Scaling Up Growth: Addressing Stunting in Tanzania Early (ASTUTE)

Behaviour Change for Health: Results of Formative Research in the Lake Zone Region of Tanzania (December 2015 – May 2016)

Formative research and report completed by Development Media International.

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Executive Summary

IMA World Health and partners Development Media International (DMI), Cornell University, and Nutrition in Tanzania (PANITA) are implementing a five-year program (**December 1, 2015-May 31, 2020**) for Addressing Stunting in Tanzania Early (ASTUTE), to improve early childhood development and reduce the prevalence of stunting among Tanzanian children under 5 years old with focus on the first 1,000 days of life. IMA will build the capacity of local government authorities (LGAs) in selected regions to address the myriad causes of child stunting and contribute to the evidence base for what works best and most cost-efficiently in the Tanzanian context. The ASTUTE project aims to address a broad range of the causes of stunting through multiple activities, based on a careful analysis of data and an evidence-base of successful interventions. The goal of this behaviour change formative research was to identify barriers and levers of beneficial nutrition and nutrition-sensitive practices of infants and young children, as well as women of reproductive age who may become pregnant, are pregnant, or have children aged under 2. This research will contribute to the design of the SBCC strategy—including the mass media campaign—and identify priorities for further qualitative and operations research. It complements two desk studies that reviewed gaps in existing information about nutrition-specific and nutrition-sensitive behaviours as well as current program efforts within Tanzania to reduce stunting.

A team of two female researchers carried out fieldwork in three regions, Mwanza, Geita, and Shinyanga. Seven villages were visited, covering different contexts such as lakeside zones with fishing, inland with cultivation, artisanal mining, and mixed areas. The researchers used the following methods to collect data: in-depth interviews with women of reproductive age (with children under 2 years), adolescent girls, fathers of children under 2, and health workers; focus group discussions with mothers, fathers, and with mixed elders; (participant) observation of household practices, food preparation, hygiene and child care/stimulation. In total, the team conducted 67 in-depth interviews and focus group discussions with 162 individuals. Summary findings regarding the priority behaviours ASTUTE aims to change are discussed briefly here.

In order for women to be healthy, both before and during pregnancy, they need a nutritious diet, appropriate antenatal care, and increased rest/reduced workload as pregnancy progresses. Findings from this formative research suggests that mothers do not eat more or better during pregnancy; diets remain the same and mothers-to-be have the same diet as other members of the household, usually meals heavy on starchy carbohydrates and low on vitamins, minerals and protein. Women's workload remains the same: they are heavy and women often maintain this up to the day labour starts.

Early and exclusive breastfeeding for the first six months are globally recognized as key behaviours for a healthy start to a child's growth and development. Early initiation is generally well accepted and practiced in Tanzania, as is exclusive breastfeeding in the first 2-3 months of life, but after about three months, there is increasing pressure on a mother to take up a “normal” workload, which can be quite heavy, especially during the rainy season. This means there is less time for adequate breastfeeding. Many women say that they start introducing other food at this moment, because they feel their milk supply is no longer satisfying the child. Milk supply depends on adequate and frequent breastfeeding: when mothers do not have time, milk supply becomes compromised.

Complementary feeding should mean a nutritious and diverse diet, with sufficient protein, vitamins and minerals, given with the right frequency. In the Lake Zone, a standard young child meal consists of a very basic porridge of maize meal, water, and a little sugar. Few mothers add extra nutritious ingredients, even though these are available and fairly cheap. While it is common for young children to start eating what other members of the household are eating, these dishes are again mostly starch-based, with some green leafy vegetables, but little protein (in the form of animal source food, or even beans and legumes). Many people think nutritious food is expensive and thus out of reach (literally as well, as fresh meat is not easily found in rural villages). While this is true for meat, there is easier physical and economic access to fish, which can be promoted as a meat alternative. The proximity to lakes offers regular fish, to lakeshore and interior areas. Eggs may be a solution to increase dietary protein but this would require a change in perception, as eggs are expected to hatch into more chickens, and chickens are considered to be "emergency cash" to be sold during a time of need.

Hand washing with soap and water at critical moments is important in reducing the danger of infectious diseases that can compromise child development. While there is awareness and limited practice, household hygiene can be greatly strengthened. Hand washing practice is incomplete, as people do not always use soap, use dirty water to wash, and do not apply it at all critical moments. Young children are left under the supervision of older siblings, who do not always make sure the youngest children have clean hands before eating. Drinking water is also not consistently treated or boiled; people trust the quality of water from boreholes. Infant stools are not considered to be harmful, especially compared to the stools of children who have started eating (semi-)solid food, so there is less careful disposal of infant stools. Chickens roam around the yards and are locked indoors at night, with the potential of contaminating surfaces where infants and children sit and play.

Interacting with and talking to children from birth onwards contributes to cognitive development. Mothers interact with and talk to their children to some degree, and often are not even aware that they are doing so. Individuals other than mothers do not consider it important, reporting that "*a baby cannot even hear*." Learning is associated with school attendance, and playful interaction and one-way conversation with infants and young children is not considered appropriate behaviour for an adult (especially fathers, who are often away from home for long periods, from early in the morning until late in the afternoon or evening). Older siblings (especially girls) are often tasked with childcare (and/or feeding) duties, and they do play children's games, sing, or talk to their young siblings.

Stunting as a health concept is little understood: most people think it has to do with acute malnutrition and realise that good nutrition can prevent it. People do come up with behavioural associations that make sense, such as making sure food is warm (cold leftover foods should be avoided); hands are washed before eating; mothers should space births so that each child can get the right amount of breastfeeding and adequate nutrition.

To achieve behaviour change at an individual level, which in the Lake Zone implies that a new mother provides adequate nutrition to her newborn up to 2 years in a clean and healthy environment, these findings show that ASTUTE needs to foster social change and shift social norms that will support and enable a mother’s healthy practices. Mass media and community-based SBCC strategies have to address all the actors within a mother’s social environment, as well as the mother

herself, and convince them that new ideas and simple, doable practices are feasible and will benefit a family's welfare, strengthen children's health, and secure a productive future.

Acronyms and Abbreviations

ANC	Antenatal Care
ASTUTE	Addressing Stunting in Tanzania Early (in the Under 5s)
CHW	Community Health Worker
DFID	Department for International Development
DMI	Development Media International
DNuO	District Nutrition Officer
EBF	Exclusive Breastfeeding
ECD	Early Childhood Development
IYCF	Infant and Young Child Feeding
LGA	Local Government Authorities
LiST	Lives Saved Tool
MoH	Ministry of Health, Community Development, Gender, Elderly and Children
NGO	Non-Governmental Organizations
NNS	National Nutrition Survey
NTWG	Nutrition Technical Working Group
OR	Operations Research
ORS	Oral Rehydration Solution
PANITA	Partnership for Nutrition in Tanzania
PDA	Personal Digital Assistant
RCT	Randomized Controlled Trial
RNuO	Regional Nutrition Officer
SAM	Severe Acute Malnutrition
SBCC	Social and Behaviour Change Communication
SD	Standard Deviation (from the median of the reference group)
TFNC	Tanzania Food and Nutrition Centre
UK	United Kingdom
WASH	Water, Sanitation, and Hygiene
WHO	World Health Organization

Background and Project Description

Project Background

The Department for International Development (DFID) in the United Kingdom (UK) has allocated funding to support the Government of Tanzania's (GOT) efforts to improve the health of its citizens through the **Scaling Up Growth: Addressing Stunting in Tanzania Early (ASTUTE)** program. IMA World Health was selected as the consortium lead to implement this project in collaboration with the Partnership for Nutrition in Tanzania (PANITA), Development Media International (DMI), and Cornell University. The project aims to reduce the prevalence of stunting in children in Kigoma, Mwanza, Shinyanga, Geita, and Kagera regions of Tanzania through interventions during the window of opportunity, the first 1,000 days of a child's life starting from conception up to 24 months of age. The proposed regions have a collective population of 10.2 million[1] and over 750,000 stunted children. The overall goal of the project (2015-2020) is to reduce stunting prevalence among young children by at least 7% in the target regions.

ASTUTE aims to create a cultural shift in Tanzania, among LGA decision-makers and caretakers of children alike, increasing their understanding of the importance of nutrition to child health, development and future productivity, and redefining the social norms for how infants and young children are fed. To realize this vision, ASTUTE takes a multi-sectoral approach, including the health and nutrition-sensitive sectors (e.g., agriculture, education, water, sanitation, and hygiene [WASH], early childhood development [ECD]), to establish sustainable, district-based interventions that identify and treat children whose growth is faltering, educate and support mothers to initiate early and exclusive breastfeeding for six months, encourage and empower families to adopt improved feeding practices, and prompt LGAs to prioritize and allocate resources for coordinated nutrition activities and supplies.

During the first year of the program, ASTUTE has conducted rapid formative research as the basis for developing effective nutrition messages and mass media strategies, to inform the project about the behavioural drivers that contribute to stunting and the barriers that prevent behavioural change, and to help develop the social and behaviour change strategy. The formative research will also contribute to the identification of selected operations research priorities in order to expand the evidence base about what works to reduce stunting, and how best to allocate resources.

In preparation for this formative research, ASTUTE carried out a desk review of the program and peer-reviewed literature focused on Tanzania exclusively (and in particular, data from the 2010 Demographic and Health Survey and the 2014 National Nutrition Survey). The purpose of the review was to 1) describe the prevalence of nutrition-specific and nutrition-sensitive practices within Tanzania, and 2) identify facilitators and barriers to those practices. While more than 100 studies were evaluated, the major finding from that review was that there was little helpful information on behavioural determinants. The majority of studies were quantitative in nature and did not shed additional light on why people practice (or fail to practice) the behaviours ASTUTE will promote.

Major findings of the desk review are substantiated by the formative research described here and include some of the following observations:

- Mothers delay the initiation of breastfeeding

[1] Census 2012, TDHS 2010, TDHS 2015

- Few mothers breastfeed exclusively after ~3 months of age
- Some mothers introduce grains and semi-solid foods in the first two months of life. Other liquids including other milks are also given, starting at 2-3 months
- Foods are too thin
- Few children get four meals a day (though many get three meals)
- Fathers often buy food for their children
- Few children consume animal source foods, even when they are 18-23 months old
- Very few caregivers wash their hands
- Water and sanitation access is far from optimal
- Disposal of infant faeces is a challenge
- At all ages, women do not usually consume animal source foods
- Women should eat more food than usual during pregnancy but do not do so
- Women are not receiving information on nutrition during pregnancy
- There are high rates of attendance at MCH clinics
- There are few kitchen gardens
- Farmers do not get information or support from government extension officers, and
- Different caregivers have different responsibilities for ECD

ASTUTE includes an intensive mass media communications strategy that is critical to our theory of change and behaviour change methodology. The strategy involves simultaneous bottom-up and top-down approaches that reinforce and saturate the various social levels and groups of stakeholders to deliver consistent, persuasive messages that will result in a shift in thinking and practices around child nutrition and feeding. Mass media communications are a key tool in reinforcing and popularising messages among broader audiences, in conjunction with the proposed household and community-level behaviour change interventions. DMI, the consortium partner responsible for the mass media component, has successfully implemented this approach in West Africa to improve health outcomes. ASTUTE will also strengthen district and regional systems to scale-up quality nutrition services.

Stunting

The 2015 Tanzania Demographic Health Survey (THDS) found national stunting prevalence of 34% (below -2 SD) among children under 5 (Table 1). Underweight increases steadily from 6% among children under 6 months to 15% among children 9-11 months and 16% among children 18-23 months. Stunting or chronic malnutrition increases rapidly after 6 months and stunting in rural areas is more than 10% higher than in urban areas. While the prevalence of exclusive breastfeeding is improving (59% in 2015), complementary feeding after 6 months remains highly problematic with only 8% of children aged 6-23 months meeting the criteria for a minimum acceptable diet. Anaemia prevalence also remains very high, at 60% or more in the Lake Zone, e.g. 71% in Shinyanga.

Table 1. Proposed Regions[1]

Region	No. stunted children <5	% Stunted
Kagera	164,362	42
Kigoma	149,930	38
Mwanza	164,136	39
Geita	145,259	41
Shinyanga	129,843	28

An initial review of the literature and discussions with TFNC, MOH and RNuOs and DNuOs revealed a general consensus that there are a range of environmental, cultural and behavioural issues that contribute to child malnutrition and stunting. In the Lake Zone regions where ASTUTE will operate,

food availability is not always the only or primary reason for poor child nutritional status, as many areas with high food production levels also feature the highest stunting rates. Diseases and inadequate dietary intake lead to these high rates of undernutrition; physical or economic access to food, poor health services, an unhealthy environment and inadequate care practices for children and mothers all contribute to undernutrition in Tanzania. There is a complex interplay of inadequate nutrition, hygiene and childcare practices: poor dietary diversity and poor child feeding, inadequate maternal nutrition (pre-conception, during pregnancy, during breastfeeding), insufficient birth spacing, low exclusive breastfeeding (EBF), insufficient hygiene practices, household food insecurity (whether related to food production, seasonality, or external food costs), and issues relating to crop management and agriculture.

It is important to remember that adolescent girls are a key population group that needs to be considered in regards to IYCF and nutrition, as many of them will become pregnant before they reach their late teens. The 2015 DHS reports that 27% of adolescent girls aged 15-18 have begun childbearing and by age 19, 57% have had a child. Teenagers are also more likely to have children if they are less educated, poorer and living in rural areas.

The aforementioned nutrition-specific and nutrition-sensitive practices are shaped by culture and knowledge and underpinned by a lack of equality between men and women within the household, as well as issues around the control of household income, all of which is exacerbated by poverty. Women's time constraints further complicate childcare practices, as does a general lack of knowledge about the value of investing in early childhood development (ECD) activities. Mothers are the primary caregivers but husbands, grandparents, relatives and key leadership figures in the community play an equally important role in determining how children are fed and nurtured. Men control most family finances and major household decisions, and thus influence food purchasing choices and time-use issues that impact on child health and welfare.

Formative Research Objectives

The goal of this formative research was to obtain an understanding of the barriers and drivers of beneficial nutrition and nutrition-related practices and develop the mass media campaign messages and an appropriate social and behavioural change communication strategy, which will also inform ASTUTE's other district level and community-based activities, materials development and training activities.

The literature/interventions evidence base shows what type of interventions can lead to reduced stunting levels.[2] The primary objective of the formative research was to assess whether target populations adopt (or do not adopt) these evidence-based interventions and identify the reasons for (non-) adoption. The research also examined media use/listening practices (radio, television, mobile phone) to obtain an overview of the media environment in the Lake Zone regions.

[2] Bhutta Z, Das J, et al. "Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost?" *The Lancet* 382, no. 9890 (2013): 452-477. Ruel MT, Alderman H, and Maternal and Child Nutrition Study Group. "Nutrition-sensitive interventions and programmes: how can they help to accelerate progress in improving maternal and child nutrition?" *The Lancet* 382, no. 9891 (2013): 536-551. 2011-2015 National Nutrition Strategy (NNS Tanzania). Shekar M. *Scaling up nutrition: what will it cost?* World Bank Publications, 2010. Smith LC, Haddad L. "Reducing child undernutrition: past drivers and priorities for the post-MDG Era." *World Development* 68 (2015): 180-204. Smith L, Haddad L. "Reducing Child Undernutrition: Past Drivers and Priorities for the Post-MDG Era." *IDS Working Papers* 2014, no. 441 (2014): 1-47.

This formative research aimed to determine which program designs and/or implementation mechanisms (of the behaviour change strategy in the mass media and the community-based campaign) best fit the socio-cultural and environmental contexts of the target beneficiaries in the Lake Zone region. The expected outcome of the ASTUTE project – a reduction in stunting – can be achieved if beneficiaries adopt proven integrated child growth and development interventions.[3] To guide the research and establish the themes that needed to be examined, we used a conceptual framework based on the social-ecological model, where "*children's outcomes (e.g. growth, development, cognition, and health) are impacted by a variety of inputs, including the individual's genetic makeup, as well as the family, organizational (e.g. school) and community (e.g. built, geographical, cultural) environments*" (Bentley et al).

Optimal child development depends on a "*combination of genetic capacity, adequate nutrition, psychosocial stimulation, and safe, clean physical environments*" (idem). Nutrition needs vary at different stages of child development, pre- and peri-conception, and especially up to 2 years of age, as this is the period with the most rapid development. There is also strong evidence that social interactions between caregiver and infants (e.g., verbalization, encouragement, developmentally appropriate play) promote infant food intake and contribute to psychosocial and cognitive development.[4] Most Tanzanian mothers, however, do not think it is important to talk to babies in the first six months of life, because "*the baby would not understand*" or a "*grandparent would not permit it*" (ZUMM Research Summary 2014).

The physical environment equally influences child growth: "*Children who live without adequate sanitation, hygiene, and clean drinking water don't grow as well as children who do.*"[5] Environmental enteropathy, caused by poor hygiene and microbial ingestion, may also enhance the risks of poor child growth, even when nutrition needs are sufficiently met.[6] There is limited evidence for appropriate interventions to address environmental enteropathy issues but several strategies are currently being studied.[7] Nonetheless, basic hygiene and specific WASH interventions (e.g., baby and household hand washing with soap at key times, hygienic infant feeding, hygienic disposal of stools, clean play environments, clean water sources) are all proven beneficial behaviours that can be promoted.[8] Deworming campaigns (alongside Vitamin A distribution) are another intervention that

[3] See http://www.thelancet.com/series/ on maternal and child undernutrition (2008, 2013), child development in developing countries (2011), and breastfeeding (2016). Bentley, Margaret E. et al. "Formative Research Methods for Designing Culturally Appropriate, Integrated Child Nutrition and Development Interventions: An Overview" (1308 (2014): 54–67), in *Annals of the New York Academy of Sciences*: *Every Child's Potential: Integrating Nutrition and Early Childhood Development Interventions* (Volume 1308, Pages v–viii, 1–255).

[4] Zungumza na Mtoto Mchanga (ZUMM) is one example of a potential ECD intervention that can be incorporated into the child nutrition/development framework. ZUMM is a project hosted by the Adult and Non-Formal Education Directorate of the Tanzanian Ministry of Education and Vocational Training, in collaboration with the Ministry of Health and Social Welfare, the Ministry of Community Development, Gender and Children, and Children in Crossfire, a UK NGO working in ECD in Tanzania. DMI is working with ZUMM to see how their work and research can be incorporated in the SBCC campaign, and exploring other ECD strategies.

[5] Schmidt CW. "Beyond Malnutrition: The Role of Sanitation in Stunted Growth." *Environmental Health Perspectives* 122.11 (2014): A298–A303. PMC. Web. 27 Mar. 2016.

[6] Humphrey JH. Child undernutrition, tropical enteropathy, toilets, and handwashing. Lancet 2009; 374:1032-5.

[7] NIH. SHINE Sanitation, Hygiene, Infant Nutrition Efficacy Project [clinical Trial]. No date. National Library of Medicine, National Institutes of Health. Arnold BF, Null C, et al. Cluster-randomised controlled trials of individual and combined water, sanitation, hygiene and nutritional interventions in rural Bangladesh and Kenya: the WASH Benefits study design and rationale. BMJ Open 2013;3:e003476.

[8] Ngure FM, Brianna MR, et al. "Water, sanitation, and hygiene (WASH), environmental enteropathy, nutrition, and early child development: making the links." *Annals of the New York Academy of Sciences* 1308, no. 1 (2014): 118-128.

has been promoted as part of a child health promotion package, especially for children under 5 (the benefits for school-age children are less evident: a 2015 systematic review found no measurable impact on nutrition indicators or educational performance benefits from routine deworming of school children[9]).

The formative research took into consideration differences in household and community characteristics. Within a household, women may be the primary caregivers but their caregiving role is constrained by their husbands or mothers-in-law, who decide household food allocation and influence food preparation, food choices and infant care practices.[10] Furthermore, different households have varying access to food sources. Communities as a whole are also dependent on broader environmental conditions that affect seasonal food production cycles, and on socioeconomic conditions that influence access to food sources.

This report describes our findings and implications of findings for the mass media campaign as well as other SBCC community-based interventions ASTUTE will use to improve the nutritional status of children in the five regions of the Lake Zone.

Themes

The topics investigated during this formative research phase were:

- **NUTRITION:** practices around the 1,000 days concept (maternal nutrition during/pre/post pregnancy, early initiation of breastfeeding, colostrum, exclusive breastfeeding (up to 6 months), continued breastfeeding (up to 2 years); complementary feeding (minimal meal frequency, dietary diversity); feeding of the sick child during recovery; norms and advice at each stage.
- **WASH**: hand washing with soap, water storage/quality; defecation/latrine practices; livestock and poultry hygiene; harvest storage hygiene.
- **EARLY CHILDHOOD DEVELOPMENT**: concepts about early childhood development; interaction and communication with infants and young children; ECD opportunities; gender and generational ECD roles.
- **AGRICULTURE & LIVESTOCK/POULTRY PRACTICES**: market and subsistence crops; seasonal practices and availability of foods for household consumption; small livestock and poultry; family/community vegetable and fruit plots.
- **STUNTING**: awareness and perceptions of the concept (*udumavu*); causes, prevention and consequences.
- **MEDIA** habits: radio listening preferences (timing, programme formats); mobile phone radio/media use; exposure to nutrition campaigns (and effect); television practices (video halls); gender influence.
- **HEALTH FACILITIES**: role of health service agents, including community health workers; community outreach activities.

[9] Taylor-Robinson DC, Maayan N, et al. "Deworming drugs for soil-transmitted intestinal worms in children: effects on nutritional indicators, haemoglobin and school performance." *Cochrane Database Syst Rev* 7 (2015).

