Social Opportunity       | Social influence                 | Environmental Restructuring | Discussion with fathers about their role in family health   |
| Children's portion sizes are age-appropriate                       | Caregivers' knowledge of age-appropriate portion size  | Psychological Capability | Knowledge                        | Education                   | Didactic session (feeding bowl and/or children 6-11 months should get 3 buna cups, and children 12-23 months should get 4 buna cups per meal) |
|  | Caregivers' knowledge / understanding of the importance of age-appropriate portion size              | Psychological Capability | Knowledge                        | Education                   | Diactic session, drawing on analogy of healthy crops need adequate water/soil/sun, etc  |
|  | Caregivers' knowledge / understanding of the importance of age-appropriate portion size              | Reflective Motivation    | Beliefs about consequences       | Education                   |   |

Table 10 (continued)

| Feeding Sufficient Quantity   |   |                          |                                  |                             |   |
|---|---|--------------------------|----------------------------------|-----------------------------|---|
| Outcomes  | Determinants  | Michie COM-B Domain      | Theoretical Domain Framework     | Intervention Function       | Example Activity  |
| Caregivers practice responsive feeding  | Caregivers' knowledge / understanding of the importance of responsive feeding                                 | Psychological Capability | Knowledge                        | Education                   | Didactic session, taste testing complementary foods to practice active and responsive feeding                         |
|   |   | Reflective Motivation    | Beliefs about consequences       | Education                   |   |
|   | Caregivers' have responsive feeding skills  | Physical Capability      | Physical skill                   | Training Modeling           |   |
| Children receive at least 2 meals per day from 6-8 months, and at least 3 meals per day from 9 to 23 months | Caregivers' knowledge of meal frequency recommendation  | Psychological Capability | Knowledge                        | Education                   | Didactic session, drawing on analogy of healthy crops need adequate water/soil/sun, etc                               |
|   | Caregivers' knowledge / understanding of the importance of age-appropriate meal frequency                     | Psychological Capability | Knowledge                        | Education                   |   |
|   |   | Reflective Motivation    | Beliefs about consequences       | Education                   |   |
| Caregivers have enough time to prepare sufficient meals / day   | Other family members (MIL, father, older children) help with household chores and/or meal prep and/or feeding | Physical Opportunity     | Environmental context, resources | Environmental restructuring | Group session with MIL and/or fathers, imparting a sense of ownership in MIL and fathers for the health of the family |
|   |   | Social opportunity       | Social influence                 | Environmental restructuring |   |