[10] Tanzania Gender Networking Program (TGNP) and Macro International, Inc. Women's health in Tanzania. Dar es Salaam: TGNP and Macro International Inc. 2007.

Research Team

Two female Tanzanian researchers carried out the formative research. Both are familiar with the Lake Zone and have extensive experience in conducting qualitative and quantitative field research and speak local languages besides Swahili. Both researchers have degrees in sociology (one has an MA degree, one has a BA degree). The researchers were trained during five days in early April in human subject research ethics procedures, qualitative research methodology, analysis, and field procedures, as well a review of nutrition best practices during the critical 1,000 days of a child's development.

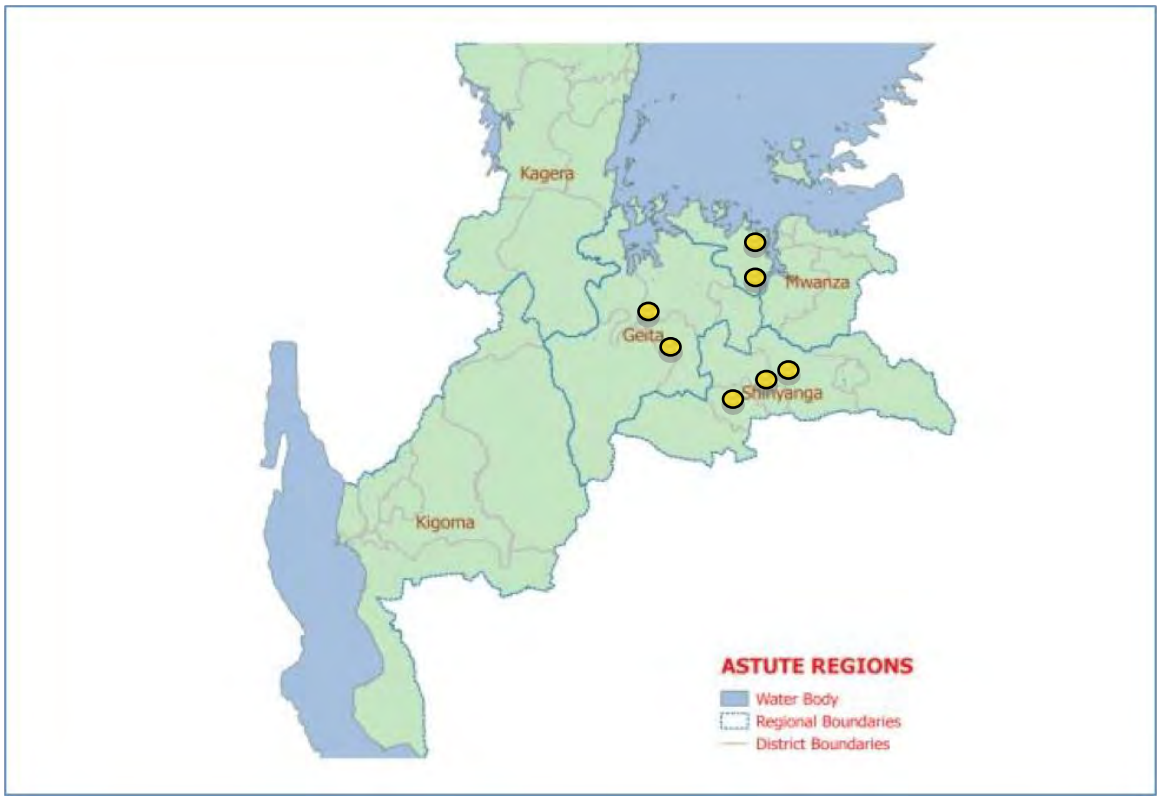
They were trained and supervised by Dr. Pieter Remes, the Communications Advisor for the ASTUTE project. Dr. Remes is an anthropologist with over 20 years of research experience in sub-Saharan Africa, who has trained and supervised multiple research teams, including teams in the Lake Zone.

Methodology

Study Locations

Formative research activities were conducted in three districts of the program area: Sengerema, Geita Town Council and Shinyanga Rural District. These districts were chosen from the regions where ASTUTE staff had already established working relationships with local authorities (Mwanza, Geita and Shinyanga regions). With the help of the District Nutrition Officers, two to three villages were selected in each district for data collection. Selection of these villages was based on the following characteristics: a mixture of areas that are rural, areas that are semi-urban, areas that are dominated by farming and livestock keeping, and areas where community members engage in other employment opportunities such as mining or fishing (lakeside communities).

Data collection activities were conducted in seven villages across the three districts. These villages were Karumo and Ngoma A in Sengerema district, Bugogo and Nyarugusu in Geita Town Council, and Mwamala, Isela and Shabuluba in Shinyanga Rural District. The following map highlights the locations of sampled villages:



Target Population

To understand knowledge, practices and perceptions around the topics of care and nutrition of pregnant women, infants and young children, we recruited pregnant women, mothers and fathers of children less than 2 years and elders to participate in in-depth interviews (IDI) and focus group discussions (FGD). Health agents and community health workers were also included in the interviews so as to better understand current reproductive, maternal and child health service provision in the study areas. The study also included adolescent girls in interviews so as to

understand their knowledge and understanding of nutrition needs during pregnancy, and their main sources of such information. Participants were purposively sampled with the help of local community leaders.

Sampling

Qualitative sampling consists of small sampling units studied in depth with the sample size often extending over the course of the data collection and analysis.[11] In this study a total of 18 FGDs were conducted with mothers of children under 2, fathers of children under 2, and elders. A total of 67 IDIs were conducted with adolescents, pregnant women, mothers and fathers of children under 2, and elders. One IDI was also conducted with a member of staff in each health facility visited: in total five IDIs were conducted with health workers. The numbers of FGDs and IDIs in each category are indicated in the results tables.

The study participants were purposively chosen and sampled until saturation was achieved and no new information was being reported. Community leaders helped in the identification and recruitment of study participants fitting our selection criteria (e.g., having a child under 2, being pregnant, being an adolescent girl) because they knew community members well. Households chosen for interviews were randomly selected in each location. Selection of respondents in each household was done by the researchers depending on who was available at the time of visiting the household.

Tables 2-3 show FGDs and IDIs respondents in the three regions visited.

Table 2: IDI Respondents

District	Ward	Village	Type of IDIs				
			Mothers	Fathers	Elders	Health staff*	Total
Sengerema	Karumo	Karumo	9	0	0	0	9
	Igalula	Ngoma A	3	3	2	0	8
Geita DC	Bukoli	Bugogo	7	2	1	2	12
	Nyarugusu	Nyarugusu	8	1	0	1	10
Shinyanga DC	Usanda	Shabuluba	4	0	0	0	4
	Samuye	Isela	10	1	0	1	12
	Mwamala	Mwamala B	8	2	1	1	12
TOTAL			**49**	**9**	**4**	**5**	**67**

[11] Daymon C, Holloway I. *Qualitative research methods in public relations and marketing communications*. Routledge, 2011.

Table 3: FGDs Respondents

District	Ward	Village	Type of FGD	Sex		
				M	F	T
Sengerema	Karumo	Karumo	Mothers of children under 2 years	0	11	11
			Fathers of children under 2 years	5	0	5
			Elders	5	3	8
	Igalula	Ngoma A	Mothers of children under 2 years	0	6	6
			Fathers of children under 2 years	7	0	7
			Elders	9	0	9
Geita DC	Bukoli	Bugogo	Mothers of children under 2 years	0	11	11
			Fathers of children under 2 years	9	0	9
			Elders	5	4	9
	Nyarugusu	Nyarugusu	Mothers of children under 2 years	0	8	8
			Fathers of children under 2 years	5	0	5
			Elders	5	5	10
Shinyanga DC	Samuye	Isela	Mothers of children under 2 years	0	12	12
			Fathers of children under 2 years	12	0	12
			Elders	4	4	8
	Mwamala	Mwamala B	Mothers of children under 2 years	0	11	11
			Fathers of children under 2 years	8	0	8
			Elders	5	8	13
TOTAL				**79**	**83**	**162**

Data collection techniques

Data collection techniques used were focus group discussions (FGDs), in-depth interviews (IDIs) and observations.

In-depth interviews: Respondents for IDIs were adolescent girls, pregnant mothers, mothers of children under 2, fathers of children under 2, elders and health workers. IDIs with community members were conducted at home but in a place away from other residents, where the respondent felt comfortable and confident to talk. This was also done so as to enable researchers to make observations around the home. Interviews were conducted between 9 a.m. to 5-6 p.m.; fathers were rarely found at home during that time. It was reported during the interviews that most fathers leave home early in the morning and come back very late in the evening. Time for each interview ranged from 30 minutes to one hour. Interviews with health service providers were conducted at their places of work so as to enable researchers to make observation of the RCH activities at the health facility. A convenient time was chosen so that service provision at the health facilities was not disturbed. Interviews were digitally recorded.

Focus Group Discussions: Focus group discussions were conducted with mothers of children under 2 years, fathers and elders. Local leaders helped in identification and recruitment of the participants. Participants were informed a day in advance of the discussion. Before the participants agreed to enrol in the discussions they were informed about the objectives of the study and that their participation in the study was voluntary: they were provided with an informed consent sheet to sign. Nobody who had consented to participate withdrew from the discussions at any time.

A focus group discussion guide was used to facilitate the discussion (IDI and FGD guides are presented in Appendix 2). The number of participants in each FGD ranged from six to 12 and they lasted from one to two hours. With participants' oral consent, all the FGDs were digitally recorded, but participants remained anonymous, as their names were not recorded. In addition to tape recording the discussions, one of the researchers took field notes during each discussion. Upon completion of each FGD, participants received a bar of soap as a token of appreciation for their participation.

Observations

Observations were done at the household, the health facility, and at the market. Doing interviews at home allowed researchers to observe routine household practices on nutrition such as caregiver-infant feeding interactions, types of food people eat and their preparations, presence and types of crops/vegetables/fruits grown at home, as well as hygiene practices which included hand washing, cleanliness of the yard and latrines, livestock hygiene as well as cleanliness and location of food storage facilities. Observation was also done at the health facilities: the focus was on Reproductive, Maternal and Child Health (RMCH) service provision. Observation at the market was done to explore types of food crops available and their costs.

Findings

Overview of geography and respondent profiles

The area has a bi-modal rainfall pattern with rainy seasons from November to December (short rains) and March through May (long rains). Major livelihood activities in the three regions are crop farming (subsistence farming), fishing, livestock keeping and artisanal, small-scale mining. These vary depending on the geographical location and households do not entirely depend on one activity. Sengerema has villages that are close to the lake (Lake Victoria) and allow for both fishing and farming. Geita is known for its gold mining activities with the Geita Gold Mine as the largest gold producer in Tanzania, and also features multiple areas with artisanal mining such as Nyarugusu. Shinyanga Region's major activities are farming and livestock keeping. Major crops produced in the regions include maize, paddy rice, sweet potatoes, cotton, cassava, sorghum, millet, groundnuts, and pulses. Small-scale livestock farming is also widespread in the area with households keeping chicken, goats, cattle, sheep, ducks, and pigeons. Other income generating activities included fresh food vending (especially vegetables), work in grinding mills, and public transport with bicycles and motorcycles. The majority of the population in the three regions visited are Sukuma. Other ethnic groups that reside in the regions are Sumbwa, Tumbatu, Nyamwezi, Zinza and Haya.

This formative research targeted various categories of respondents, specifically mothers of children under 2 years, fathers of children under 2 years, elders, adolescent girls and health workers in village and facilities. A total of 229 respondents were interviewed through both FGDs (162) and IDIs (67) as seen in tables 1 and 2 above. Majority of the respondents were of reproductive age. Respondents included adolescents aged 17 to 19 years and adults aged 20 to 97 years. The majority of the respondents had attained primary education, followed by those who had no education at all; very few had completed secondary education; only one had a post-secondary diploma. The health workers who were interviewed mostly had post-secondary education; one health worker, a medical

attendant, had only completed primary education. Most respondents were married and were caregivers of children under 5, except for adolescent girls who were living with their parents.

Radio

Ownership of radio, TV and mobile phones varied in all three regions and villages. Ownership of these devices was most frequent in villages near urban centres. For instance, in Geita, most people had radios and almost half of all households around centres had TV and preferred watching TV to listening to radios. People's favourite TV programs in Geita included the evening news at 8 p.m. and local serialised dramas in Swahili, also in the evening. In all regions visited, approximately 70% of respondents said they owned radios, however these radio sets were often not functioning. People lacked batteries for the radios, had broken radio sets; some female respondents said the radios belonged to the male head of the family and they themselves were not allowed to operate the radio when the household head was not present. Using mobile phones to listen to the radio is done mostly by youth; they are the ones, according to mothers and elders, who have time and know how to operate these phones.

Table 4: Radios according to respondents

No.	District	Radio stations mentioned
1.	Sengerema	Radio Free Africa, Radio Sengerema FM, TBC FM, Radio One, Clouds FM
2.	Geita DC	Radio Free Africa, Storm FM, Kahama FM, Kwizera FM, Radio Maria, Radio Sengerema FM, Radio One, TBC FM
3.	Shinyanga DC	Radio Free Africa, Radio Faraja, Radio One, TBC FM

A separate quantitative media survey among 2,500 female respondents (500 in each region) will be completed by August and will provide more detailed and precise information on regional radio and television preferences and media habits. This will help with the analysis of the media environment in the Lake Zone and contribute to the selection of the most suitable media partners of the mass media campaign.

Adolescent Nutrition

Interviews with adolescent girls revealed that adolescents have inadequate access to health information, especially on issues related to pregnancy, or the need for good nutritional status for mothers. It was reported that parents do not talk with their children about issues concerning pregnancy, but are forced to do so once their child gets pregnant and then give advice on preventing another pregnancy. One adolescent girl said she was told by her mother to use family planning after she got pregnant. A few adolescents reported that they get such information from their peers, from the radios and from school (Standard VI and VII) though they could not clearly explain what they have heard from those sources:

> *"We were learning in school. There were health workers who were coming to school ... they were teaching about child nutrition." [Adolescent IDI, Shinyanga]*

It was reported that adolescent girls aged 15 to 19 years frequently drop out of school because of pregnancy. Because extra-marital pregnancies are not socially accepted, many adolescent girls hide their pregnancies for fear of being accused of immoral behaviour. This results in lack of antenatal care at an appropriate time – early in pregnancy – as well as reduces the chances of getting appropriate nutrition counselling and pregnancy supplements. During interviews with adolescent girls, they reported that they get support from their parents during the later stages of pregnancy. A 19-year-old young mother with a baby of 8 months from Isela village mentioned that:

> *"…I became pregnant and did not tell anyone at home until I was six months in my pregnancy. All along my mother believed that I was ill. When I told her I was pregnant, she supported me by getting me proper food such as milk, vegetables and fruits and she advised I start antenatal care visits. I gave birth at home because I did not know how labour pains felt and was scared of telling my mother." [Adolescent IDI, Shinyanga]*

Another girl reported:

> "*I never told my parents that I was pregnant, but they discovered when I was six months pregnant … my parents were too harsh. I thought they would get annoyed if I tell them so I kept quiet.*" [Adolescent IDI, Sengerema]

When adolescent girls become pregnant and have delivered their babies, they continue to depend on their parents for provision of food and advice regarding issues of maternal and child health. Most of the men who are responsible for the pregnancy do not help them. Though they reported that they received support from their parents, some explained how difficult it was to get assistance from the parents.

> *"When you ask something from the parent, he/she would tell you go ask the person who is responsible for the pregnancy."* [Adolescent IDI, Sengerema]

KEY ISSUES AND OPPORTUNITIES:

Barriers

Adolescent girls who get pregnant fear disclosing it (to parents, to school), which stops them from obtaining early and appropriate antenatal care and nutritional guidance.

Adolescent girls do not have information or access to birth control prior to getting pregnant.

Male partners are rarely involved in providing support for unmarried pregnant adolescent girls.

Facilitators

Once parents are informed, mothers help their adolescent daughters with nutrition and care. Schools provide health information before teenage pregnancy occurs. However, it appears to be ineffective since teens did not retain knowledge.

Nutrition and Health Care During Pregnancy

Nutrition during pregnancy

Reportedly, many women do not change their diet during pregnancy; the food they eat before pregnancy is the same food they eat when they are pregnant. The amount and the type of food pregnant women eat was reported (in both IDIs and FGDs) to be influenced by economic status,

availability, knowledge and personal preferences. Women expressed that when they are pregnant they eat what is available at home during that time. In all the regions visited, women and men believed that nutritious food has to be expensive. Still, most participants mentioned green vegetables and fruits as nutritious food that is good for pregnant women and which are consumed regularly.

Many participants in the villages visited said they largely depend on agricultural activities as sources of food and income. Food products like maize, sweet (white) potatoes, groundnuts, rice, cassava, beans, chickpeas and small fish (*dagaa*, a species of ray-finned fish) were most commonly mentioned by participants. Among green leafy vegetables, people mostly mentioned the leaves of cassava, amaranth, jute mallow (*mlenda*), and pumpkin. Fruits were said to be only plentiful when mangoes abound during the rainy season. After the rains, other fruits like oranges, avocados, and bananas become more expensive and are rarely eaten. Eating fruit is further complicated by the fact that the food is considered special and to be shared in a family; one does not buy one orange for one family member. If one is purchased, then every member of the family should benefit.

Participants said that the lack of financial resources limits their access to certain kinds of food such as meat, chicken, milk and fruits, even when they are pregnant. Male support and food provision for their wives during pregnancy is reportedly limited, once again because of a lack of financial resources, as expressed by one of the fathers in a FGD:

> *"A mother can be advised to eat fish, beans, and fruits, but as a father you may lack ability to provide such things... When you look inside, you have two or three sacks of food and if you decide to sell, when the time of delivery comes, you don't have food inside the house… Making available other foods like meat, fish and fruits is hard, you have to go to town in order to get them."* [FGD, Father, Shinyanga]

Apart from Shinyanga, where fish was very scarce, because of the distance to Lake Victoria and drought in local rivers, many participants in other villages said they could at least afford fish once a week, more so if living by the lakeshore or if husbands are involved in fishing. *Dagaa* were plentiful and cheap in all three regions. In most of the villages visited, there were no butchers and participants revealed that they get meat when someone's cow is dead or slaughtered when it is sick. In all the places visited, meat was sold at TZS 5,000 – 6,000 per kilogram.

Most pregnant women said they eat three times a day at breakfast, lunch and dinner, just like other family members. Some participants also expressed a belief that sometimes women fear to eat more food during pregnancy because they are afraid the unborn baby will grow too big and therefore women might have problems during delivery; women were also said to fear cesarean births; and some said that women would defecate during delivery if they eat more food during pregnancy.

It was also reported that some pregnant women do not eat certain kinds of food, even if they are nutritious and available, because they lack knowledge on what foods are important during pregnancy. Some participants reported that pregnant women would only start eating additional nutritious food such as eggs, fruits and leafy vegetables when they have complications and have been advised by a health professional. As one father claimed: *"Some women wait until they are advised by a doctor who says they need to eat this; only then they will eat those foods."* [FGD, Father, Shinyanga].

Our research did not find specific cultural rules or taboos against pregnant women eating certain food. While there may have been taboos in the past, participants claimed people no longer practice them. But some elders may still be trying to persuade younger generations that there are taboos to be respected, even though they seem to fail to be convincing:

> *"If we teach them, they don't agree, they say those are for elders, they are out-dated... Nowadays if we tell them, do not eat, this is a taboo, they tell you go away, that information is out-dated, what can you do?" (FGD, Elder woman, Karumo)*

KEY ISSUES

Barriers

Lack of knowledge regarding nutritious foods, even when easily available locally at low cost. Prohibitive physical and economic access to animal food sources. Knowledge of the importance of prioritizing certain foods and quantities of foods during pregnancy is not widely shared in the community, leading to pregnant women eating the same as prior to pregnancy.

Male control of food resources.

Fear that eating more food causes complications during delivery.

Facilitators

Easier access to fish (especially *dagaa*). Mangoes plentiful during rainy season. No food taboos.

Sources of information during pregnancy

Women reported that they get health information from health facility workers, community health workers, mothers, grandmothers and mothers-in-laws. Health workers (nurses) provide information when mothers attend antenatal care. In some health facilities, health workers reportedly provide group counselling to pregnant mothers, but most mothers said that they get individual advice from health workers, especially on the types of food to eat, "*when they see there is a problem*" (which may indicate that information does not always cover nutrition-related advice). It was reported that community health workers visit mothers at their homes, advising them to attend antenatal care sessions (though this does not occur in each village, nor is it clear how frequent such home visits occur). Pregnant women who live with parents, including in-laws, reportedly seek advice from mothers and mothers-in-laws, especially on breastfeeding and complementary food for children. Participants also admitted to receiving information through radio, but could not mention specific information they had heard.

KEY ISSUES

Barriers

Incomplete counselling during ANC (ad-hoc when problems occur, not routinely). No clear recall of media-based nutrition messages.

Facilitators

ANC provides opportunity for counselling. CHWs conduct home visits.

Pregnant women seek advice from other women, including their mothers and in-laws, providing opportunity to reinforce appropriate behaviours.

Workload during pregnancy

Few women said they receive support for managing or reducing their workload from their husbands during pregnancy; those who said they received support reported that they mostly received it during the third trimester. Such support includes reducing the time they spent on farming and fetching water. Most women who responded said it is hard to reduce their workload during pregnancy because their families depend on them; they have to work so that they can get food for their families. Women also said that men do not allow them to rest, even when they are pregnant and men do not help with anything. Most women depend on agriculture and it is hard to find someone to help when they are pregnant, especially during the rainy season. The researchers met several women who reported that they gave birth a few hours after coming from the farm."

> "*Who can help you if you are alone? You have to work hard... You don't have money to pay someone.*" (IDI, Mother, Karumo)

> *"I got pregnant when it was dry season so it was not so hard for me. I used to relax ... it becomes very hard when it is cultivation period; even if you remain at home, you have to cook for people who have gone to the farm."* (IDI, Mother, Geita)

There was also a belief that resting during pregnancy makes it harder during childbirth. In discussions with fathers, they expressed that women like working even when they are pregnant; they also declared that activities like farming, fetching water, and washing clothes are "*exercises*" for pregnant women:

> *"The mother who is pregnant and then keeps on sleeping is useless, you will have to encourage her to work so that she will not have problems during delivery; if she sleeps too much, she will have to be operated (cesarean)."* (FGD, Father, Karumo)

KEY ISSUES

Barriers

Work during pregnancy is considered protective, especially by men; reduction of workload is perceived as potentially dangerous.

Women remain primary labour producers, even during pregnancy, and have little power to change this situation.

Some men see work such as farming, fetching water, and washing clothes as exercise while women are pregnant.

Health care during pregnancy

Most women said they go to the health facility for antenatal care when they are pregnant. Advice on when to start and where to go for antenatal care is mostly given by mothers, mothers-in-laws, neighbours and friends, and this is mostly during the first pregnancy. Participants also mentioned community health workers who sensitize them during home visits to seek for antenatal care. Reportedly, most women start antenatal care when they are already four to six months in their pregnancy. A few women went earlier than that, explaining that they did so because they started feeling sick early in their pregnancy and had to go for a check-up. According to the health service providers, a pregnant mother should usually start attending antenatal care not later than week 12 of her pregnancy. In the FGDs and IDIs with women, most did not know the best time to start antenatal care. Health service providers suggested using community health workers to mobilize mothers to attend antenatal care early.

A delay for mothers to attend antenatal care was said to be partly caused by long distances and the inadequacy of transport to the facilities but also by carelessness/negligence. Some women revealed that it is more tedious to start antenatal care early because then you have to go so many times. They said that they know their babies are fine because they feel the baby moving inside the womb.

Another influencing factor is that women do not announce their pregnancies early to anyone apart from the husband or a very close friend or relative. Going to antenatal care would divulge to everyone that someone is pregnant. One of the health service providers we interviewed revealed that this might be due to fear of witchcraft:

> *"They have their own taboo that it is not good to announce one's pregnancy early, so if they come to the clinic early, everyone will know that she is pregnant."[*IDI, Health Worker, Geita]

It was also reported in all the regions that, when attending antenatal care, women are advised to go with their husband especially for the first visit. Health providers said they insist the women to go with their husband to the clinic as a way of getting men involved in reproductive and child care, plus women have to have HIV status checked for the purpose of protecting the child. Though some men reported that they accompany their wives or partners to the clinic, the interviews and discussions with both men and women showed that some men refuse or delay going to the clinic because they fear being tested for HIV (this may also explain why only 50% of women have 4+ ANC visits, according to the TDHS 2015).

In some of the villages, health service providers revealed that if the mother is not accompanied by the husband she will not get ANC services unless she obtains an official letter from the village authority. This affects mothers' ANC attendance because a woman may be forced to wait until her husband agrees to go with her to the clinic or unless she decides to go to a private hospital where she can get the service without the presence of her husband (but this means she has to pay the service).

> *"Some men do not go until the time for delivery comes... Some have to go to the private hospital… The mother will say, I am tired, I will go to other places, she stays at home and goes to another hospital for delivery*." [FGD, Father, Shinyanga]

"A man would tell a woman 'If they are disturbing you, do not go anymore. When it's time for delivery, you will go to another hospital,' and they would go to a private hospital." [FGD, Father, Shinyanga]

When they go to the health facility, all pregnant women should be provided with antimalarial tablets and tablets for anaemia (IFA/Iron-Folic Acid). The research team found that most women (or men) did not know the names of the medicines and therefore described them by their size, colour, their function, or mode of taking: "*Very small tablets, for chewing, for augmenting the blood*." In some of the dispensaries health workers said there is a poor supply of these medicines, especially antimalarials and deworming tablets; when there are no medicines, they advise the women to buy at local pharmacies.

IDIs and FGDs with men and women revealed that many pregnant women do not take the medicine obtained from the health facility. Women explained that they do not take the prescribed medicines, especially deworming and anaemia tablets, because they have a bad smell that makes them vomit; people also said that if you take those medicines they will prolong pregnancy:

"I don't take the medicines for anaemia because if I take them I feel like vomiting, it is better for me to take the traditional medicines, so when I take the medicines from the hospital I just leave them at home." [FGD, Mother, Geita]

"Sometimes they don't even check if you have enough blood or not, they just give you the medicines so you don't see the importance of taking them." [FGD, Mothers, Geita]

Men also knew that the medicines given to women are given at the health centre and described why many of them do not take the medicines and why it sometimes becomes hard to change this situation. Most of them said it is hard for them to force their wives to take the medicines. They suggested that women should be told to swallow the medicines at the health centre and not take them at home (thus not realising that some of these pills are to be taken on a daily basis). They also suggested that women should be educated on the importance of those medicines:

"Some women say if I continue taking these medicines, the child will be so big so I will have difficulties in delivery… they are afraid." [FGD, Father, Shinyanga]

"If you ask her, she becomes harsh and you can't do anything because she is pregnant… When they take the medicine from the health centre, many women lie to us saying 'I have been told to take them once in a week… or once in two days…'then they throw them away, if you look at the amount, it is decreasing... For us men, we come back late in at night, if you ask, she tells you I have taken the medicine." [FGD, Father, Shinyanga]

As indicated above, pregnant women may also be taking traditional medicine; many described symptoms related to *mchango*, stomach pain and vaginal discharge, which may lead to miscarriage.

KEY ISSUES

Barriers

ANC delayed because of fear of disclosure to community, because husbands need to accompany, because of HIV test, because mothers only seek ANC in a timely fashion when they feel sick,

because movement of the baby in the womb is a sign that pregnancy is okay and the mother does not need ANC.

In some health facilities, if the mother is not accompanied by the husband, she will not get health care services unless she obtains an official letter from the village authority.

Iron supplements, de-worming and malaria medications are perceived to add problems, not resolve them (and traditional medicines are substituted). Stock disruptions result in lack of availability of essential drugs.

Facilitators
Many people advise pregnant women to seek ANC.

Willingness of men to accompany women to health centre. Males are partially aware of the benefits of pregnancy supplements.

Delivery

Most women who were interviewed revealed that they deliver their babies at the health facilities and do so because of the sensitization by health workers, including community health workers who visit them at home. Health service providers report that they advise those who are giving birth for the first time or those who have more than four children to go to tertiary hospitals for delivery. This affects women's choices for delivery because especially women of poor households fail to go to health facilities they are referred to and therefore end up delivering at home. Furthermore, they then also fear to go to health services after delivery because they are afraid that health service providers will be harsh on them, so their choice is to deliver either at a private hospital, which is often expensive, or to remain at home (the latter is usually the result). Some women said they delivered their babies at home or on the way to the hospital because they delayed going to the hospital because they were still working in the field. In Shinyanga, Pathfinder's project designed to help pregnant mothers at high risk appears to increase health centre deliveries. Pregnant women can go early to the regional hospital and stay at the maternity home neighbouring the hospital until they give birth.

KEY ISSUES

Barriers
Poor women fear higher costs of delivery, especially when it is a first pregnancy or after having had more than four children.

Delivery at home leads to less prompt and regular postnatal care because mothers are fearful of the reaction of health providers.

Health service providers report that they advise those who are giving birth for the first time or those who have more than four children to go to hospitals for delivery.

Facilitators

High acceptance of health facility delivery, in part due to CHW encouragement of mothers during home visits. High-risk pregnancies are believed to be adequately covered - e.g. Pathfinder, Shinyanga.

Breastfeeding

Colostrum

Health workers reported that if a mother does not have any problems during or after delivery, a baby would be put to the breast immediately after birth. Most mothers reported that they give their babies colostrum after being advised by health workers. This is a change from past practice when mothers considered the first milk dirty, likely due to the influence of their own mother or their mother-in-law, especially when it is a first pregnancy. Many women will also spend the first period after delivery with their parents (mothers and mothers-in-laws), a time when this entourage can play a great influence of feeding practices. The researchers met several participants who admitted that they were advised by their mothers and/or mothers-in-law not to give their babies the first milk because it was dirty. One mother said she fed her newborn a mixture of water and salt with a tablespoon, on the advice of her mother-in-law, when her baby could not breastfeed the first three days after birth.

Exclusive breastfeeding for babies up to age six months

Most women said they are aware of the importance of exclusively breastfeeding a child for the first six months. They are advised to do so by health professionals; nevertheless, most of the mothers admitted that they do not breastfeed their children exclusively for six months. Even those who claimed to breastfeed their children exclusively for six months, when probed further said they start giving their children water at three to four months. For them, water was not recognized as a supplementary food. Most mothers said they start feeding their children complementary food at three to four months, some even start in the first month.

Mothers mentioned several reasons why they fail to exclusively breastfeed their children. Mothers frequently mentioned insufficient breast milk supply as the reason why they start giving their babies supplementary food before six months. Some mothers said they have poor milk supply and could not exclusively breastfeed their children. When asked how do women know they have poor milk supply, mothers said they know their milk is not enough if the baby is not satisfied, evidenced by a baby who keeps crying even after breastfeeding. Mothers also claim that they can tell their breast milk is not sufficient for the baby by touching their breasts.

> **"***The breasts become light, you directly know that there isn't milk, even if you breast feed the child will not get anything… The milk does not come out if you squeeze, and the milk becomes very light "the milk looks like water after washing rice."* [IDI, Mother, Karumo].

Another reason for not exclusively breastfeeding is time: mothers are busy with other activities, mostly agricultural work. Some mothers are so busy with their activities that they don't have enough time to breastfeed their babies frequently enough. In those cases, they leave their babies at home with older siblings (most often girls aged 6-15) or with grandparents. Mothers either prepare a simple porridge, leave it at home or they leave such siblings and grandmothers to prepare the

porridge for their babies. Most mothers said they resume work when the baby is two or three months old. Furthermore, men expressed their expectation that mothers would resume work as soon as possible, once they have gained enough strength, because work cannot be managed without them for a long time, especially during cultivation season when mothers are expected to start work earlier than other times:

> *"Children cannot breastfeed exclusively for six months because of our activities. If the baby reaches four months a mother will be okay and activities are waiting for her, so she has to find an alternative. If she is not at home, the baby will be given porridge… She has to make the baby get used to that so that she can work."* [FGD, Father, Shinyanga]

A few mothers said they considered the advice of health workers, had enough milk supply and took their children with them when they went to work in the field. There was basically no awareness or knowledge about strategies for expressing and storing breast milk.

Most mothers declared that having insufficient breast milk is a natural thing. In the FGDs with elders, they revealed that mothers having a poor supply of breastmilk are a more common problem today than in the past. When asked why this is happening, the elders said that in the past there was more food and more food variety compared to the present:

> *"In the past, we were eating food made with sorghum and very little cassava flour, but now cassava is food. In the past, children were eating left overs but now children are not eating anymore, because if they eat the stomach becomes big, I don't know why."* [FGD, Elder Woman, Karumo]

Participants also said that mothers of the current generation do not want to breastfeed their children because they fear their breasts will enlarge. One participant who received counselling from the health facility revealed that poor milk supply results from infrequently breastfeeding the child:

> "*I once attended the clinic and health workers said in order for the mother to have enough milk, she must breastfeed more frequently. If she doesn't do that she will not have enough milk."* [FGD, Elder Man, Ngoma A]

This was not often reported as a remedy for insufficient breastmilk. Women more frequently said they use traditional medicines to increase their milk supply.

KEY ISSUES

Barriers

Resuming work (under pressure from husbands) interrupts exclusive breastfeeding. The widespread perception of insufficient milk supply may be linked to poor diet and workload but is likely also associated with infrequent feeding, failure to empty one breast before giving the child the other breast, and insufficient time for correct breastfeeding.

There is widespread belief that insufficient breast milk is normal and leads to strategies to supplement feeding, despite knowledge that exclusive breastfeeding is important.

Water before 6 months is not seen as supplemental to food and therefore does not compromise the child's diet.

Facilitators

Few difficulties are reported with the start of breastfeeding and exclusivity is initially well accepted and practiced, in part because of CHW encouragement of breastfeeding. Elder belief that greater food variety and food intake is associated with good breastmilk supply. Reinforce financial savings of exclusive breastfeeding to husband.

A few mothers said they considered the advice of health workers, had enough milk supply and took their children with them when they went to work in the field.

Supplementary food given before six months

Apart from the perception that mothers have poor milk supply and being busy with other activities participants revealed that some children are given supplementary food before six months because infants want to be given food, they cry for food when others are eating:

> *"If the child is growing, if you start eating he starts shouting and make his hands like this, then you know that the child needs to eat so you give him."* [FGD, Elder Woman, Ngoma A]

It is common to give porridge, cow's milk (if available), and water before a child reaches six months, usually around 3-4 months. Porridge is either made with maize, millet or cassava flour. Most mothers said they prefer giving their children porridge made from cassava flour because it is soft and cheap. Porridge is just prepared with water, flour and sugar. Most mothers said they don't add anything to the porridge because they say they cannot afford other ingredients. Those who have money may add milk to the porridge. When probed and asked what nutritious porridge should contain, most participants mentioned a mixture of peanuts, maize, millet, sorghum and milk.

Women also said that babies are given specific medicines before six months: gripe water was mentioned to be given to cure "stomach ache" of newborn babies and infants. Mothers believe that if babies keep on crying for long they must have stomach ache, similar to the *mchango* that mothers feel during pregnancy. Among babies, *mchango* is associated with high fever, frequent crying, and stiffness. The gripe water is either bought or made by a traditional healer or by parents; new mothers who stay with their in-laws said their mother-in-law gives such medicine to her grandchild and new mother does not have the power to stop this.

Complementary Feeding

Complementary Feeding for children older than 6 months

For children who are over 6 months, parents mentioned they give them porridge in addition to breast milk. The kind of porridge, which they prepare, depends on one's economic status. Those who do not have sufficient resources - the norm among the households visited - give their children a simple porridge made with maize flour, water, and a bit of sugar. Most mothers said they don't add other nutritious ingredients to the porridge due to poverty. Those who have resources add additional cereals like millet, sorghum, soya beans, rice, or groundnuts to make enriched flour. Most women would consider this to be a nutritious porridge. Children would be assisted to drink the porridge from a cup or by using a spoon.

After six months, and as a child grows older, a child would also increasingly start eating some of the food that other members of the family normally eat at breakfast, lunch and dinner, like *ugali*, sweet

potatoes, green leafy vegetables, like jute mallow (*mlenda*), meat soup, and fish soup, though the main meals would still consist of porridge. At this age, children would not eat hard food like meat. According to the participants, children only start eating meat when they have teeth between 18 months and 24 months. Many people knew little about the types of supplementary food children should eat after 6 months.

Children who are older than 6 months usually eat two to three times in a day, while continuing to breastfeed. There was a perception among community members that giving children food more than three times a day is not good for the child: the child's stomach would grow big which, in people's perception, is a sign of malnutrition. In a FGD discussion, men said that they fear to get their children used to expensive food or eating a lot of food, because when the time comes that there is only inexpensive or less food, children will fuss.

Participants suggested that there is a need for more education among caregivers about child nutrition, besides the information that those who attend health centre receive. They said not every caregiver can attend health centre meetings, so community meetings may provide an alternative, possibly done by community health workers who can also make follow-up visits.

KEY ISSUES

Barriers

Few ideas regarding foods that can be added to a cereal-based diet. Perception of nutritious food as expensive. Little local knowledge of what might be nutritious. Increased frequency of YC meals seen as potentially negative. Standard preparation of porridge provides little nutrition. Children eat what others in the household eat and receive no special treatment.

Medicine is given frequently to address infant and young child crying.

Children only start eating meat when they have teeth between 18 months and 24 months. Otherwise, meat is considered too difficult to chew and swallow.

Facilitators

Desire to learn more about nutritious foods. Positive perception of health worker information.

Weaning children

Mothers were aware that they should breastfeed their children up to two or three years. A new pregnancy is often the reason why many mothers wean their babies before two years. According to participants, breastfeeding a baby while pregnant would affects the foetus' growth. Husbands are not in favour of family planning; they worry that it leads to immorality, while some mothers say they do take contraceptive injections in secret.

Other mothers wean out of necessity: single mothers leave their babies with grandparents when they seek work elsewhere. During the research trips, the researchers met several elders who were the primary caregivers of children under 2: their mothers left home.

Sources of information on breastfeeding and complementary feeding

The main sources of information on breastfeeding were health professionals, friends, neighbours and family members, especially mothers and mothers-in-law. Most of the mothers who knew the

importance of exclusive breastfeeding and colostrum reported to have received such information from health professionals.

Mothers and mothers-in-law play an important role in providing information on breastfeeding and supplementary food for young children. When a participant said she did not give colostrum, it was done on the advice of a mother-in-law.

Even if mothers reportedly rarely consult health professionals about problems related to breastfeeding, they might receive incorrect information. One of the RCH attendants our researcher met in one of the dispensaries said they advise mothers to start giving their children complementary foods at 3 to 4 months. One mother said she was advised by a health provider not to give colostrum to her baby because it was "dirty" milk.

We also heard a few other examples of poor advice regarding breast milk by health service providers:

> *"I only went once and they told me that I have to eat more food, they said 'you will not get enough milk if you are not eating enough food, also depression can lead to poor milk supply.'"* [FGD, Mother, Geita]
>
> *"I went to the pharmacy, they advised me eat raw groundnuts, raw cassava and also to drink porridge… I did that but nothing changed."* [FGD, Mother, Geita]

KEY ISSUES

Barriers
Occasionally, incomplete and incorrect advice from health workers.

Facilitators
Mothers and mothers-in-law are key influencers, if they can be convinced to provide beneficial information.

Dietary diversity

Women reported that they decide what to feed the children; in most families men do not care what the children eat because they are busy with their own activities and consider child feeding to be women's work. Men leave in the morning and come home in the evening. FGDs and IDIs with men and women showed that men provide money and women then choose what to buy and cook for the family. According to the participants currently there are no taboos or rules against feeding children certain types of food, but people feed their children depending on what is available locally and their economic status.

In all the regions visited, maize, cassava, beans, chickpeas, sweet potatoes, rice, and pumpkins are common types of food that are grown and these were the kinds food eaten by both children and adults in families. Millet was more common in Shinyanga region. Children start eating these foods when they are six months, on top of porridge, because at this time they start eating what other family members eat.

Many households did not have homestead gardens in all the three regions: water scarcity was the most cited reason. Despite this, some households found niches near their home or in the valleys to grow green leafy vegetables. In most rural areas, green leafy vegetables provide an important source of food; it is cheap in comparison to other foods. There was no mention of wild greens. Easily available green leafy vegetables are amaranth, spinach: people grow these in valleys or at home, if they have a well. These would be sold at local markets. Pumpkin leaves, cassava leaves and jute mallow (*mlenda*) are also grown at home and these are the kinds of vegetables most families eat regularly. Some of these leaf types can be stored: pumpkin leaves (*mzubo*) can be dried in the sun and stored for a long time; cowpea leaves (*msasa*) can also be dried and stored. These two types are very common in all villages. At local markets, other kinds of vegetables like eggplants, cabbage, green peppers, and cucumber were being sold at the market. Few people grow these, and when they do it is done in order to sell.

The most common fruits consumed are mangoes; easily available and cheap during the rainy season (from November through March). Otherwise, fruit tends to be considered as expensive so people rarely eat fruit. A few households have fruit trees near their homes, such as papaya. When markets are present, one can find avocados, oranges, guava, bananas, and watermelon (depending on the season). Participants revealed that they rarely buy these fruits due to lack of money: buying one orange would not suffice for all members of the family.

As explained earlier, eating meat is highly dependent on one's economic status. Many families report not eating meat, or giving their children meat, frequently because it is very costly; added to this is that meat is not easily obtained locally in rural villages. Many participants said they spend more than a month without eating meat. One kilogram of meat costs between 5,000 and 6,000 Tanzanian Shilling and most families will wait to buy meat until they have a very important visitor or special occasions. A few, more well-off families keep livestock like cows, goats, and sheep; they may decide to slaughter these animals only when there is an important occasion like a marriage or when these animals get sick or die. These animals are used as investments to cover major expenses like health services, dowry, or school fees. Cows are also used for farming. Cow's milk is sold and little left for home consumption. Some people take it to nearby towns to have a better price. Those who are not keeping animals said they would sometimes buy milk, when they have money.

A big proportion of villagers raise poultry, mostly chicken. Some said that they keep poultry for home consumption, but most people use chicken as an emergency cash reserve. The eggs are not eaten, neither by children nor by adults; the objective is to raise more chickens or sell the eggs for cash:

> *"For the WaSukuma, eggs are business, if the chicken starts laying eggs, you start making a budget with the eggs, if there comes a day you don't have money to buy salt, you sell the egg and then you have money to buy salt. Then later you will have more chicken from the eggs and if you don't have money for food, you sell the chicken and buy food for the family."* [*IDI, Elder, Sengerema*]

Eggs are also not a common part of people's diet: few know that an egg can be an important part of a child's diet. Some of the respondents reported only eating eggs when advised by a health professional. One of the elders in a FGD said, "*I was brought up without eating eggs and I am alive*

and old now." Some make financial calculations and weigh how a family can be fed: "*It is better to sell chicken at ten thousand and buy fish at two thousand."*

As explained above, apart from Shinyanga, in Mwanza and Geita participants reported that fish is affordable once a week, especially smaller and dried fish. *Dagaa* type fish is plenty and cheap in all the villages visited.