## Appendix G: Problem and Solution Trees, Behavior Determinants of Dietary Diversity

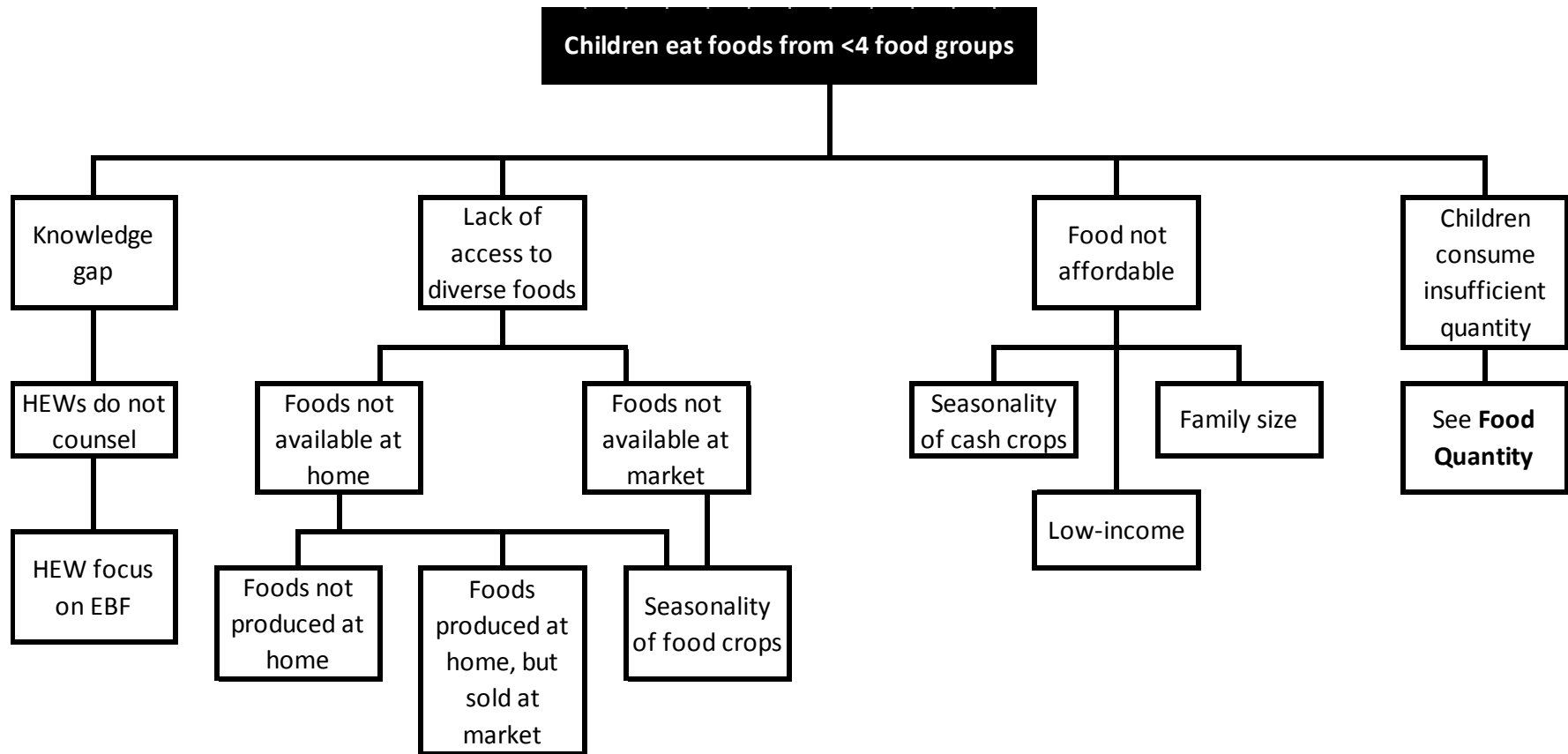
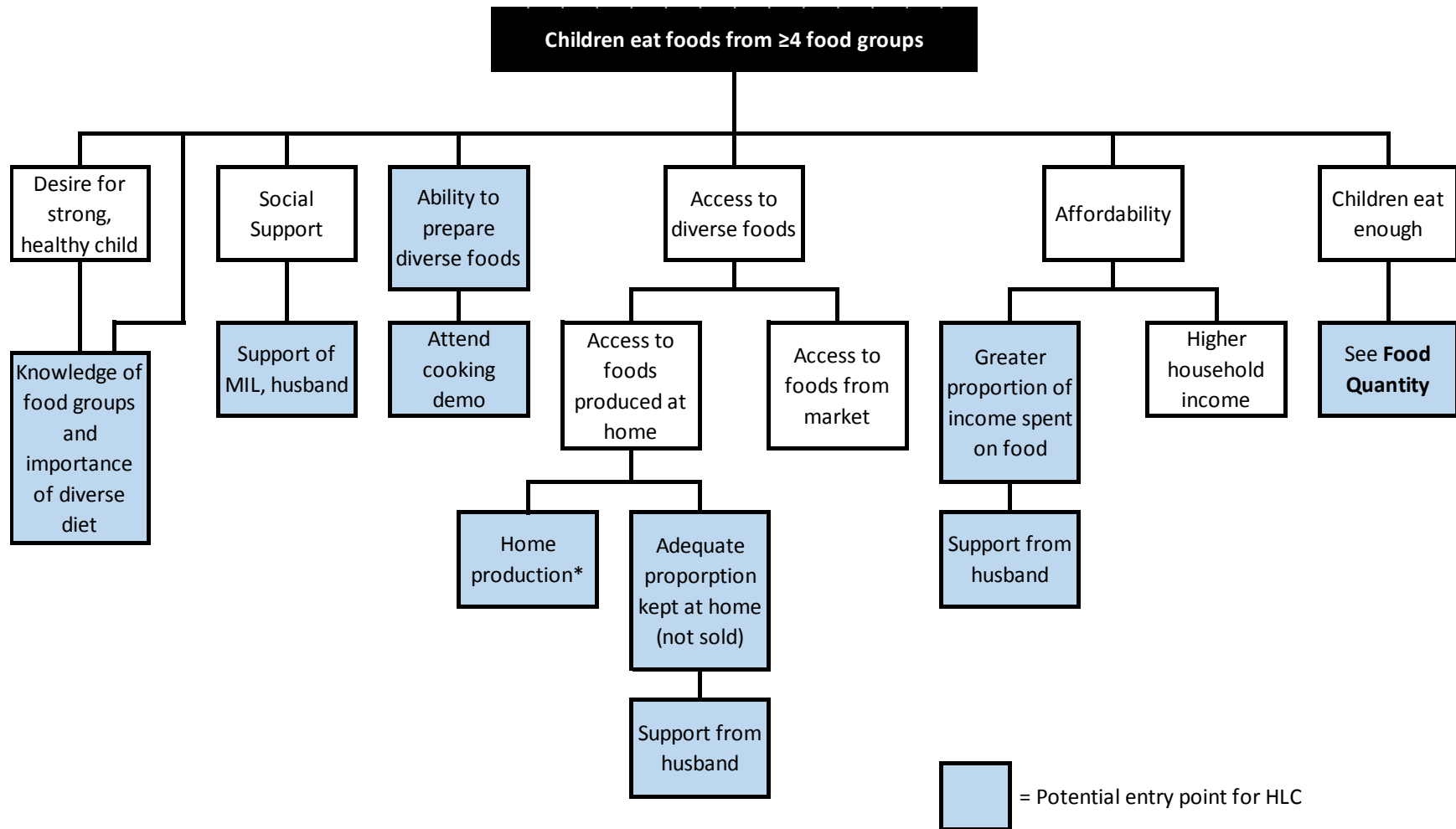


Figure 13. Problem tree – feeding less than 4 food groups a day.