The size of the family obviously affects and limits the consumption of certain types of food in the household. A single mother who stays with five children and nine grandchildren reported:

> *"Look at my family. If you go to the market a portion of small fish is sold at three thousand. Because of the size of my family, four fish will not be enough so you decide to buy dagaa so that everyone will be satisfied."* [IDI, Elder Woman, Sengerema]

A lack of knowledge about nutritious food can also influence a poor choice of food for children: an elder said *"These women can decide to sell eggs and then buy kitumbua (local cakes made by rice flour) and sweets for the child*." [FGD, Elder, Sengerema]

Non-iodized salt, known as rock salt or *chumvi ya mawe*, is available in local markets and more prevalent and preferred than iodized salt. Most people said they prefer using it because it is cheap and it has no chemicals (compared to iodized salt); few know of the benefits of iodized salt.

KEY ISSUES

Barriers

Men are absent from home for long stretches of time making it difficult for them to have a positive influence on their children (for example, diet).

Poverty, male authority, and low access to diverse foods constrain women's autonomy to prepare appropriate nutritious food. Chicken and eggs considered investments, not as sources of family nutrition. Low food diversity.

There are few taboos or rules against feeding children certain types of food.

Facilitators

Women are able to make decisions regarding what to feed children.

Some households found niches near their home or in the valleys to grow green leafy vegetables. Raising chickens is widespread: further stimulation may improve uptake of eggs in children's diets. Fish is a relatively cheap, and a more accessible protein food source. Fruits like mangoes readily available. Additionally, in all the regions visited, children consume other nutritious foods including beans, chickpeas, sweet potatoes, and pumpkins. Amaranth, spinach, and some other green, leafy vegetables are available and inexpensive. Storage techniques (sun drying) known and used to store food for consumption during the lean season.

Agriculture

Livestock

The livestock and poultry kept in the three regions visited include: goats, sheep, cattle, chicken, ducks, and pigeons. Ownership of livestock and poultry is divided: in some households, fathers own goats, mothers own chickens, and children are also given their own chickens to rear. In some households, livestock is the property of both father and mother. Men mostly make decisions regarding large livestock. Most households visited try to raise at least chickens; more well off households raise goats, sheep, or cows, but these are a minority. Respondents mentioned common reasons for keeping these animals are:

Selling livestock or poultry occurs when they have emergencies like paying for medical care, buying school materials for their children, major housing expenses like buying corrugated iron sheets, and buying food when they do not have enough food for consumption at home.

Goats and poultry are only being used as a food source when people have important visitors at home. One father said:

> *"I only slaughter a goat when my mother, father, in-laws or important friends visit, the same with chicken because we cannot keep eating them, they are expensive and help us when we are in need and have no way out."* [IDI, Father, Geita]

People also eat goats or chicken on special celebrations during cultivation, weeding and harvesting periods (commonly known in Sukuma as *malika/masalenge*). This is a common practice where neighbours and friends come together to help each other cultivate or harvest crops. During this time, when they go to one farm, the owner slaughters a goat and prepares food for everyone when that activity is done. This repeats until they have finished all the farms for each group member.

Eggs are kept until they hatch because people want to keep and raise more chickens. However, in one case, a father in Geita said he learnt from the health centre that one can mix an egg into his grandchild's food specifically *bokoboko* (rice that is cooked until it becomes soft enough for a baby to swallow) so he and his wife did this at least once a week until their grandson grew up (he is 5 years now). Respondents suggested that more awareness is needed on the importance of feeding their children eggs. Some argued that the main barrier for adopting this behaviour is poverty. A grandmother in Bugogo village said:

> *"I have seven grandchildren living with me, if I get two eggs it is hard to share, so it is better to sell the two eggs and buy vegetables rather than having children fighting over the two eggs."* [FGD, Elder Woman, Geita]

Poultry is also kept in order to upgrade to other livestock. For instance, if one has many chickens, one can decide to sell and buy goats, while others sell goats to get cattle.

Most houses complained that the main challenge in keeping poultry is the presence of new diseases that affect chicken and expensive treatments. Another challenge is chicken theft. This is the major reason why people keep their chicken inside their houses or kitchen for safety. Coops are not commonly used in the regions because of theft and because it means one has to provide chicken feed.

Milk and yoghurt are widely used in Shinyanga region; those who own cattle milk them and sell the milk in town. However, others keep the milk at home for home consumption. Through interviews and observation, respondents preferred yoghurt (*maziwa mgando/mtindi).* Others mentioned that children do not like fresh milk because of its smell.

In Nyarugusu village in Geita, a father, who is relatively well off, owns 10 cattle: 8 help him in his farms to cultivate and plant, and two cows are for dairy products. On average, he gets 3-4 litres of milk a day. His family and children get fresh milk, butter/ghee (*samli*), which is used as cooking oil, and raw yoghurt (*mtindi*). He mentioned that, *"the butter/ghee obtained from the milk is better than the cooking oil sold in shops"* [IDI, Father, Geita]. According to him, the dairy products are not sold but used for household consumption. His wife knows how to make the yoghurt and butter/ghee. This has been the practice done among the Sukuma tribe so they continue to do the same because children and the whole family get nutrients from the milk.

KEY ISSUES

Barriers

Husbands control decision-making regarding livestock. Livestock are rarely consumed because they are expensive and are reserved for special occasions or sold to provide emergency cash.

Main challenges in keeping poultry include: presence of new diseases that affect chicken; expensive treatments; chicken theft. Coops are not commonly used in the regions because of theft and because it means one has to provide chicken feed.

Facilitators

Shinyanga region has more dairy products and some families feed their children dairy-based foods.

During weeding and harvesting periods, on a rotating basis, families slaughter a goat and prepare food for everyone when weeding and harvesting are over. This repeats until all farms have provided meat for each group member.

Home Gardening

In all three visited regions homestead gardening is not a common practice. The main challenge is water availability and accessibility, especially during the dry season, as mentioned by respondents in all regions. During the rainy season, people plant pumpkins and eat the leaves (*msusa*). The pumpkins are harvested and dried, to be eaten during food shortages.

However, in Karumo village in Sengerema, households that are near the lakeshore and those with land near the lake do practice gardening. This is where people purchase fresh vegetables. Also in other villages in regions of Geita and Shinyanga, they have valleys where gardening is done. Vegetables grown in these areas include; tomatoes, pumpkin, amaranth, cassava leaves, eggplants, cabbage, spinach, and green pepper. Fruits are not commonly grown in these areas because of the unfavourable weather and culture (and people are not used to growing fruits); only mangoes are a common consumed fruit, when in season. A mother in Karumo said, *"Here we don't eat fruits, maybe if it is the season for mangoes"* [IDI, Woman, Sengerema].

The few people in the regions who plant fruits have papaya, oranges, mangoes, avocados and bananas. These were seen being sold in the villages and especially in Shinyanga where women carry

papaya and sell in villages, towns and along the main road. Parents who go to town or urban centres may bring fruits for their children but this is not common, as they will prefer buying artificial juice or soda than fruits.

The researchers found a (rare) positive deviant father in Nyarugusu village in Geita. This father of four - the oldest child being 9 years and youngest one 6 months, visited the health centre when his wife pressured him to accompany her to an ANC visit. There he learned from the health workers that his wife was supposed to eat nutritious food including fruits, so he spent a lot of money buying fruits, but thought it was wise to start a homestead garden (see photo above). The fruit he planted include papaya, bananas, avocados, and oranges. He managed to do this because he dug a well at his compound, and he and his wife together take care of the garden.

In the three regions, home gardens are usually maintained by women and youth. In Shinyanga and Geita, most women resort to gardening as a way to make money and to eat vegetables from the gardens. However, the challenge is land ownership, since most do not own these lands and have to rent or ask for a small part from friends to grow vegetables which will be eaten at home, while the surplus can be sold.

Availability of Different Food Types

Overall, the villages visited feature subsistence agriculture. Land ownership is mostly for the natives of a particular village, while others can buy starting at a price of TZS 600,000 an acre or rent at TZS 20,000 and above an acre per season of planting, depending on the consensus with the owner. The type of crops grown are staple foods which include maize, sweet potatoes, paddy rice, millet, sorghum, cassava, lentils, cowpeas, beans, sunflower, groundnuts, and pulses.

Respondents reported that crops grown are mostly used for household consumption; a portion of the produce can be sold to cover other expenses at home such as medical care, buying other food that is not grown, school expenses for children, or investing in livestock (esp. chicken and goats). The amount of crops produced is not always sufficient throughout the year because of the following reasons, which were common in all three regions visited. Crop production is dependent on the weather; the amount of rainfall each year is not predictable. For instance, last year due to heavy rains they had to grow more rice instead of maize; other crops like beans were destroyed by the heavy rains.

Size of the land owned or rented: farms that are rented are always of small size because people cannot afford renting big farms. The resulting harvest will thus also be small. In Shinyanga, families that own land have to divide the land for their children and grandchildren (this includes those with families away from home). This leads to small yields per family. An elder in Shinyanga said, *"Most families now are big in size and we must divide land among the children, even those that live away from home"* [FGD, Elder man, Shinyanga].

High expenses associated with farming: the use of fertilizer or manure which is costly (one haul costs around TZS 30,000-40,000), buying improved seeds (around TZS 6,000/kg), renting an ox-plough (around TZS 50,000). Weeding and harvesting also incur the costs of inviting a group of people to do the work plus providing food for them (*malika* or *masalenge*). As a result, most households can only practice small-scale farming, using poor farming tools, without manure or fertilizers. Fertilizer usage is limited because the subsidised fertilizer from the government can arrive late in the villages and hence is not used, or those that rent land opt not to use the fertilizers because it is not their land. One respondent in Shinyanga said,

> *"I cannot buy fertilizer because I am renting the plot for only one season of planting, in the long run it will benefit the owner of the land and not me. Those that use fertilizer are owners, why should I improve someone's farm and next year it will be another person using it?"* [FGD, Father, Shinyanga].

Those with cattle use their own manure. So generally, small-scale farming leads to households without a year round access to sufficient food for family's needs.

Production of only food crops: With decreasing profit for cotton, many farmers have resorted to produce food crops, both for household consumption and for commerce. This has resulted in food shortages at home because many households have to sell their produce to meet household expenses.

Reportedly, there is a lack of support from agricultural extension officers. This may be because officers have little time (or resources, such as transport and equipment) to attend to the needs of all farmers, but the team also heard complaints about extension officers who do not perform their duties effectively. In interviews, respondents complained of officers collecting fines from farmers who mix cotton and other crops or who only focus on running their own agricultural shops in the villages. This was observed in one village, which had more than three livestock and agricultural equipment shops, all owned by the village agricultural extension officers.

Most respondents said their coping strategies during food shortages are reducing the number of meals they consume from three to two, working for money or food, selling poultry especially chicken, exchanging food with those that have (e.g., maize for beans), casual labour especially in Shinyanga (riding bicycles as public transport) and Geita (working in the mines).

However, in these regions there are farmers who have succeeded in employing improved farming practices. A good example of positive deviant behaviours in agriculture was seen in Bugogo village in Geita. An elder there practices crop rotation with success: it helps him increase soil fertility and his yields. He revealed he learned this in Urambo, Tabora, where his family used to work in tobacco farms. Also, he uses both fertilizer from shops and mixes with manure obtained from his own livestock. He collects and stores every day unlike other people who just sweep and throw away goat and chicken faeces. He learned this habit from his children; one works in a tobacco farm in Tabora as an agriculture officer and one is a teacher. He says education has helped his children learn important things in life and now he does not only depend on them for financial support but also advice on how to practice better farming methods. He mentioned that his harvest sustains his household food needs throughout the year because of these practices.

A common practice in food storage seen in all visited villages in three regions was sacks. They use sacks to store mainly maize and keep them safe from pests and weevils by using pesticides. Using pesticides forces them to husk the maize grains before grinding them to get flour. However, during discussions with elders, it was revealed that there are traditional ways of storing grains by the use of ash from rice or sunflower chaff. They also mentioned to store seeds using ash from maize cobs, and other chaff from grains. These are not commonly used, especially among young families because it takes time, and many prefer the pesticides.

Sweet potatoes are stored by drying them under the sun on the roof, after peeling and cutting into small slices (*michembe*) and others by boiling the slices and drying them (*matobolwa*). A mother said, *"They can stay on the roof for up to three months, thereafter we put in sacks for future use"* [IDI, Mother, Shinyanga].

Sweet potatoes slices, which are put on a stand and on the ground to dry under the sun: michembe (left), matobolwa (right)

Through observation and IDI, a household in Mwamala village in Shinyanga was using a traditional type of food storage, made out of reed and covered by cow dung. The respondent said that these had been in their households for three generations and they are still using them for storage. She further explained that people nowadays do not use them because they do not know how to make them, do not have space to put them at home, and are expensive to buy (*TZS 25,000-50,000 depending on the size*): making them takes time and the resources (reed for storage containers) used to make them are no longer available since land is being used for farming and livestock keeping. Elders confirmed these arguments during a group discussion.

Traditional food storage facility (Ghala la asili)

Some of the suggestions given in discussions to improve farming practices and food production included:

Enhance farmer knowledge: farmers said they could learn through community meetings and with individual farmers about better farming methods like the benefits of intercropping. Agriculture extension officers should also do more visits and educate farmers.

Taking the subsidized fertilizers to farmers early from the district agriculture office so that they may be able to buy and use them on time. They think this may improve their crop production because the soil of their land is depleted of nutrients.

Forming organized farmers groups: if these are supported with skills and training, they can educate others through field farm schools (*shamba darasa*) and they can also start income generating activities to enhance their livelihood. However, the sustainability of these groups was questionable since there have been similar groups that did not last once projects phase out. For example, in Mwamala village, there was a storehouse built by a project but when the project ended, the building was abandoned. Some participants said these groups collapse because they do not get support from the agricultural extension officers. The researchers found that in Ngoma A village, a group of farmers grow nutritious (orange-fleshed) sweet potatoes. This group was formed and is supported by Ukiliguru Agricultural Research Institute; however, the harvest did not benefit local households, as it was sold in urban markets.

KEY ISSUES

Barriers

Due to high costs of land rent/equipment, cultivated plots are small, resulting in small harvests. Mostly food crops produced, partly sold for cash. Poor agricultural extension support. Storage method using pesticides.

Facilitators

Knowledge of storage techniques to preserve foods for lean season, including traditional methods of storing grains. Some positive deviance of homestead gardening, soil conservation.

Farmers already have many ideas about how to improve production and these ideas could be shared and vetted in the community — perhaps through positive deviance — to improve productivity and availability of nutritious foods.

Water, Sanitation and Hygiene

Drinking water

The research team found that main sources of drinking water in the regions are open wells, community boreholes with hand pumps, and lake water. It is the responsibility of women and older children (12 years and above, usually girls) to fetch water for household use; they do this early in the morning (5 a.m.-9 a.m.) and evening (4 p.m.-6 p.m.). Most households that own bicycles use these to transport water. The size of a family determines the number of trips to fetch water from the water point, the bigger the size the more trips. Households that are near the lakeshore in Karumo village in Sengerema may take less than 10 minutes to fetch water depending on the distance from the lake. Women in other villages spend 30 minutes to four hours to fetch water. Water needs may impact heavily on the time women have to take care of their children, for instance time for breastfeeding

the child. The availability of drinking water changes during the rainy seasons (late September through December and March through May): villagers reported that they then also use rainwater for drinking.

Respondents said that they do not treat the water to make it safe for drinking. Respondents mentioned why they do not make water safe for drinking:

- Boiling water consumes time, which they do not have, and takes a long time to cool.
- Water becomes tasteless when boiled.
- Water quantity is reduced when boiled.
- Water smells of smoke when boiled.
- Large family size prevents them from boiling water; they would need money to buy either charcoal or firewood.
- People are not used to drinking treated/boiled water and believe it can cause diarrhoea. A respondent in Shinyanga in a FGD said, *"The biggest percentage of people in rural Shinyanga do not boil water, we just get it from the wells, put in water pot and start using it, if I see the water is having snails or dirt I just use a piece of cloth to sieve."* [FGD, Father, Shinyanga].
- Using water from protected boreholes: respondents use water from hand-pump boreholes for drinking and perceive it to be clean and safe because the borehole is well protected and the depth of the boreholes ensures clean water. An elder in IDI said, *"The experts who drilled the boreholes said that the water is safe and can be drunk without treating because of the depth of the boreholes"* [IDI, Elder man, Geita].

Very few respondents said they have a habit of boiling or treating water for drinking. A mother in Bugogo village in Geita said she treats her water for drinking with Water Guard; when probing, her husband sells clothing and often travels to other towns like Nyarugusu and there he buys and brings back Water Guard. His wife learned how to use it by watching TV and listening to radio programs that educate people on water and treating water for drinking.

Households that have access to lake water said they boil the lake water since it is not clean and most people prefer not to use it for drinking but only for other uses in the household. During an interview a mother who lives near the lake in Karumo village said, *"We have to boil the water, don't you see the lake? The water is dirty, and you can see the dirt."* [IDI, Mother, Sengerema].

Another respondent, an elder in an IDI in Geita, said he and his family learned how to boil water to make it safe for drinking through a community sensitization that was done by Tearfund, an organisation that had a campaign in the village on water, sanitation and hygiene. He said,

> *"I see the change because members of my family do not get so many stomach pains as before because we now boil water for drinking and store it in a separate container, unlike other households. Others should also be educated more and monitored closely to make sure they boil water before drinking."* [IDI, Elder man, Geita].

Handwashing

The researchers found that respondents were knowledgeable about *some but not all* critical moments for hand washing. These are after using the toilet, before and after eating, and when they feel their hands are visibly dirty. However, knowledge does not translate into practice. In all visited regions, researchers found that it is common for household members to wash hands in the same bowl of water that passes around for everyone to dip and wash their hands before meals. Children often eat separately from adults and thus have no supervision, and often eat without washing hands.

This was observed in one household in Shabuluba village in Shinyanga where children sat and ate with only the older children washing hands leaving the young children under 2 years to eat without washing hands.

Children in Shabuluba village in Shinyanga sat on the ground where they ate their lunch, washing their hands in one bowl after eating. The same water used to wash hands before eating was used. The water in the jug with a cup in it is both used for drinking and washing hands when the water in the bowl gets dirty.

Fathers said they are not sure if their children wash hands at all times and cannot monitor them. They suggested that mothers should be taught the importance of hand washing since they are closer to children and spend more time with them at home. This was the case in all visited villages. Most fathers do not spend time at home; they are usually away from the household because they have to work as family breadwinners. When asked what they do while they are away from home some mentioned farming or casual labour such as brick making and work in grinding mills. During the dry season, most men said they just go to meet their friends and play chess (*bao*) and drink alcohol.

At each occasion of hand washing, soap is rarely used for a variety of reasons, including because it is expensive (TZS 100-200/piece); people are not used to using soap and do not know of the importance or necessity of using soap; soap can be misused by children or get stolen when left near a handwashing station. Handwashing with soap may, however, be done after eating food like *dagaa*, meat, or fish to get rid of the smell as reported by the respondents.

Very few respondents mentioned other occasions of hand washing like before preparing food, after cleaning baby's bottom. The person who mentioned this turned out to be a member of the community WASH committee in Bugogo village in Geita: he explained that this was not practiced by many people in the community especially those in the interior. Hand washing after cleaning baby's bottoms was said not to be important because when cleaning the baby water is used. Some respondents, especially women, mentioned that they wash their hands when preparing and eating fruits like papaya and oranges because these fruits are juicy and watery.

Hand washing after using the toilet was not common according to the FGDs with respondents in all three regions. Despite the WASH campaigns in some villages like Bugogo in Geita, Isela, Shabuluba and Mwamala villages in Shinyanga, behaviours have not changed: people are not used to washing their hands because they do not consider it necessary; they are in a hurry; or they do not have latrines at home and practice open defecation.

Tippy taps seen in these villages were a reminder of initiatives by the regional health department in Shinyanga and TearFund organisation in Bugogo village in Geita. One respondent in Bugogo said, *"We install tippy taps because we do not want to pay the fine, the village WASH committee normally does household supervision and if you are found without a tippy tap you have to pay a fine"* [FGD, Elder man, Geita].

The presence of a tippy tap was less out of conviction than out of fear of having to pay a fine. This was evident through observation as researchers found tippy taps in disrepair and not in use near latrines.

However, the researchers also encountered positive deviance regarding the use of tippy taps in Mwamala village in Shinyanga. The campaign to install them had not yet reached this village, but a few households had them and when asked they said they had learnt from the neighbouring villages and found it to be effective since they can easily wash hands. In Karumo village in Sengerema District, a household had a water storage jerry can near the toilet for hand washing purposes: the mother said that they are Muslims and it is their tradition to use water after using the toilet.

Disposal of Infant Stools

The researchers found that children who have started walking commonly defecate around the household compound. Infants' nappies *(madaso*) are washed in water and the water is poured near the household compound. When children defecate in the compound, their stool is thrown in the latrine by an adult member of the household or older children aged 8 years and above who have been left to take care of their younger siblings when parents are not at home. In some households, infants' stools were thrown in the rubbish pit or in nearby bush near the household. When observing, the older children were also seen to simply remove the stool and failed to wash their hands. Others continued to play and forgot to clean the infant, which lead to flies surrounding the area.

Almost all respondents in IDIs and FGDs did not understand or find it important to safely dispose infants' stools. The common perception is that stool from an infant who is breastfeeding does not

smell and is thus harmless; stool of an older child (though still below 2 years) who has started semisolid or solid foods is perceived as harmful and smells, and therefore needs to be buried in the ground, or thrown in the bush or latrine. Some respondents showed an interest in knowing and wanting to be educated on the issue of stool disposal. During an IDI a mother said,

> *"I do not know if it is necessary or if one is supposed to carefully know how to dispose a child's stool, tell me if it is important."* [IDI, Mother, Shinyanga].

In all regions visited, researchers found that the majority of households have basic latrines. Some share a latrine with neighbours. Few (mostly men) admitted that they go to the bush to defecate, while women were more hesitant to state they practice open defecation because it is considered shameful not to have a latrine.

Cleanliness of the yard

When at home, most infants that are younger than 6 months are placed on the ground, on plastic bags or pieces of cloth. This applies to infants who are not yet crawling. Most mothers said when children start to crawl, it is hard to monitor them and they will touch the soil and play on the ground where chicken, ducks and goats are roaming about, like this mother:

> *"Children are playful and when playing with their friends and siblings they touch a lot of dirt, even animal faeces, but it is hard to monitor them because we are busy." [IDI, Mother, Geita].*

The researchers frequently observed children playing on the ground, while chicken, ducks, guinea fowls, goats and sheep wander about the compound, leaving behind animal faeces that is not removed. Most respondents revealed that animals are left out during the day because caging them would mean providing feed and that is expensive. Furthermore, most households do not have coops because they fear their animals may be stolen if kept outside during the night.

A child in Geita seated on a plastic bag, while her mother was peeling sweet potatoes

> *"Chicken and ducks sleep in the kitchen or in a certain corner in the house, building coops is not very expensive, but we fear that chickens may be stolen if left outside. This has happened so many times in this village." [FGD, Father, Shinyanga].*

However, it is common for most households to clean their compounds every morning and evening. This activity is done by mothers and older children (8 years and above) in the family.

KEY ISSUES

Barriers

Fetching water is time-consuming. Low use of water treatment for drinking water (people rely on community wells, but this water may become contaminated through transport and storage later on).

Hand washing knowledge partly good but practice is poor: little soap use, no running water, and little supervision of child/baby WASH. Poor recognition of the danger of contact with infant stools. Poor yard hygiene: unconfined poultry and livestock.

Children who have started walking defecate around the household compound. Water for washing infants' nappies is poured near the household compound. Children's stools are thrown indiscriminately around the compound. Handwashing after disposing of young children's stools is rare. Older siblings often forget to clean the infant after defecation.

When at home, most infants that are younger than 6 months are placed on the ground. Most mothers said when children start to crawl, it is hard to monitor them and they will touch the soil and play on the ground where chicken, ducks and goats are roaming about.

Facilitators

Tippy taps present in some villages: positive and negative experiences with enforcement versus conviction.

Regular sweeping of compound around the house.

Infants' nappies are washed in water. Infants' stools are sometimes disposed of in latrines or buried.

Some children younger than 6 months are place on plastic bags or pieces of cloth.

The majority of households have basic latrines or share latrines with neighbours.

Early Childhood Development

Generally, children who are under 5 years do not have children's books at home. For most parents, children's books are a foreign concept. They usually associate books with school textbooks that are used at schools when a child gets enrolled at 6 or 7 years. Even if children's books would be available locally, their cost would be prohibitive for most villagers. According to respondents, parents do not read books to their children at home. Some parents said even if they would buy books, they are afraid that young children would tear them up so it would be a waste of money to buy books.

Most times, mothers and older children (usually girls) aged 6-14 years are the ones who stay with children less than 2 years. Mothers subconsciously start talking to their children right from birth and interact, using gestures, small talk and smiles. When asked directly if caregivers interact with infants and young children, female caregivers usually state that there is little interaction because infants do not speak, or even are said to not hear. Few realise that early stimulation promotes cognitive development. There are exceptions demonstrating positive deviance: a mother said, "*If I do not talk to my baby, he may become dumb.*" [IDI, Mother, Sengerema].

The routine interaction happens frequently when they are breastfeeding their babies. Activities such as singing, talking walks, counting, playing, and storytelling are done by older children (girls age 6-14). The researchers observed this in all regions, as these girls would be seen interacting, playing and carrying their siblings on their backs. When mothers are away from home, these girls are left to take care of (and feed) their younger siblings.

When playing at home, children under 2 years use tins and homemade toys such as cars, toys made from old clothes, balls made out of old socks and plastic bags, and soil and clay. Their older siblings

make them; parents said that they do not make or buy toys for their children since they do not have the time to make toys nor the money to buy toys. A few parents who have the financial means buy toys, such as rattles for children under 6 months; the babies play with these when the mother is busy.

Parents especially fathers were surprised and reacted with laughter when asked if they play with their children. Fathers said that they do not have time to spend with their children because they are not at home most times. According to them, it is the responsibility of mothers to play and engage with children, especially younger children, while fathers look for money and food for the family. This was backed up by mothers who said that men do not have time to stay at home, to take care of or play with their children. Women went on and said that men spend most of their time at the village centre taking coffee and alcohol and playing chess. Fathers did say that time spent at home is used to follow up on the progress of older children who are already enrolled in school. A father in an FGD in Sengerema said, *"I cannot take my under-2 child for a walk because they cannot talk back or understand, what if he/she urinates? What will I do? Mothers know what to do when that happens but I don't."* FGD, Father, Sengerema].

Though they admitted that they do not spend time with their children, some parents were aware of its importance. According to them, spending time builds good relationships between the child and parents, it helps the children know their family members by name and it helps children to start talking. The community perception towards adults who play with children was seen as a barrier; during FGD discussions participants said that someone who plays with children might be seen as having nothing else to do. Elders in Geita mentioned that grandparents are allowed to play with children because they are already considered old but not middle-aged parents.

There were no day care schools in the visited villages. Respondents said that they enrol their children in nursery schools, which are found in the government primary schools, when they are 5-7 years old. Most start late because these schools are far, younger children cannot walk there, and parents do not have time to drop and pick them from school every day.

Parents have aspirations for a better life for their children: the majority of rural villagers wish and hope that their children go to school and, afterwards, get good jobs so that they can help them to get out of poverty. Fathers are mainly concerned with their children's progress in school. However, there are exceptions, examples of positive deviance, where one's education and exposure to other possibilities and information influences what aspirations a parent may have for his/her children. In Shinyanga, the researchers met a family where both parents had secondary education: their approach to their children's future follows the norm but also considers individual children's ability and desire:

> This father of eight children said that, after completing primary school, his two older children (girl and boy) decided what they wanted to do, the girl wanted to continue with school and the boy wanted to do farming: he let them do what they wanted. Now the girl has just finished form six and the boy is maintaining a vegetable garden that helps support the family. He went on to say that the girl wants to continue with university and the family supports her because they know, when she completes school, she will get a good job and help the family, especially her younger siblings.

KEY ISSUES

Barriers

No explicit awareness of the importance of child stimulation for children under 2-3 years. Few local structured resources (e.g. community day-care centres) to promote child stimulation. Little/no involvement of fathers because of lack of time and the perception that it is mothers who should carry out these responsibilities. Parents who play with their children are seen as having too much time on their hands.

Facilitators

Parents understand at least in part the importance of stimulating the child.

Implicit interaction with infants and young children by mothers, and by older siblings (girls aged 6-14). Potential role for grandparents to push early stimulation. Some examples of positive deviance.

General aspiration for children to become educated and support their family.

Stunting

The majority of respondents in FGDs and IDIs did not have clear ideas of stunting as a distinct health concern; only very few had a correct understanding of its meaning. Most associated stunting with acute malnutrition symptoms like a child having soft and reddish hair, an enlarged stomach, fat cheeks, a crying and unhappy child, a child looking younger than he/she actually is, and generally poor health. The causes were reported as primarily associated with a lack of nutritious food. Most respondents link the lack of good nutrition to the economic welfare of a child. Being financially capable is seen as the precondition to provide nutritious food for her family. Other causes included:

Giving cold leftover foods, especially sweet potatoes and stiff porridge (*ugali*). This was observed in the villages where researchers usually met children eating cold leftover sweet potatoes as they play. During an interview with elders in Nyarugusu, a grandmother said,

> *"When you wake up in the morning, you do not have time to heat anything so you just eat anything that is available and go to the farm, the same happens for children, we do not have time to prepare for them anything as that will delay other chores and especially farm work." [FGD, Elder woman, Geita].*

Eating without washing hands leads to children getting sick because of contamination of food. A mother getting pregnant when they are still breastfeeding leads to both the breastfeeding baby and the growing foetus having insufficient nutrition and reduced development.

In some villages like Karumo, respondents refer to stunted children as *mkomao* or *mbilikimo* meaning children who don't grow or are short. Participants suggested measures to prevent children from becoming stunted are eating nutritious and warm food, and living in a clean environment. When asked what nutritious food meant, respondents mentioned nutritious porridge made out of a mixture of maize, soya beans, rice and groundnuts flour.

Most respondents did not know a treatment for stunting, whether traditional or modern. A few elders in a FGD in Ngoma A village said that stunting is caused by the mother being unfaithful and having a child out of wedlock, while at the same time having to breastfeed a child: the traditional

solution was to mix milk in the child's bath water, a practice that was done in the past but is not common nowadays. Some mothers in all villages suggested that nutritious food if given continuously could help a child with stunting. While most respondents said if a child is stunted it is better to go to a health facility to get advice and treatment.

KEY ISSUES

Barriers

Stunting is poorly understood, confused with acute malnutrition, and associated with physical but not cognitive growth. Knowledge of the importance of the first 1,000 days is not yet widespread.

Facilitators

Some awareness of the stunting link to hygiene exists (hand washing and food preparation). There is recognition of the importance of good nutrition, both for children and mothers.

SBCC Overview

Based of the findings of the formative research, ASTUTE proposes a social and behavioural approach that focuses on a range of target audiences, multiple levels of interventions and targeted messages addressing key drivers of stunting. The proposed SBCC strategy is first summarised in a series of supplemental tables at the end of this report that incorporate the key findings of the formative research and include recommended approaches and activities for key audiences. Immediately below, please find a narrative description of the SBCC strategy and its different components.

Proposed SBCC Strategy

Objective

To achieve beneficial social and behaviour changes in nutrition and nutrition-related practices in the ASTUTE target areas, scaled-up effective and integrated interventions, programs, and systems need to be operational. This includes advocacy for prioritization of nutrition and coordination with government structures at all levels, training of health providers at health facility and community levels, a mass media campaign, and community-based interventions at community and household levels.

Effective SBCC is an interactive, researched and planned process in which activities are based on data and evidence (from a variety of sources, including project-based research and analysis of relevant literature), and are flexible enough to incorporate feedback from the target audience on an on-going basis to tailor messages appropriately. For ASTUTE, SBCC will be approached through multiple channels, including advocacy at national, regional, district and community levels, improved nutrition counselling and promotion of skills among health providers, social mobilisation through community health workers and civil society organisations carrying out community-based activities, and behaviour change communication through an intensive mass media campaign.

ASTUTE's strategy is based on a dynamic socio-ecological model that considers the individual as operating in a wider network with different social layers (self, family/household, community, policy at district/region/national level), where at each layer social influences operate and structure

individual actions and behaviours, while the whole is embedded in a physical, natural environment which influences behaviours, e.g. the potential for what can be grown nearby.

Target Audience

Primary

The primary target audience for social and behaviour change in nutrition are the primary caregivers of children under 2 years: these are adolescent girls and women of reproductive age (15-49 years). They are the persons responsible for everyday care and feeding of infants and young children, who are the ultimate beneficiaries of ASTUTE's interventions. This audience includes women who are currently pregnant, or have children less than 2 years of age, as well as women who are at risk of, or are planning to become pregnant. This includes adolescent girls since by age 19, 57% of Tanzanian girls have begun childbearing and yet this population group is likely to have less access to nutrition information and health services, as adolescent girls often hide unplanned pregnancies out of fear and shame

Secondary

It is necessary to expand the target population and include key secondary audiences, because women of reproductive age live within a social environment where other individuals play a key role in maternal and child nutrition. The immediate secondary audience is the woman's husband and her mother or mother-in-law. Husbands are the heads of households and make the key decisions regarding financial expenses and food production: they supply women with financial assistance for food purchases (beyond households' own subsistence production), and they also influence women's work and time use. A mother-in-law or mother of a woman who is pregnant or who has a young child is another key figure in a household: especially for a first pregnancy when a woman often relies on advice from elder women in their entourage. Older women have greater authority and are also able to influence men. Lastly, older siblings (especially girls) in a household should also be included: while they do not have authority over their mother, they are often tasked with childcare and child feeding duties.

Tertiary

The tertiary audience consists of community-level leadership and authority figures. To shift behaviours at the individual level, we need to create a shift at the social or community level and move social norms around nutrition and nutrition-related practices. This implies working with village leadership and religious leaders who have influence over community members. Authorities at the district and regional level form part of the tertiary audience through their role in policy directives and LGA initiatives.

Target Behaviours

ASTUTE aims to improve the following behaviours:

- **Appropriate maternal nutrition and health (MNH) support** before/during pregnancy and during breastfeeding: improved diet during pregnancy, increased rest during the later stages of pregnancy, early start of antenatal care to ensure adequate follow-up throughout pregnancy, birth spacing.

- **Exclusive breastfeeding (EBF) during the first six months**: special attention will be given to promote exclusivity (no other liquids, no semi-solid foods) by addressing the constraints that make it hard for women to practice EBF, plus a focus on assuring breast milk supply through frequent and correct feeding.
- **Complementary feeding**: children aged 6 to 23 months should eat at least three meals per day, alongside continued breastfeeding. Meals need to contain a diversity of nutritious ingredients (such as green leafy vegetables, orange-fleshed foods, and animal source foods like fish or eggs). Special attention should be given to nutritious composition of standard porridge (*uji*).
- **Food production**: raise chickens and use eggs in children's diets; promote fish (and where available, dairy) into diet.
- **WASH**: hand washing with soap at critical moments (before eating/feeding a young child, before preparing food, after defecation/latrine use, after handling baby/infant stools).
- **Early childhood development (ECD)**: Talk to and stimulate children from birth.

A detailed justification of the target behaviours for the media campaign messages is provided further below, including message weightings.

Many of the "drivers" of the above-mentioned behaviours are associated with women's social position and constrained autonomy. Media messaging and community activities need to address these drivers: e.g. exclusive breastfeeding is made difficult and impossible if women are expected to take up a regular workload as soon as possible after delivery, under pressure from their husbands. Working with husbands to improve awareness that breast milk supply depends on regular and appropriate breastfeeding is thus key to reach behaviour change.

One of the drivers behind the lack of early childhood care and stimulation is that people associate learning and cognitive development with formal schooling at 5-6 years of age. Mothers in particular do interact and talk to infants and young children, but they often do not do this in a conscious way, nor do they realise its importance in child development. Fathers doing this type of early stimulation would be considered outside the norm of socially accepted behaviour (though grandparents are allowed to engage in play and talk with very young children). The majority of parents wish their children to be successful in school and life, and be in good health (with a long-term goal of helping their family in the future); tapping into these aspirations (a driver for positive behaviours) can help to shift social norms that nurturing and feeding the brain of infants and young children is just as important as feeding their body, and trigger new, beneficial behaviours.

The messaging approaches in media and community activities should feature information about the correct health behaviours but embed these in personal, emotionally engaging short narratives that convince target audience to adopt beneficial behaviours. Based on a thorough understanding of everyday life and experience (and informed by qualitative research), such narratives are aiming to shift social norms and convince target audiences rather than simply educating or sensitising that audience. Much health information is already being spread in communities but putting that information into practice is limited, for multiple reasons. For example, mothers are well aware of the importance of EBF, but the conditions in which they find themselves once a child is 4-5 months old, do not allow her to continue EBF and a mother by herself cannot change those conditions. Men consider women's work as "exercise" and perpetuate the belief that women's work is beneficial, even during the late stages of pregnancy. Such social norms need to be addressed and changed in

SBCC activities; raising financial and health concerns in narratives can be a convincing motivation for fathers.

Beneficial behaviours need to be simple and doable in order for people to consider adoption; messages should focus on a single behaviour that is clear and within the scope of possibility, fitting the local context of our target audiences. For example, physical and economic access to meat is very limited among rural households; even chickens are less seen as a source of animal protein than as "walking emergency cash." Still, fish -- more easily found and cheaper (especially the *dagaa* type) -- can be a more viable alternative than meat to increase protein intake.

Undernutrition has multiple causes; addressing it will require a multi-issue media campaign, as well as a multi-issue community and policy components. The situation where many adolescent girls become pregnant without planning to do so, and then hide the pregnancy from parents and schools (if they attend school), thus missing key antenatal care, is an example where multiple issues come together. To attain healthy behaviours among these adolescent pregnant girls, changes would be needed at different levels: better nutrition information and awareness at schools, easy access to health services, and social acceptance of youth-centred and youth-friendly services. An additional example is that of poverty. Lack of financial and other resources reduces people's access to water and sanitation, health facilities, education and training, and nutritious foods. While poverty reduction is not ASTUTE's primary aim, through media and community-based behaviour change strategies, ASTUTE will work to create changes in mindsets. For example, even though many nutritious foods are expensive, not all healthy foods are out of reach of resource-poor families and ASTUTE's mass media campaign and counselling will provide them with ideas for purchasing inexpensive foods that are nutritious.

Messaging should be consistent across SBCC components, whether it is radio, a community event, or an encounter with a health agent, or a local support group. There is an important role for ASTUTE to ensure that health staff in facilities and community health workers are properly trained and provide similar, correct messages in their counselling and/or home visits, as people would hear on the radio. The researchers have encountered examples where health providers give out incorrect information, or where a health facility is perceived as offering poor quality and unfriendly services, such that people seek health services at a more distant facility.

SBCC Mass Media Component

Messages on the target behaviours will be embedded in short, 6O-second spots and an interactive evening program. The radio station partners will be selected after an analysis of media listening habits in the five regions and radio station assessments: the objective is to select one regional (and hence national) radio station plus one dominant community radio station in each of the five regions. We will broadcast spots at key listening times, at a high frequency during the one week that a unique spot is being aired. Each week of broadcasting will feature a new spot: currently, broadcasting of spots is scheduled to be done over 48 weeks, in three three-month "bursts" over the campaign, rather than continuously, to reduce audience fatigue, maximize impact and reduce airtime costs.

An SBCC landscape analysis conducted in support of the Tanzania National SBCC Nutrition Strategy 2013-18 found that existing SBCC initiatives are not interactive, tend to be "dry" in presenting factual information without explaining significance or appealing to emotion, do not tap into

Tanzania's strong oral culture and do not engage with male audiences or discuss the underlying gender dynamics that affect stunting. We have developed two formats to fill these gaps:

Format 1: 60-second radio spots. DMI's experience shows that short, frequently repeated radio spots are the most cost-effective way of delivering behaviour change at scale. We will broadcast 60-second radio spots 10 times per day on our partner radio stations, to ensure blanket coverage of radio audiences in all five regions. We will produce spots covering the full range of target health topics, including maternal nutrition and health, early and exclusive breastfeeding for the first six months, complementary feeding from six months, WASH, and ECD. The spots will give listeners practical advice on how to make their children smarter, healthier and more successful. These tips will mostly be based on nutritional advice (such as EBF or consuming protein). We will also produce spots promoting the role of CHWs. DMI has a strong track record producing short, realistic dramas that use emotion, humour and suspense to convince target audiences to adopt healthy behaviours.[12]

Format 2: Interactive live radio phone-in programme. A critical determinant to success for longer formats is that the health content is pivotal to the programming, but is not the subject of the programme itself; for example, an hour-long show on breastfeeding will attract few listeners. ASTUTE will, therefore, offer a weekly one-hour live radio phone-in programme where gender and social norms, especially in relation to household tasks and how they affect maternal and child nutrition and health outcomes, are treated. It will not focus directly on the target behaviours, but rather on the social roles and norms that influence which household members should have responsibility for implementing each of them. This is designed to make the programme much more entertaining than a show that simply provides advice about healthy behaviours. Instead, it will lay open a range of highly charged and often unexamined issues around gender and social dynamics in modern Tanzania, and will invite people to call in (anonymously, if preferred) to explore these issues fully and honestly. It will likely engender productive debate. After demonstrating success with the piloting phase of the programme and if budget allows, we will look for opportunities with broadcasters to increase the frequency of these segments to several times per week.

Rather than simply promoting these behaviours, the programme will promote lively and entertaining debate about issues that are accessible to as many listeners as possible, engaging them with contexts where everyone has an opinion. We are exploring a range of different platforms for these shows, such as "The Healthiest Village Competition," or "What if You Were the (Village) President for a Day" where everyday cases -- based on real-life experiences and qualitative research -- related to maternal and child nutrition are opened up for questions and solutions. The programme will seek to tackle the gender and social dynamics that inhibit behaviour change (such as the belief that men make all decisions about household expenses). Whichever way the gender and social discussion plays out, the target behaviours will be promoted.

The programme will cover a wide range of behaviours, responsibilities, and roles that have a gender and social dimension. Most of them will be linked to health and nutrition, including issues such as who should be responsible for buying food, providing food, cooking, cleaning, caring for the child at home, reinforcing hygiene messages and practices, and so on. Presenters will start the conversation,

[12] Sarrassat S, *et al* (2015) Behaviour change after 20 months of a radio campaign addressing key life saving family behaviours for child survival: Midline results from a cluster randomised controlled trial in rural Burkina Faso *Global Health Science and Practice* **3** (4) 530-543

inviting input from guests when appropriate, include dramatized segments produced by DMI, and then invite calls from listeners. Presenters will keep the conversation open rather than steering it in a particular direction, so that it maintains engagement and thoroughly explores gender and social issues, but "fake callers" (scriptwriters and production staff) may also be able to call in to get the conversation back on track if it goes off-topic.