\*CIP is promoting OFSP growth; home production of other crops will not be addressed in the Healthy Living Clubs

Figure 14. Solution tree – feeding 4 or more food groups per day.

Table 11. Analysis of behavioral determinants of dietary diversity based on Michie domains.

| Dietary Diversity  |  |                          |                                  |                                |  |
|--|--|--------------------------|----------------------------------|--------------------------------|--|
| Outcomes   | Determinants   | Michie COM-B Domains     | Theoretical Domain Framework     | Intervention Function          | Example Activity   |
| Caregivers have access to foods from several food groups | Home production of foods from a variety of food groups   | Physical Opportunity     | Environmental context, resources | Enablement (OFSP)              | Vine acquisition from CIP; ongoing work with agriculture DAs to successfully grow and harvest OFSP roots and leaves  |
|  | Retention of a greater proportion of harvest for household consumption (rather than selling at market) | Reflective Motivation    | Goals<br>Intentions              | Persuasion<br>Incentivization  | Goal setting with fathers and mothers together   |
|  | Dedicate adequate income to purchase nutritious foods from market                                      | Reflective Motivation    | Goals<br>Intentions              | Persuasion<br>Incentivization  |  |
|  | Support from and involvement of husband  | Social Opportunity       | Social influence                 | Environmental<br>Restructuring | Discussion with fathers about their role in family health  |
| Caregiver provides child with foods from ≥4 food groups  | Able to prepare dishes with multiple food groups that family accepts                                   | Physical Capability      | Physical skill                   | Training<br>Modeling           | Cooking demonstrations   |
|  |  | Psychological Capability | Skills                           | Training<br>Modeling           |  |
|  | Knowledge of food groups   | Psychological Capability | Knowledge                        | Education                      | Diet diversity wheel, didactic session   |
|  | Knowledge / understanding of the importance of diverse diet  | Psychological Capability | Knowledge                        | Education                      |  |
|  |  | Reflective Motivation    | Beliefs about consequences       | Education                      | Didactic session, drawing on an analogy (for example, just like crops need sun, soil, water to grow, children also need diverse diets), and personal experiences |

Table 11 (continued)

| Dietary Diversity                            |                                  |                    |                              |                             |  |
|--|----------------------------------|--------------------|------------------------------|-----------------------------|--|
| Outcomes                                     | Determinants                     | COM-B Domains      | Theoretical Domain Framework | Intervention Function       | Example Activity   |
| Feeding diverse foods is considered the norm | Support from MIL, husband, peers | Social Opportunity | Social influence             | Environmental Restructuring | Group sessions with MIL and fathers, inclusion of local religious leaders, community leaders; didactic session |

## Appendix H. Theoretical Domain Framework and Intervention Functions used to model behavioral determinants.

Table 12. Theoretical Domain Frameworks defined by Cane et al [39].

| <b>Theoretical Domain Frameworks</b>    |  |
|---|--|
| Knowledge                               | An awareness of the existence of something   |
| Skills                                  | An ability or proficiency acquired through practice  |
| Social/Professional Role and Identity   | A coherent set of behaviors and displayed personal qualities of an individual in a social or work setting  |
| Beliefs about Capabilities              | Acceptance of the truth, reality, or validity about an ability, talent, or facility that a person can put to constructive use  |
| Optimism                                | The confidence that things will happen for the best or that desired goals will be attained   |
| Beliefs about Consequences              | Acceptance of the truth, reality, or validity about outcomes of a behavior in a given situation  |
| Reinforcement                           | Increasing the probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus  |
| Intentions                              | A conscious decision to perform a behavior or a resolve to act in a certain way  |
| Goals                                   | Mental representations of outcomes or end states that an individual wants to achieve   |
| Memory, Attention, and Decision Process | The ability to retain information, focus selectively on aspects of the environment, and choose between two or more alternatives  |
| Environmental Context and Resources     | Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behavior |
| Social Influence                        | Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviors  |
| Emotion                                 | A complex reaction pattern, involving experiential, behavioral, and physiological elements, by which the individual attempts to deal with a personally significant matter or event     |
| Behavioral Regulation                   | Anything aimed at managing or changing objectively observed or measured actions  |



Table 13. Intervention Functions defined by Michie et al [38].

| <b>Intervention Functions</b> |  |
|-------------------------------|--|
| Education                     | Increasing knowledge or understanding  |
| Persuasion                    | Using communication to induce positive or negative feelings or stimulate action  |
| Incentivization               | Creating an expectation of reward  |
| Coercion                      | Creating an expectation of punishment or cost  |
| Training                      | Imparting skills   |
| Restriction                   | Using rules to reduce the opportunity to engage in the target behavior (or to increase the target behavior by reducing the opportunity to engage in competing behaviors) |
| Environmental Restructuring   | Changing the physical or social context  |
| Modeling                      | Providing an example for people to aspire to   |
| Enablement                    | Increasing means/reducing barriers to increase capacity (beyond education and training) or opportunity (beyond environmental restructuring)                              |

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