Share radio content with non-radio listeners using mobile phones. We will make episodes of the radio phone-in show (and/or a five-minute "highlights" package of each one) plus our radio spots available to CHWs to share, using secure digital cards (SD cards) or Bluetooth, with household members in audio format for mobile phones. CHWs may choose to listen to some of these outputs alongside the household members, or to leave copies with them to listen to later. Using CHWs as alternative "vectors" for our radio content will further increase ASTUTE's reach. We plan to distribute the audio files to CHWs while they are attending scheduled training programme or supervisions.

SBCC Community Components

ASTUTE's community intervention strategy complements its other work at the national, regional, and district levels including advocacy and coordination with government officials, training of health facility staff, mass media, and other interventions. Collectively, these efforts will encourage adoption of healthy behaviours and improve the nutritional status of women and children.

ASTUTE's community interventions are based on the following pillars of behaviour change:

- Interventions are needed at all levels (national, regional, and district levels as well as in communities and households); messages and approaches should be mutually reinforcing;
- Families try new practices when those practices are broken into small, doable behaviours;
- Families are more likely to adopt healthy behaviours when they get to decide how they will change their own practices;
- Giving families frequent opportunities to practice new behaviours (and not simply hear about them) maximizes behaviour change;
- People change behaviours when it is fun, popular, and easy to do so; thus, ASTUTE programs should engage communities in creative ways; ensure that individuals who influence mothers' practices support them as they attempt to change behaviours, and emphasize the benefits of behaviour change while reducing barriers.

For the community SBCC activities, ASTUTE proposes focusing on five key practices in year 1 with additional behaviours added in subsequent years.[13] Narrowing the list of initial behaviours to five helps focus government efforts and community-level activities. The five proposed behaviours for year 1 include:

[13] In years two through four, ASTUTE proposes focusing on two to three (additional) practices each year. These could include: 1. Grow colourful crops that you can give your family. 2. Give your child clean, safe household things to handle, bang, and drop. 3. Treat your water at the source. Even if water looks clean, often it isn't. 4. Use floor mats and play pens to keep children away from animals and their waste. 5. Dispose of children's feces in toilets. 6. Steam vegetables for a short period of time. Try not to cook them too long. 7. Husbands and mothers-in-law: make sure your child eats meat, poultry, fish, and eggs at least three times a week. 8. Give your child smaller, more frequent meals and snacks. 9. When your baby is sick, continue to breastfeed and give extra food. After your baby is better, give an extra meal each day for two weeks. 10. Make sure you eat meat/poultry/fish and green, leafy vegetables at least three times per week.

1. Agriculture: Keep chickens and other small animals in coops. When animals are cooped, your compound is cleaner and your animals and family are healthier;
2. WASH: Wash your hands with soap and running water *before* you prepare food and before you feed your child. When you wash your hands, the food your family eats is healthier;[14]
3. IYCF: Starting at 6 months, continue to breastfeed your child first, then add three things to your baby's diet: 1) animal source foods such as eggs, poultry, and fish 2) green leafy vegetables, and 3) orange-fleshed foods such as vitamin A rich fruits and orange tubers. Feeding your child a "colourful plate" will make him smart;
4. IYCF: Wait until the child is 6 months old before giving them anything but breast milk. Your child will be stronger if you give only breast milk in the first six months of life;
5. ECD: From birth, using short sentences, tell your child about your family and your village. Children learn to hear and understand what you say beginning at birth.

Proposed community-level interventions include:

1. Positive deviance;
2. Support groups;
3. Home visits based on negotiating for behaviour change (GALIDRAA=Greet, Ask, Listen, Identify, Decide, Recommend, Agree, Appointment);
4. Homestead food production, including home gardens and demonstration plots; and
5. Mobile technology to reinforce messages and improve nutrition; water, sanitation, and hygiene (WASH); and early childhood development (ECD) behaviours as well as practices related to homestead food production.

SUPPORT GROUPS

Other projects in Tanzania (including the ASTUTE/UNICEF project and Mwanzo Bora) place primary emphasis on support groups to bring about behaviour change. Likewise, the ASTUTE project in the Lake Region will capitalize on support groups to effect behaviour change at the community level, complemented by home visits. Support groups in the five Lake Regions will include elements found in many support groups globally including information sharing and opportunities for mothers to share solutions to challenges and offer support. In addition, support groups will include:

1. An interactive social and behaviour change communication kit (similar to Mwanzo Bora) that may include mobile videos and audio recordings to promote behaviour change;
2. Testimonials from "doers" of healthy practices and "positive deviants;"
3. Introduction of bowls with colourful compartments that help parents diversify their children's diets and provide sufficient quantities of food;
4. Meal planning card games, cooking demonstrations, and song and dance;
5. Discussions of how to improve adolescents' and mothers' diets, including consumption of animal source foods and green, leafy vegetables; and
6. Additional opportunities for group members to practice the practice, not simply hear about it

In addition to dietary practices, support groups will be used to promote WASH and "baby WASH" initiatives. For example, community health workers (CHWs) can work with support group members to:

[14] Often parents wash their hands only after feeding the child.

- Improve disposal of all faeces in latrines;
- Increase the uptake of hand washing with running water and soap at all five critical points;
- Put the baby in a clean area where she or he cannot access dirt/faeces when playing or eating;
- Promote the separation of toddlers from animals (e.g., by using doors and gates to keep animals outside the house);
- Ensure compost piles are away from the house; and
- Construct tippy taps.

HOME VISITS

Mwanzo Bora, the Government, and other organizations place importance on CHW home visits, but often there is greater emphasis on support groups. However, home visits change behaviours in ways peer support groups cannot. Home visits enable CHWs to work through the challenges individuals face as they attempt to improve practices. Home visits also offer an opportunity to commit individuals to trying out those practices. Home visits should include:

- Delivery of key messages related to ECD, IYCF, WASH, agriculture, and maternal nutrition with a focus on mothers. The primary behaviour change strategy during home visits will be GALIDRAA.[15] For example, through demonstration and practice, CHWs should reinforce parents' ability to provide psychosocial stimulation to their children;
- Similar to Alive & Thrive's strategy in Ethiopia, commit husbands and in-laws to engage in practices that promote good health, including giving animal sourced foods to children and assuming extra household responsibilities to let the pregnant mother rest;
- Promotion of Small Doable Actions (SDAs) that are tailor-made to mothers' own situations;
- Use of "action cards" (interpersonal counselling cards that allow mothers to identify barriers to a healthy behaviour and to address those barriers, for example, antenatal care visits);
- Exploration alternative protein sources including insects and wild plants;
- CHWs, clinicians, agriculture extension workers, and others will remind individuals of "this week's" radio spot and other mass media components and reinforce key messages;
- CHW detection and referral for MAM and SAM; and
- Referral for clinic-based services.

MOBILE TECHNOLOGY

Mobile phones are an increasingly popular and effective way of improving health and homestead food production in Africa. Mobile phones provide a means of reinforcing key health messages and sharing information with others, including farmers. The details of how ASTUTE will use mobile phones need to be determined. However, strong possibilities include:

- Reinforcing messages heard during support group meetings;
- Improving the frequency and quality of contact between CHWs and mothers; and
- Providing farmers with information to improve production of animals and crops, coordinate labour, collect weather information, borrow farm implements, collect information about new types of seeds and when they might be available through VMFs, and determine when agricultural extension officers are available for support. The SPRING project has online resources for incorporating mobile phone technology into agricultural interventions.

[15] GALIDRAA has been used extensively and successfully by the Suaahara project (Nepal) and LINKAGES (Ethiopia, Ghana, Madagascar, Bolivia, and elsewhere). GALIDRAA stands for Greet, Ask, Listen, Identify, Discuss, Recommend, Agree, and follow-up Appointment. GALIDRAA helps CHWs listen to what mothers' current food, care, and health practices are, identify options mothers can choose to improve those practices, allow mothers to choose one practice (from among several recommended), and support the mother by identifying benefits and barriers, committing the mother to change her behaviour, and following up in a week—through a home visit or call—to see how things have gone.

SBCC Advocacy/Policy Components

The ASTUTE team will work with government stakeholders at national, regional, and district levels to advocate for the inclusion of nutrition in multi-sectoral agendas, planning and budgets. Through various mechanisms, such as the national steering committee, the National Multi-Sectoral Technical Working Group on Nutrition, and the DPG-N forum, ASTUTE can share information about ASTUTE with the larger nutrition community and ensures coordination of the ASTUTE program with other stakeholders. Through the above mechanisms, and others, ASTUTE will learn from other programs by proactively capitalizing on what has already been learned regarding the design, implementation, and evaluation of integrated nutrition projects both globally and nationally. Particularly helpful experiences include large initiatives such as Alive & Thrive, government programs, and other on-going initiatives in WASH, ECD, homestead food production, and gender carried-out by UNICEF, Mwanzo Bora, and Helen Keller International.

ASTUTE will second nutrition and SBCC officers to the regions in order to support both regional authorities and district councils with technical and financial assistance for the implementation and funding of activities, as well as report feedback on ASTUTE progress in the districts, assist with training of health facility workers, and liaise with CSO carrying out community-based interventions. The ASTUTE officers will help strengthen linkages between the different administrative levels, as well as contribute to a coordinated effort and adoption of ASTUTE-wide messaging and approaches (while allowing for contextual variation in the different regions and tailored programs, the key nutrition practices that are prioritized will be the same across all regions).

Messages for Media Campaign

Based on the formative research carried out during this inception phase, DMI has identified 10 core messages that will form the basis of the mass media campaign. These communications are built upon the 5 practices in year 1 that will be the focus of ASTUTE's community-based strategy. DMI breaks these 5 practices up into 10 broad core messages, so that the mass media campaign contains a variety of spots because audiences may tire of just a few key messages. For each core communication, DMI will produce different spots, with each spot broadcast at a high frequency for a single week. The core messages will also featured in the interactive evening programme that DMI will co-produce with regional radio station partners. The broad themes of these messages, the target audience, key influencers, and the message weightings for the campaign are detailed in the table below.

Main Theme	Sub-Messages	Target Audience	Influencers of Behaviour	Message Weightings
Maternal Nutrition	1) During pregnancy women should get more rest and eat an improved diet 2) Women should attend ANC as soon as they	All women of reproductive age (potential and existing mothers) and their husbands	Husbands and family members, who can help by taking women to health centres for ANC, and also by assisting with household chores, fetching water etc.	10% Sub-messages split with a 1:1 ratio

	realize they are pregnant and need to make sure they take the supplements provided		Men are required to accompany women to their first ANC appointment and to help with transport to health centres.	
Exclusive Breastfeeding	1) Wait until the child is six months old before giving her anything but breastmilk 2) Breastfeed more frequently (including emptying one breast before feeding from the other) to maintain sufficient supply	All women of reproductive age (potential and existing mothers) and their support network	Mothers-in-law and husbands, health workers	25% Sub-messages split with a 1:1 ratio
Complementary Feeding	1) Feed children aged 6 to 23 months at least 3 nutritious meals per day 2) Starting at 6 months, continue to breastfeed your child, but also add animal source foods such as eggs, poultry, and fish; green leafy vegetables; and orange-fleshed foods such as vitamin A rich fruits and orange tubers	All mothers (existing and potential) of a child aged under 2 years and their husbands	Husbands often control the money available to women for purchasing food for the family	20% Sub-messages split with a 1:1 ratio
Food Production	Keep chickens and give their eggs to the family.	All mothers (existing and potential) of a child aged under 2 years and their husbands	Husbands (who often control household spending and the selling)	10%

WASH	Handwash with soap and water (at critical moments, especially before you prepare food and before you feed your child) (For interactive evening programme: Keep chickens and other small animals in coops)	All women of reproductive age (potential and existing mothers) and their husbands	Husbands and other care-givers, wider family network	15%
Early Childhood Development	From birth, stimulate your child by telling him or her about objects at home and your interactions with others	Mothers and fathers	Other care-givers such as grandmothers and older siblings	20%

In addition to producing spots and interactive radio shows, which will feature these core messages, we will also produce short PSAs to notify parents when nationwide vitamin A or other supplementation programmes are occurring.

We will continue to conduct additional formative research to inform the design and content of our media campaign, including conducting research in the two regions of the lake zone that our researchers have not yet visited (Kagera and Kigoma), in order to tailor messages to specific settings. Sub-messages may be further refined or added to, as a result of further formative research and the post-broadcasting qualitative feedback research that we will collect throughout the project period.

Proposed Weighting of Campaign Messages

The table of campaign messages includes an approximate weighting for each set of messages. These weightings were determined taking into consideration both the ASTUTE priority outcome metrics and also the predicted impact of the target behaviours on child stunting. The estimated impact of each behaviour on stunting has been summarized in the 2013 Lancet nutrition series, where the Lives Saved Tool (LiST)[16] was used to model the effect of scaling up proven nutrition interventions on the health of children.[17] The LiST analysis found that increasing coverage of several key interventions such as management of severe acute malnutrition (SAM), preventive zinc supplementation and promotion of breastfeeding, had the largest potential impact on preventing child mortality. Scaling up of 10 key interventions to 90% coverage was also associated with an average 20.3% (range 11.1-28.9) reduction in child stunting and a 61.4% (range 35.7-72.0) reduction in severe wasting. Based on the available evidence for the predicted impact of different behaviours on stunting, as incorporated in LiST, we have prioritized the promotion of exclusive breastfeeding to receive the highest amount of broadcasting in DMI's radio campaign. We have also prioritized early childhood development as a

[16] The Lives Saved Tool http://livessavedtool.org/

[17] Bhutta ZA, *et al* (2013) Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost? *The Lancet* 382 (9890) p452-477

nutrition sensitive intervention. The 2013 Lancet nutrition series concluded that combined ECD and nutrition interventions show promising additive and synergistic effects on child development, and in some cases nutrition outcomes.

DMI has strong evidence from the only cluster randomized controlled trial (RCT) to show that a Saturation+ approach to mass media campaigns can improve life-saving behaviours.[18] Data from the RCT in Burkina Faso showed a correlation between the amount of broadcasting on a message and impact on behaviour change: a regression coefficient of 0.9 suggested that on average, each additional week of broadcasting represents a 0.9 percentage point change in behaviour. Whilst the impact will also be dependent upon the type of behaviour and the specific barriers that influence its adoption, it is clear that targeting too many different behaviours could result in a radio campaign failing to achieve sufficient saturation across all messages and therefore diluting its impact. In light of this evidence, we have selected a limited number of behaviours to target in our ASTUTE radio campaign, to maximize the amount of broadcasting that each message receives in order to achieve behaviour change.

Recommendations for Further Qualitative Research

Our campaign will emphasise how improved IYCF practices will help children grow up to be strong and smart young adults, but we will continue to use our qualitative research to ascertain what parents' aspirations and goals for their children are.

Adolescents

Through qualitative research, we will investigate 1) what adolescent girls currently understand about optimal nutrition, and 2) what (if any) information girls receive about nutrition from schools, health agents or any other sources. We will also use qualitative methods to learn more about awareness and attitudes adolescents and young parents have toward family planning.

Maternal Nutrition

We will determine which supplements women consistently receive during ANC. We will also gauge their understanding of when pregnant women should start taking these, for how long, and how frequently. We will clarify exactly which pills are most commonly *not* taken and what these pills look like. This information will help us to develop a message brief to address the barriers to consumption of nutritional supplements during pregnancy.

Exclusive Breastfeeding

To inform our breastfeeding messages and to improve upon social norms, we will use qualitative research methods to extend our understanding of how women fit breastfeeding into their daily lives, what technical advice they have received and the extent to which health workers are adequately trained in providing counselling around infant feeding. A separate, complementary study using Trials of Improved Practices (TIPs) will be used to negotiate solutions to time constraints around breastfeeding. A more detailed description of TIPs is available in this report under the Operations Research section as well as in ASTUTE's M&E Plan.

[18] Sarrassat S, *et al* (2015) Behaviour change after 20 months of a radio campaign addressing key life saving family behaviours for child survival: Midline results from a cluster randomised controlled trial in rural Burkina Faso *Global Health Science and Practice* **3** (4) 530-543

Food Production

The formative research outlined several large challenges to promoting consumption (rather than sale) of chickens and their eggs. However, more in-depth qualitative research is needed to understand the potential barriers to using chickens for home consumption and the perhaps greater feasibility of promoting fish.

WASH

Our research will explore further how men and women can be encouraged to spend scarce resources on soap for handwashing, as cost of soap is consistently reported to be a major barrier to its use.

We have not prioritized messaging about keeping the home/compound clean within our media campaign, as our formative research to date has not revealed this to be theme for which the barriers can be easily addressed using radio alone. We should however continue to monitor this through our qualitative research in case it is a more significant issue in other areas.

Drinking Water

Formative research has so far suggested that most people have access to clean drinking water. Furthermore improved drinking water has a limited effect on the prevalence of child stunting. We have therefore decided not to prioritise any messaging on the theme of drinking water purification or storage. However, we will continue to explore drinking water access and practices as we conduct further qualitative research, leaving open the possibility of adding messages on this theme if we find that it is a bigger issue in other areas.

ECD

In Geita our researchers observed that many children aged 4-6 years were still at home and not yet enrolled in primary school. In some instances this was linked to the distance of homes from schools and the limited time available to parents to escort young children on the journey to and from schools. Another reason for late school enrolment was parents' ignorance of the importance of early education. This is an issue we need to research further in order to decide whether this is a widespread problem across the Lake Zone region and if so, whether we should promote the benefits of early school enrolment in our radio campaign.

Awareness and Understanding of Stunting

We will conduct further in-depth interviews with community health workers (CHWs) to try to ascertain how much they really know and understand about IYCF practices and the extent of training they have received. This information will be used to help inform the design of other components of the ASTUTE programme as well as the media campaign. A separate study using TIPS (described in the Operations Research section of this report as well as in ASTUTE's M&E Plan) will complement this research.

Gender roles

In order to determine the extent to which we target campaign messages to males, we will explore in greater depth gender roles and decision-making around family roles and activities, including social acceptance of adolescents' role in caregiving, support for women during pregnancy (including reduction in work load), improved diet for pregnant women, agricultural practices, etc. During formative research, fathers were usually away during the day: can they be more involved in

everyday household activities and childcare, and if so, how? What additional efforts need to be made to get fathers and other men to support some of the social changes that will be required? What incentives do we need to present to men that will allow them to accept that investing in better food for women and children has benefits for the family and the future productivity of their offspring?

Recommendations for Operations Research

The goal for Operations Research is to identify and test interventions in a timely fashion so that promising initiatives can be scaled up and integrated into ongoing ASTUTE activities. IMA and its partners, Cornell University and DMI, have identified programmatically relevant topics based on findings from formative research, two desk reviews, and examination of the peer-reviewed and grey literature on prioritized topics. As part of the design of operations research and in consultation with DFID staff, ASTUTE will identify how findings from each study will be incorporated into modification and improvement of ASTUTE's program strategy. Furthermore, we will identify specific target audiences for dissemination of findings including donors, program planners and implementers, academics, and policy makers. Cornell will lead operations research, in close collaboration with the Senior Advisor for Research and Quality Assurance.

Based on the formative research reported here, two IMA-commissioned desk reviews, and examination of the peer-reviewed and grey literature, the following four operations research studies are proposed and will be carried out in the order specified below.

1. Complementary feeding practices.

Trials of Improved Practices (TIPs) identify barriers to engaging in a particular behaviour and provide women with options for improving child feeding frequency, nutrient density, dietary diversity, inclusion of animal source foods (ASFs), and responsive feeding. As indicated throughout this report, families (and mothers in particular) often fail to provide their children adequate diets because they face numerous challenges in doing so. These challenges include poverty, lack of support from husbands and in-laws, unfavourable norms, time constraints, lack of access to information, and inadequate access to healthy foods, among others. TIPS has been used in Tanzania (chlorhexidine application for neonatal cord care) and has been employed extensively globally (including by the Alive & Thrive project). Its widespread use is due in part to its ability to break down barriers to behaviour change and foster the uptake of optimal behaviours, at scale.

TIPs includes following key steps for nutrition counselling: gathering input from mothers, offering ideas and support, and follow up. This will inform creation of counselling materials and training and can also be used to inform mass media campaigns. Findings from TIPs will provide information on what behaviour change options families choose, their ability to try optimal behaviours given the various barriers they face, their direct experiences, and response of the child and other family members all with the aim of identifying the most acceptable and feasible practices to inform planning for community-level promotion of child feeding behaviours. If details are needed on recipes to promote this could be explored using participatory "recipe trials" where groups of women are offered local ingredients and asked to come up with recipes appropriate for children of target ages. Complementary feeding should be explored in maize staple and banana staple areas; thus, 6-8 communities will be selected. For TIPs, women will be visited three times over about two weeks, and

should include a diverse sample with children aged 6-9 months, 9-12 months, and 12-18 months. This phase of TIPs is planned to begin in year 1 before completion of breastfeeding TIPs (below), although recipe trials may occur during the breastfeeding research.

It should be noted that TIPs can be used for a variety of behaviours and in fact, ASTUTE will use TIPs to identify how workload and unfavourable social norms impinge upon families' ability to practice optimal behaviours such as giving children animal source foods.

In recognition of important barriers such as lack of resources for food, lack of time, and resistance from family members, we propose an innovative adaption of the TIPs methodology, namely: including fathers in counselling and asking them to select and commit to a behavioural change such as purchasing ASFs for the child, interacting with the child, or participating in feeding. Thus, parents will be recruited to participate together. We will learn about fathers' willingness, motivation and actual trial of behaviours linked to child feeding and child development. The content of this counselling (i.e. suggested behaviours as well as motivational messages) will be designed based on the formative research results and tie into radio messages whenever possible. When the father is not present in the home, the mother may suggest another family member or support person to participate in TIPS with her. Similarly, early child development activities can be integrated into TIPs by recommending behaviours such as father/young children interaction and responsive feeding that includes verbal encouragement.

2. Exclusive breastfeeding.

We will also use TIPS to identify barriers, facilitators and household strategies to increase feasibility of exclusive breastfeeding. These data will inform development of intervention materials (or adaptation of existing materials) on the most essential messages and practices to be promoted at community level. Messages are an important component of behaviour change; however, findings from TIPs will be used not only to identify messages but also to negotiate for behaviour change during home visits and support groups. TIPs will be used to follow a small purposeful sample of breastfeeding women with infants aged 0-6 months and women about to deliver. Counselling will be provided, tailored to each woman's current practices, and she will be asked to choose and try one or two practices related to exclusive breastfeeding. For example, prior to delivery, suggested practices may be to initiate breastfeeding early and negotiate with family members to ensure she can feed colostrum and avoid other liquids. A woman with a 3-month-old who is concerned about insufficient milk may be offered options such as feeding more frequently and ways to cope with a child whose crying may be due to colic or other issues rather than lack of milk.

As in complementary feeding TIPs, other family members will be included in TIPs, based on women's preferences for who can support them. Fathers could provide additional food for mothers, take on tasks that allow them time to rest and breastfeed, encourage the mother, and help to soothe and interact with fussy babies. Grandmothers or female relatives could agree not to feed other foods, could bring the child to the mother for frequent feeds if she is working, or help with household tasks so she can rest. Counselling guides will be developed based on formative research.

As has been noted, program interventions designed to improve families' well-being may unintentionally burden women with added responsibilities, particularly in light of traditional gender roles. This is an important cross-cutting issue and ASTUTE will focus on women's time use in its

operations research studies, and in particular, its research on complementary feeding and breastfeeding.

Longer but less frequent follow up (three interviews over approximately two months) will be used to assess whether families have tried the practices they chose, adopted the practices over a longer period of time, and what barriers and facilitators experienced. Provisionally, TIPs will include a sample of 40 families from six communities, purposefully selected to represent a diversity of project areas and program participants. This will occur pre-intervention, most likely in the second quarter of year 1, once ethical approval is received.

3. Mentoring of District Nutrition Officers.

One of ASTUTE's primary mandates is to implement effective programs and achieve impact at scale. A major component of ASTUTE's approach is to strengthen DNuOs and CHWs who form the backbone of the government's strategy on improving nutrition. Thus, it is essential to identify strategies for strengthening DNuOs' capacity for planning, outreach, and action. ASTUTE will assess the feasibility of transferring and scaling up district-level DNuO mentoring approaches from Siha and Mvomero districts in the Cornell BMG-funded "Building Strong Nutrition Systems" (BSNS) project. Assuming feasibility, ASTUTE will then adapt and transfer this program methodology to the five Lake regions. This includes identifying mentors such as regional nutritionists (assisted by ASTUTE regional staff) and testing the existing mentoring manual. ASTUTE will support and monitor the mentoring of DNuOs to conduct community stakeholder mapping and use results in multi-sectoral planning and building relationships with CSOs which are also critical reducing stunting in the Lake regions. Materials will be available from the investigators collaborating with Cornell in the first quarter of year 1. ASTUTE will work with three districts designated as "learning zones" and explore best practices for supporting and building capacity of DNuOs.

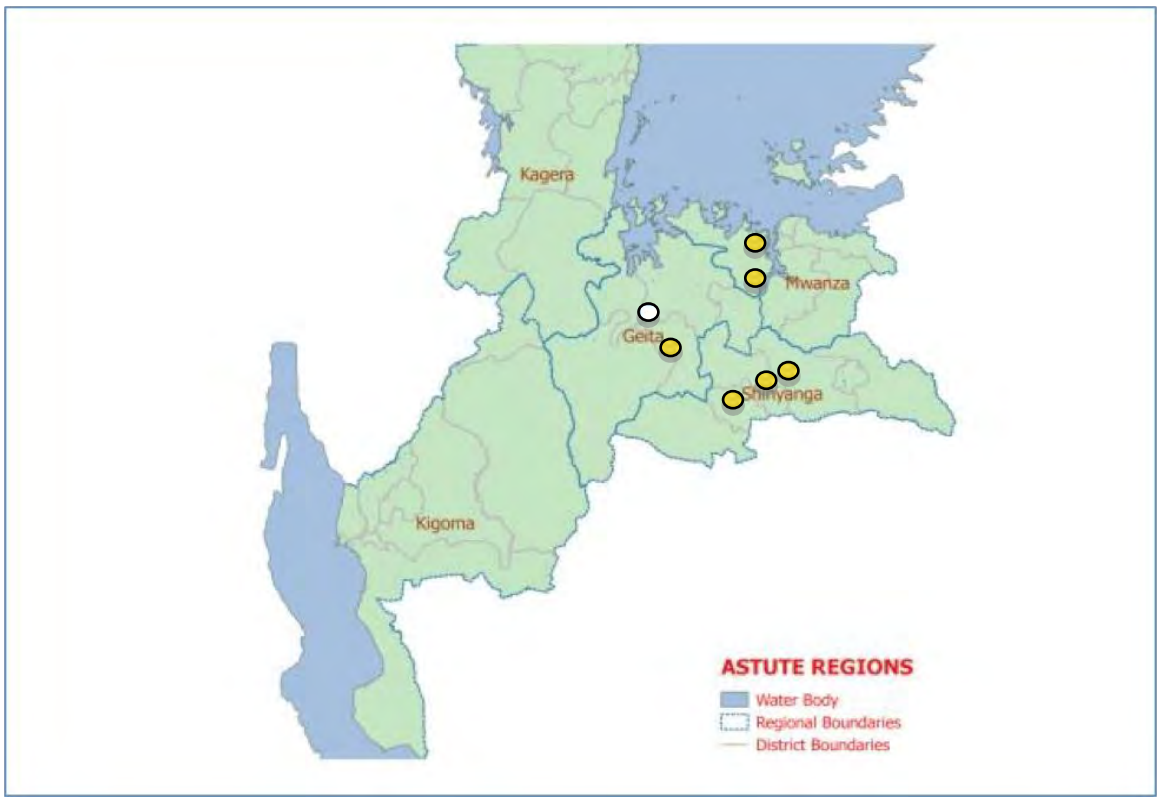
4. Fidelity, acceptability and feasibility of outreach strategies.

ASTUTE's success in reducing childhood stunting at scale depends not only on selecting interventions with a proven track record, but engaging in constant monitoring of program implementation and modification of programs to maximise impact. This study will take place in all five regions, in 20 wards within a sample of districts representative of diversity in ecological zone, urban/rural character, accessibility, etc. The goals of this operations research are to 1) understand the degree to which program outreach activities have been implemented according to standard 2) determine the extent to which activities have reached the community level, and 3) gauge how these activities are viewed by a variety of stakeholders. Interviews will be conducted with families; ASTUTE's partner CSOs; village health committees and village executives; relevant ward level officials; and health facility staff and CHWs to qualitatively evaluate the process of program delivery. When possible, observations and exit interviews will be used to document response to actual program participation in training, home visits, educational sessions and support groups. Additional in-depth data can be collected from particularly successful sites (positive deviants). This information will help identify "best practices" to inform on-going training, outreach, supervision and other aspects of implementation. This study is proposed for year 2, once outreach activities have been running for six months.

Conclusion

The formative research found a range of important facilitators and barriers to improved nutrition-specific and nutrition-sensitive practices for reducing stunting in the Lake Zone. On the surface, the zone appears fertile and has intensive agricultural production, but seen from the perspective of a household involved in small-scale subsistence, with heavy workloads for women (even during pregnancy and when they are supposed to breastfeed), and with little agricultural diversity, the barriers to a healthy diet for children and mothers and a clear path for early childhood development are apparent. ASTUTE will apply various approaches -- from positive deviance, support groups, mass media, to home visits -- to improve this situation, approaches that are informed by a rigorous analysis of available data including two desk reviews and this formative research. This includes evidence from evidence of successful interventions in Tanzania and elsewhere. Demographic trends indicate improvements in child nutrition practices and our research found examples of positive deviance, illustrating that it is possible to overcome the barriers that many face, going against the social norms around women's and men's roles, with a healthier family as a result. There is a great willingness to preserve and improve the health of one's children, and an openness to hear about new possibilities and new ways of doing things. This motivation and the lessons learnt through the formative research should facilitate the ASTUTE programme in achieving its objective of improving child and maternal nutrition practices and reducing stunting in the Lake Zone regions of Tanzania.

Appendix 1: Map of project regions indicating locations of research trips



Appendix 2: Qualitative formative research question guides

IDI GUIDE FOR MOTHERS

Hello, my name is _____ and I am part of a team looking into maternal and child nutrition. I would like to hear your views on the topic of _____. The interview will take approximately 45 minutes. You are not obliged to participate, if you decide not to. Likewise, if you decide to be interviewed, you will not be compensated in any way or receive any gifts or services. Everything we discuss will be held in strict confidence. Would you like to talk with me? (If not, thank them for their time.)

Habari, mimi naitwa _____ na ni mmoja wa wana timu wanaoangalia lishe ya mama na mtoto. Ningependa kusikia mawazo yako juu ya _____ (k.m., lishe ya mtoto. Mahojiano haya yatachukua takribani dakika 45. Aidha una uhuru wa kushiriki katika zoezi hili na hakutakuwa na malipo yoyote baada ya zoezi hili. Yote tutakayozungumza hapa yatakuwa ni ya siri na hayatatolewa kwa mtu yeyote. Baada hayo tunaweza kuanza mazungumzo yetu? (Kama hapana, mshukuru kwa muda wake/kama ndiyo mueleze kwamba utakuwa unaandika mahojiano haya.)

Start by general inquiry about how mother and her family are doing, and then move on to questions about nutrition (start with mother's current nutritional phase: eg breastfeeding, complementary feeding, pregnancy)?

NUTRITION DURING PREGNANCY / LISHE YA MAMA WAKATI WA UJAUZITO

1. Tell me about your diet during your last/current pregnancy?
Niambie kuhusu utaratibu wa chakula katika ujauzito wako (wa mwisho)?
   - Probe: Did you change your diet? What changed?
   - Probe: Amount of food; types of foods
   - Probe: What was the reason (for eating less/more, for eating different foods)? Who decided this and how was this decided?

2. Do some women eat the same or more foods during pregnancy? What do you think about that? What would the benefits/disadvantages be of you eating the same or more food during pregnancy than usual?
Je, kuna wakinamama wanakula chakula sawa au zaidi wakati wa ujauzito? Unaonaje? Kuna faida/manufaa gani au kuna hasara gani ya wewe kula kiasi sawa cha chakula au zaidi wakati wa ujauzito ukilinganisha na wakati ambao hukuwa mjamzito?

3. Tell me if it is easy or difficult for you to eat the same or more amount of food during pregnancy than usual?
Niambie ni kitu/mambo gani yanakuwezesha au yanakuletea ugumu wa kula kiasi sawa cha chakula au zaidi wakati wa ujauzito ukilinganisha na wakati ambao hukuwa mjamzito?
   - Probe: Explain why it is easy or difficult?
   - Is it easy or difficult to find the food items you need? Why/why not?

5. Some children develop poorly in the womb. Others are healthy. What do you do to stay healthy during pregnancy?
Baadhi ya watoto wanakuwa vizuri tumboni, baadhi hawakuwa vizuri. Ulifanya nini ili kuhakikisha unakuwa na afya wakati wa ujauzito?
   - Probe: Why did you do this?
   - Probe: How do you know this? Did someone tell you?

- Probe: Workload during pregnancy

6. Tell me about any cultural rules or taboos that you know of for or against eating (the same or more / specific types of) food during pregnancy than usual?
Niambie kama kuna taratibu za kiutamaduni au kimila au miiko unayoifahamu yenye kuhimiza kula (kiasi sawa cha / aina ya) chakula (au zaidi) wakati wa ujauzito ukilinganisha na wakati ambao hukuwa mjamzito?
- Probe: How is this decided? Who decides this and what happens if you break the taboo?
Nani anaamua kufanya hivi na nini inaweza kutokea usipofanya hivi?

7. Tell me about the antenatal care visits you did during your (last) pregnancy?
Nieleze kuhusu huduma za afya ulizopata wakati wa ujauzito (wa mwisho)?
- Probe: start and frequency of antenatal care visits
- Probe: type of antenatal care: traditional birth attendants (wakunga wa jadi), CHW (wafanyakazi wa afya vijijini), health centre (kituo cha afya)
- Probe: reasons for timing of visits and choice of ANC (cost/transport/access); source of advice about ANC. What do women around you do?
- Probe: When (and why) do you announce your pregnancy? When do other mothers announce?

8. Were you given or did you buy any medicine during your (last) pregnancy?
Wakati wa kipindi chako cha ujauzito (wa mwisho), je ulipata au kununua vidonge?
- Probe: what type(s) of medicine / duration / dosage.
- Probe: Are there special medicines (traditional and/or modern) that pregnant women should take? Tell me what you know about this?
- Probe: whether mother knows about any iron/folic acid, deworming, and antimalaria tablets (vidonge dawa ya maji ya nyongeza ya madini chuma na/au acid ya foliki / vidonge vya kwa kuzuia malaria au kuzuia minyoo)

9. Tell me where you delivered (or will deliver) your baby?
Niambie ulijifungulia (au atajifungulia) wapi?
- Probe: Why there? Who helps you during delivery? How was it decided?
- Probe: What care did mother and baby receive after delivery?

10. During your last pregnancy did you reduce your workload compared to before the pregnancy (*if not already addressed during previous questions*)?
Wakati wa ujauzito wako (uliopita), je ulipunguza kazi ulizokuwa ukizifanya ukilinganisha na kipindi cha kabla ya ujauzito?
- Probe: How was this decided? Who decided this? What did your husband think of this? What did your mother-in-law think? Was it easy or difficult to reduce your workload?

11. During your last pregnancy did you receive any additional support from your husband?
Wakati wa ujauzito wako wa mwisho, ulipata msaada (zaidi) kutoka kwa mume wako?
- Probe: What type of support? Did you receive support from others in your family?
- Probe: What support would have been most helpful?

12. Tell me how decisions regarding what to feed your children are made in your family?
Je, niambie namna gani uamuzi kuhusu ulaji wa mtoto hufanywa kwenye familia yako?

13. Tell me about any advice you have ever received on child or maternal nutrition?
Je, niambie kuhusu ushauri wa lishe ya wazazi na/au lishe ya watoto uliopokea?

- Probe: What type of advice? If yes, who advised you? How long ago did you receive that advice? What happened: was advice followed? Why/why not? Where would you go if you needed advice?

14. Have you ever received any information on maternal and child nutrition through mass media, e.g. radio, TV, newspaper, drama/role play, internet, mobile phone?
Umewahi kupata habari kuhusu lishe ya mama na watoto kupitia vyombo vya habari kama redio, luninga, magazeti, michezo ya kuigiza, intanet, simu ya mkononi?

- Probe: What type of information?
- If yes, through what mass media did you receive that information?
- Probe: Which sources do you trust? (type of person, program)
- Probe: radio station listening (timing); channels of communication/information in the household, especially women's access

What are the things that you want most in life for your children?
Kwa maisha ya baadaye ya watoto wako, ungependa waweje?

BREASTFEEDING / KUNYONYESHA (for children upto six months)

Note: depending on child's nutritional stage, adapt breastfeeding questions to the mother's situation:

1. For mother with child older than 6 months) In the first 6 months, what did you feed your child? *Katika kipindi cha miezi sita ya mwanzo, ulikuwa unamlisha/unampa nini mtoto wako?*
(For mother with child under 6 months) What did you feed their child yesterday? *Ulikuwa ulimlisha/ulimpa chakula/kinywaji gani mtoto wako jana?*

- Probe: Any other food/drink else? *DADISI: Nini zaidi?*
- Probe: Is this what you normally give? If not, probe.
- Probe: How do you know when to breastfeed your child (depending on age of child)? What happens when you aren't able to breastfeed the child as much as you would like?
- Why did you feed your child like this? *Kwa nini ulimlisha mtoto wako chakula/vyakula hivyo?*

2. How soon after birth did you put (child's name) to the breast?
Baada ya kujifungua, ulikaa muda gani kabla ya kumweka mtoto kwenye kifua?

- Probe: How soon did he/she breastfeed? Alinyonya baada ya muda gani?

3. What do you think about "first milk"? Do you think it is good or bad for a child? What do others around you think? Why?
Unaonaje maziwa ya kwanza ya mama? Unafikiri ni mazuri au mabaya kwa mtoto? Watu wengine unaoishi nao wanaonaje? Kwa nini?

- Probe: Are there traditional medicines (*dawa za kienyeji*) newborns should be given? When? Who decides? Could you refuse this? Why/why not?

4. Some mothers give only breastmilk for the first six months of life. What do you think about that?

- Probe: Is it possible to do this? Why/why not?
- Probe: Is breast milk alone sufficient for a child's development? Why/why not?

3. What would make it easy for you to exclusively breastfeed your child for the first 6 months?
Unahisi mambo gani yatakayokuwezesha kunyonyesha mwanao maziwa ya mama pekee kwa muda wa miezi 6 ya mwanzo?

- Probe: frequency and duration of breastfeeding?

- Probe: stimulation of child, techniques

4. What makes it difficult for you to exclusively breastfeed your child for the first 6 months?
Je kuna ugumu gani katika kumnyonyesha mtoto maziwa ya mama pekee kwa miezi sita ya mwanzo?
- Probe: Does mother think she has enough breast milk? Why/why not?
- Probe: Who gave you advice on breastfeeding when you first started breastfeeding?
- Probe: What does the mother do for breastfeeding when she leaves the household? Who else looks after the child and when? What do they then feed the child when the mother is away?

5. Do most of the people that you know approve you exclusively breastfeeding your child for the first 6 months?
Je kuna watu unaowafahamu ambao wanakubaliana na utaratibu wa kumnyonyesha mtoto maziwa ya mama pekee kwa miezi sita ya mwanzo?
- Probe: Who approves? Who does not approve? Why?
- Probe: Has anyone helped you? How?

6. At what age did you start giving other food or liquids other than breast milk, e.g. water, porridge, animal milk, juice etc.?
Katika umri gani ulianza kumpa mwanao vyakula au vitu vingine mbali na maziwa yako? Mfano; maji, uji, maziwa ya wanyama, juisi n.k.
- Probe: Why did you start at that time?
- Probe: What did you start giving as food/other liquid? How many times a day? Who decided on the type of food?

7. Are there any other reasons that you know of for or against exclusive breastfeeding of children for the first 6 months?
Je, kuna sababu nyingine unayoifahamu inayokubaliana au kupingana na unyonyeshaji wa maziwa ya mama pekee kwa miezi 6 ya mwanzo?

COMPLEMENTARY FEEDING (for children older than 6 months) / KUMLISHA CHAKULA MTOTO BAADA YA MIEZI SITA

Note: to be asked of mothers with children over 6 months:
1. Tell me about how and when you breastfeed your baby yesterday?
Niambie ni jinsi gani na mara ngapi ulimnyonyesha mtoto wako jana?
- Probe: Number of times, timing.
- Probe: Are there challenges to continued breastfeeding post 6-months, up to two years?

2. We would now like to ask you about everything that (child's name) ate yesterday during the day or night (whether at home or outside the home). Think about what (child's name) ate from the time he/she woke up yesterday until he/she slept.
Tafadhali nieleze kila kitu ambacho (Jina la mtoto) alikula mchana au usiku wa jana (Ikiwa ni hapa nyumbani au nje ya nyumbani). Fikiria kuhusu nini (Jina la mtoto)alikula tangu alipoamka asubuhi hadi analala usiku wa jana. Je alikula kitu kingine chochote? Nieleze ni kipi hicho?
- Probe: "For breakfast? For lunch? For dinner? Any snacks?"
- Probe: Did he/ she eat anything else? Tell me what it was.
- Probe: Did you give them any other liquids yesterday?
- Probe: Type of foods / type of preparation

- Probe: Specific composition and preparation of porridge.
- Probe: What variation is there during an average week?

3. **Note: depending on previous answer, adapt accordingly**: Some mothers feed a child, older than 6 months, 3 or more times per day, in addition to breastfeeding. Do you think that you could feed your child 3 or more times food per day?
Baadhi ya wakinamama wanampa mtoto wa miezi sita chakula mara tatu au zaidi, pamoja na maziwa ya mama. Kwa ufahamu wako, unafikiri kwamba unaweza kumpa au kumlisha chakula mara tatu au zaidi mtoto kwa siku, ?
- Probe: Why/why not?

4. What are the advantages/disadvantages of you feeding your child 3 or more times food per day?
Kuna faida/manufaa gani au kuna hasara gani ya kumpa au kumlisha mtoto chakula mara tatu au zaidi kwa siku?

5. How can you get the resources (e.g., food, time) you need to feed your child 3 or more times food per day?
Unawezaje kupata mahitaji (muda, vyakula) ya kumlisha au kumpa chakula mtoto mara tatu au zaidi kwa siku?
- Probe: What challenges would you have?

DIETARY DIVERSITY (for children older than 6 months)

NOTE: These are lists of food types for our internal use.

Cereals, grains, roots or tubers (**ugali, bread**, pasta, biscuit, **porridge, thin porridge, foods made from sorghum, maize,** wheat, irish potato, **sweet potatoes** that are white inside, white yams, cassava rice, millet) : Nafaka na mizizi: ugali, mikate, tambi, biskuti, uji, uji mwembamba, vyakula vitokanavyo ulezi, mahindi, mtama, viazi ulaya, viazi vitamu vyenye njano ndani, viazi vitamu, magimbi, muhogo, mchele na uwele

Vitamin-A rich plant foods (**Pumpkin, carrot, squash, sweet potatoes that are orange inside, mango, papaya, ripe passion fruit, tree tomato**) : Vyakula vya Vitamini A: maboga, karoti, viazi njano, embe papai, mango, papaya, mapasheni/ makakara yaliyoiva, nyanya

Other fruits or vegetables (Tomato, onion, garlic, eggplant, cabbage, beetroot, mushroom, green pepper, fresh peas, wild vegetables, cucumber, avocado, apple, banana, guava, lemon, orange, pineapple, strawberry, watermelon, grapefruit, wild fruits): Matunda na mbogamboga nyingine: Mboga mboga: vitunguu, vitunguu saumu, biringanya, kabichi, hoho, njengere mbichi, matango, uyoga na mboga za asili. Matunda mengine: Parachichi, maepo, ndizi, mapera, limao, machungwa, mananasi, stroberi, matikiti maji, zabibu, na Matunda mengine ya asili.

Green leafy vegetables: mlenda, majani maboga, mchicha, sukumawiki, kisamvu, matembele

Meat, poultry, fish, seafood (Beef, lamb, goat, wild game, pork, chicken, other poultry such as…, organ meat, dried or fresh fish) : Nyama, Jamii ya ndege, samaki, vyakula vya baharini: Ngombe, kondoo, mbuzi, nguruwe, wanyamapori, nyama za ogani (maini,figo,firigisi), samaki wabichi au wakavu na dagaa

Eggs / Mayai

Pulses/ legumes/ nuts (beans, peas, chickpeas, lentils, soya bean, nuts, sesame, haricot beans or other foods made from these): Jamii ya kunde na mbegu: Maharagwe, kunde, choroko, soya, mbaazi, njengere, ufuta, karanga, au vyakula vilivyo kwa jamii hizo, dengu.

Milk and milk products (milk, cheese, yogurt, other milk products, infant formula): Maziwa na vyakula vinavyotokana na maziwa: Maziwa, jibini, mgando/mtindi, siagi na vyakula vingine vya maziwa na maziwa maalum ya kukuzia watoto.

1. In your family, how are decisions made regarding what to feed your children?
Kwenye familia yako, uamuzi kuhusu ulaji wa mtoto unafanyikaje?
- Probe: who decides; role of fathers

2. Are there any cultural rules or taboos that you know of for or against feeding children certain types of food?
Je, kuna taratibu za kitamaduni au kimila au miiko unayoifahamu inayokubaliana au kupingana na kuwalisha watoto aina tofauti ya chakula kila siku?
- Probe: appropriate/good foods and non-appropriate/bad foods (for children 6-9 months, 9-12 months): FREE LIST

3. Did (name) eat any (iron rich foods: give examples such as spinach, sukuma wiki) yesterday during the day or night?
Je (Jina mtoto) amekula/amelishwa (toa mfano ya chakula chochote chenye asili ya madini chuma, kama mchicha, mlenda, n.k.) wakati wa jana mchana au usiku?
- Probe whether caregiver uses micronutrient powders/sprinkles (unga/maji maalum yenye mchanganyiko wa virutubishi) or lipid-based nutrient supplements (virutubishi vya ziada vyenye asili ya mafuta). Note: identify local packaging.

4. Some mothers give their children eggs starting at about 6 months of age. What do you think about that?
Unaweza kuzungumzia kuhusu wakinamama wanawapa watoto wao mayai wakiwa na miezi sita?
- Probe: Would you be able to do this as well? Why/Why not?

5. Some mothers give their children meat, poultry, or fish starting at about 6 months of age. What do you think about that?
Unaweza kuzungumzia kuhusu wakinamama wanawapa watoto wao nyama, samaki au kuku wakiwa na miezi sita?
-Probe: Would you be able to do this as well? Why/Why not?

6. In the past 6 months, did the child receive a vitamin A dose (show capsule) and/or deworming treatment?
Ndani ya miezi sita iliyopita (Jina la mtoto) alipewa vitamin A na/au dawa ya minyoo pengine wakati wa kampeni, kwenye kituo cha tiba au kwenye mpango maalum wa lishe?
- Probe: When? Where?

7. Now I would like to ask you about the types of food that you or anyone else in your household ate yesterday during the day or night.
Sasa ningependa kuuliza aina ya chakula ambacho watu wa kaya yako walikula jana mchana na usiku.
- Probe: types of food consumed by different household members,
- Probe: difference between boys/girls, older/younger children

- Probe: variation of foods during an average week, reasons for these choices?

8. How frequently does your household eat meat, fish, poultry and/or eggs?
Je, mara ngapi (kwa wiki) mnakula nyama, samaki, kuku/bata, au/na mayai?
- Probe: for dairy products (milk, yoghurt)
- Probe: importance of these food types (for IYC) & ease/difficulty of inclusion in diet; reasons.

9. What type of salt are you using for cooking?
Unatumia aina gani ya chumvi katika mapishi?
- Probe/observe: iodized salt in the household.
- Check local shops.

WATER, SANITATION and HYGIENE

1. Where do the children play/sit usually?
Niambie ni wapi watoto huwa wanacheza/wanakaa?
- Probe & Note: on mats, on cement floor, …
+ Observe: where children are currently.

2. What are the main sources of drinking water for your household?
Kipi ni chanzo kikuu cha maji ya kunywa kwa familia yako?

3. In your household, what do you do to make your water safe to drink?
Katika nyumba yako, je huwa unafanya nini ili maji ya kunywa yawe salama kwa kunywa?
- Probe: how do they know the water is safe to drink?

4. Can you tell me about all the occasions when you or your children wash your hands?
Tafadhali, niambie ni wakati gani muhimu ambapo wewe ama watoto wako mnanawa mikono (kama hakuna jibu, jaribu kuelekeza ila usitoe jibu)
- Probe: Any other occasion? What is the reason?
- Probe: What do they use to wash their hands?
- Probe/ What makes it easy or difficult to wash hands?
- If critical hand washing times are not mentioned, ask why no hand washing at these times? (Before preparing food/before eating/after latrine use/after a child defecated/after touching waste)

5. Can you show me where members of your households most often wash their hands?
Unaweza kuniosha sehemu mnayotumia kunawa mikono mara kwa mara? Tafadhali chunguza na jibu maswali yanayofuata.
- Probe: + Observe & Note: Is there a handwashing station? Is there soap/detergent/ash (sabuni/majivu)? Is there water at the station?

6. The last time your child defecated, what was done with the stools?
Mara ya mwisho mwanao alipojisaidia, ulifanya nini na kinyesi?
- Probe: reasons, perception of safety of infants/children's stools.

7. What kind of toilet facility do members of your household usually use?
Je, familia yako wanatumia choo ya aina gani?
- Probe: Why do they use the kind of toilet they have?
+ Observe & Note: location/cleanliness of the latrine, if available.

8. Observe & Note:
- cleanliness of the yard
- presence of free-range fowl and other animals / coops, pens, etc. for animals
- type of house floors

AGRICULTURE & LIVESTOCK

1. How much land does your household use for cultivation?
Kiasi gani cha ardhi kaya yako inaweza kutumia kwa kulima na/au kwa wanyama/jamii ya ndege?
- Probe: ownership/rent?

2. What livestock does your household keep?
Wanyama gani wanaofugwa katika kaya yako?
- Probe: How is it decided which crops to plant, which animals to keep?

3. What do you do with the milk and meat obtained from these animals?
Unafanyia nini mazao/bidhaa unazozalisha kutokana kuwa na wanyama hawa?

4. What kind of poultry do you keep?
Unafuga aina ya jamii ya ndege?
- Probe: What do you do with the meat and eggs obtained from the poultry?
- Probe: Ease/difficulties of keeping poultry?

5. Did you practice fish farming or did you go fishing in a river, lake, or pond?
Ulifuga samaki wowote au ulivua samaki katika mto au bwawa?
- Probe: What do you do with the fish product?

6. What type of crops did you produce in the last cropping season?
Umezalisha zao lolote katika msimu wa kilimo uliopita?
- Probe: **seasonality**
Cereals (nafaka) / Root, tuber crop, plantain/banana: asili ya mizizi au linaloweka chakula chini ya udongo au ndizi / Green leafy vegetable: mboga za majani
Pulses and legumes: jamii ya mikunde / Oil crops: mazao ya asili ya mafuta
Spices: mazao ya viungo / Beverage or honey: mazao yanayotoa vinywaji au asali
- Probe for challenges in cultivation: e.g., seed selection/source, soil quality, irrigation, labour, …

7.What did you do with the produced crops?
Ulifanyia nini mavuno yaliyozalishwa?
- Probe: why was this done/who decided?

8. Among the crops produced, which one is most commonly consumed at your home?
Kati ya mazao yanayozalishwa ktk kaya, ni zao gani linatumika sana katika nyumba yako?

9. Within the last 12 months, are there months that your household did not have enough food for consumption?
Katika kipindi cha mwaka/ miezi kumi na miwili uliyopita, kuna miezi ambayo kaya yako haikuwa na chakula cha kutosha?
- Probe: In which months of the last year did your household not have enough food for

consumption? *Kama ndiyo, ni miezi gani kwa mwaka uliopita?*
- Probe: reason why/why not.
- How did you cope?

10. Do you have a home/kitchen garden?
Una bustani ya mboga au matunda nyumbani?
- Probe: reason why/why not.
- Probe: type of vegetables/fruits in home/kitchen garden, crop selection choice.
- Probe: Who is mainly taking care of the garden?
- Probe: What do you mainly do with the crops produced in your vegetable garden?
- Probe: decision-making process.

11. If you sell your crops from the vegetable garden, who decides what to use the income for?
Kama unauza mazao kutoka kwenye bustani ya mboga nani anaamua juu ya matumizi ya fedha zitokanzo na mauzo?

12. Where do you buy most of the fresh foods you do not produce yourself? (For example, Fresh foods = fruit, vegetables, milk, milk products, meat, fish, eggs)
Ni wapi unanunua vyakula ambavyo huzalishi/hulimi mwenyewe ? (Kwa mfano: matunda, mboga za majani, maziwa na chakula kitokanacho na maziwa, nyama, samaki, mayai)
- Probe: How often do you buy fresh foods?

13. When you work in the vegetable garden or field or you go to the market to sell/buy foods, where is your youngest child?
Unapokuwa bustanini au shambani au ukienda sokoni kuuza au kununua chakula mwanao anakuwa wapi?
- Probe: If you take your youngest child with you, do you carry food for him/her?
- Probe: If child is left at home, who is taking care of him?
- Probe: If you leave the child at home do you prepare food in advance to be given to your child while you are away?

14. Is your family involved in any food processing or preservation activities?
Je, kaya yako inafanya shughuli yoyote ya kusindika au kuhifadhi chakula?
- Probe: reason why/why not.
- Probe: type of food processing/preservation.

15. Do you store any harvest produce? Could you show me where?
Je, familia yako wanahifadhi mavuno? Unaweza kunionyesha ni wapi?
+ Observe & Note: cleanliness and location of storage (near house and where children play?).

16. In the last three months, tell me about any advice on agricultural/livestock production you have received?
Katika miezi mitatu iliyopita, niambie kuhusu ushauri wowote uliopokea kuhusu uzalishaji katika kilimo na ufugaji.
- Probe: source/content of advice.
- Probe: what type of agricultural/livestock advice would they like to receive?

17. Are there any organized farmer groups in this village?
Je kuna vikundi vyovyote vya uzalishaji vya wakulima katika hiki kijiji?
- Probe: What do they do? How are they organized? Is there any farmer who volunteers to

assist other farmers to improve their farming skills in this village?
- Follow-up with farmer interview if present.

EARLY CHILDHOOD DEVELOPMENT

Note: The following are potential questions. This new domain of inquiry needs to be piloted. These questions can also be integrated into other sections, e.g. during breastfeeding or complementary feeding, probe what type of interaction there is between caregiver and child. This theme will also be treated during observation.

1. When you feed your child, what do you do to encourage your child to eat?
Ukiwa unamlisha mtoto wako, unafanya nini kumpa motisha ya kula?
- Probe: Do they interact with the child? If so, how: smile, talk, respond to child gestures, encourage feeding?

2. How many children's books or picture books do you have for (name)?
Una vitabu vingapi vya watoto au vya picha kwa ajili ya (jina)

3. I am interested in learning about the things that (name) plays with when he/she is at home.
Ningependa kujua ni vitu gani (jina) huchezea akiwa nyumbani.
- Probe: Does he/she play with:
- Homemade toys (such as dolls, cars, or other toys made at home)? *(vidude vya kutengeneza nyumbani (mwanasesere, magari na vinginevyo vya kutengeneza nyumbani)*
- Toys from a shop or manufactured toys? *Vidude vya kuchezea vya dukani*
- Household objects (such as bowls or pots) or objects found outside (such as sticks, rocks, animal shells or leaves)? *Vifaa vya ndani ya nyumba (kama bakuli, vyungu) au vile vinavyopatikana nje ya nyumba (kama vijiti, mawe, makombe ya wanyama au majani)*

4. In the past 7 days, did you or any household member age 15 or over engage in any of the following activities with (child's name): Probe: who?
Katika siku saba zilizopita, je wewe au mtu yoyote katika familia mwenye zaidi ya miaka 15 amefanya yafuatayo na (jina)?
- Read books to or looked at picture books with (name)?
Kusoma vitabu au kuangalia picha na (jina)
- Told stories to (name)? Probe: type of stories
Alimsimulia hadithi (jina)
- Sang songs to (name) or with (name), including lullabies?
Alimuimbia au aliimba na (jina), pamoja na nyimbo za kubembeleza
- Took (name) outside the home, compound, yard or enclosure?
Alimpeleka (jina) nje ya nyumba?
- Played with (name)? Probe: type of games
Alicheza na (jina)
- Named, counted, or drew things to or with (name)?
Alitaja majina ya vitu, kuhesabu, kuchora vitu na (jina)
- Probe: If (not) done, why (not)? Who advised caregiver to do so?

5. Do people in your community consider it important to do these things??
J*e, watu katika jamii yako wanafikiri ni muhimu kufanya mambo haya na mtoto?*
- Probe: Why is (not) important? Does the age of the child play a role? Whose responsibility would it be to do these things?

6. Are there specific things a mother or father could or should do to be sure a baby learns and develops ?
Kuna mambo gani maalum wazazi hufanya kuhakikisha mtoto anajifunza na anakuwa vizuri kwa wakati?

- Probe: explore the reasons for the caregiver's response.

7. Where does the baby spend most of her time while at home? What do you do with her/him? What does she/he do?
Mara nyingi mtoto huwa anakuwa wapi anapokuwa nyumbani? Huwa unafanyia nini na yeye? Mtoto anafanya nini?

- Probe for opportunities for play in the house.
- Observation: Depending on the child's age, observe caregiver-infant (and/or sibling-infant and household-infant) interactions and the language environment of the infant.

8. Does (name) attend any organized learning or early childhood education programme, such as a private or government facility, including kindergarten or community child care?
Je, (Jina) anahudhuria masomo yoyote ya watoto wadogo kama chekechea na shule za jamii yanayoandaliwa na watu binafsi au serikali?

STUNTING

1. Do you know the term 'stunting'?
Umeshasikia kuhusu udumavu wa watoto?

2. Can you tell me what it means to you in your own words?
Unaweza kuniambia kwa maneno yako inamaanisha nini?

- Probe: Suspected causes.
- Probe: What do people call children who do not grow as well as they should : or who stay short? Why do they call them such?

3. How would one know if a child is stunted / does not grow well?
Je, ni kwa namna gani mzazi/mlezi na mtu mwengine yeyote anaweza kujua kama mtoto ana udumavu?

4. What can one do to prevent stunting?
Kuna njia ipi mzazi/mlezi na mtu yeyote anaweza kuitumia kuzuia mtoto kudumaa?

5. What can one do when a child is stunted?
Je, mzazi/mlezi na mtu yeyote anaweza kufanya nini kama mtoto ameshadumaa?

- Probe: treatments (traditional or modern)

DEMOGRAPHICS

How old are you? Una umri gani?

How many children do you have? How many children are younger than five? What is the age of your youngest child? Other members of the household? Una watoto wangapi? Watoto ngapi wana umri chini ya miaka mitano? Mtoto mdogo ana umrii gani na jina lake ni nani?

What is your education status? Umesoma mpaka darasa la ngapi?

What is your occupation? Unafanya kazi gani?

What is your marital status? Hali ya ndoa yako?

Does your household own a radio, TV and/or mobile phone? Nyumbani inamiliki redio ama tv au simu?

FGD GUIDE FOR FATHERS

Hello, my name is _____ and I am part of a team looking into maternal and child nutrition. I would like to hear your views on the topic of _____. The interview will take approximately 45 minutes. You are not obliged to participate, if you decide not to. Likewise, if you decide to be interviewed, you will not be compensated in any way or receive any gifts or services. Everything we discuss will be held in strict confidence. Would you like to talk with me? (If not, thank them for their time.)

Start by general inquiry about how mother and her family are doing, and then move on to questions about nutrition.

NUTRITION DURING PREGNANCY / LISHE YA MAMA WAKATI WA UJAUZITO

1. Tell me about women's diet during pregnancy
Niambieni kuhusu utaratibu wa chakula wa wanawake wanapo kua wajawazito
    - Probe: Do they change their diet? What changed?
    - Probe: Amount of food; types of foods
    - Probe: What is the reason (for eating less/more, for eating different foods)? Who decided this and how was this decided?

2. Do some women eat the same or more foods during pregnancy? What do you think about that? What would the benefits/disadvantages of women eating the same or more food during pregnancy than usual?
Je, kuna wakinamama wanakula chakula sawa au zaidi wakati wa ujauzito? mnaonaje? Kuna faida/manufaa gani au kuna hasara gani kwa wanawake kula kiasi sawa cha chakula au zaidi wakati wa ujauzito ukilinganisha na wakati ambao hukuwa mjamzito?

3. Tell me if it is easy or difficult for women to eat the same or more amount of food during pregnancy than usual?
Ni kitu/mambo gani yanawawezesha au yanawaletea ugumu wa kula kiasi sawa cha chakula au zaidi wakati wa ujauzito ukilinganisha na wakati ambao si wjawazito?
    - Probe: Explain why it is easy or difficult?
    - Is it easy or difficult to find the food items they need? Why/why not?

4. Some children develop poorly in the womb. Others are healthy. What do women in this community do to stay healthy during pregnancy?
Baadhi ya watoto wanakui vizuri tumboni, baadhi wanakuawa vizuri. Wanawake katika jamii hii hufanya nini ili kuhakikisha wanakuwa na afya wakati wa ujauzito?
    - Probe: Why do they do this?
    - Probe: How do they know this?
    - Probe: Workload during pregnancy

5. Tell me about any cultural rules or taboos that you know of for or against eating (the same or more / specific types of) food during pregnancy than usual?
Niambieni kama kuna taratibu za kiutamaduni au kimila au miiko mnayoifahamu yenye kuhimiza kula (kiasi sawa cha / aina ya) chakula (au zaidi) wakati wa ujauzito ukilinganisha na wakati ambao hukuwa mjamzito?

    - Probe: How is this decided? Who decides this and what happens if you break the taboo?
    Nani anaamua kufanya hivi na nini inaweza kutokea usipofanya hivi?

6. Tell me about the antenatal care visits women in this community do when they are pregnant.
Nielezeni kuhusu huduma za afya wanazo pata wanawake wanapo kuwa wajawazito?

- Probe: start and frequency of antenatal care visits: wanaanza lini, wanaenda mara ngapi
- Probe: type of antenatal care: traditional birth attendants (wakunga wa jadi), CHW (wafanyakazi wa afya vijijini), health centre (kituo cha afya)
- Probe: reasons for timing of visits and choice of ANC (cost/transport/access); source of advice about ANC. What do women around you do?
- Probe: When (and why) do you announce your pregnancy? When do other mothers announce?

7. Are there special medicines (traditional and/or modern) that pregnant women should take?

- Probe: whether they know about any iron/folic acid, deworming, and antimalaria tablets (vidonge dawa ya maji ya nyongeza ya madini chuma na/au acid ya foliki / vidonge vya kwa kuzuia malaria au kuzuia minyoo)

8. Where do women go for delivery in this community?
Katika jamii hii wanawake hujifungulia wapi?

- Probe: Why there?

9. Do women in this community reduce workload compared to before the pregnancy?
Je wanawake katika jamii hii hupunguza kufany kazi wakati wa ujauzito ukilinganisha na kipindi cha kabla ya ujauzito?

- Probe: Who decided this? Is it easy or difficult to reduce your workload?

10. How are decisions regarding what to feed children made in the families?
Ni namna gani uamuzi kuhusu ulaji wa mtoto hufanywa kwenye familia?

11. Where do women receive advice on child or maternal nutrition?
Je, wamawale jupata wapi ushauri juu ya lishe ya wazazi na/au lishe ya watoto?

- Probe: What type of information? Is the information helpful?
- If yes, through what mass media did you receive that information?
- Probe: Which sources do you trust? (type of person, program)
- Probe: radio station (timing); channels of communication/information in the household (vifaa gani vya kupokea mawasiliano na taarifa)

What are the things that you want most in life for your children?
Kwa maisha ya baadaye ya watoto wako, ungependa waweje?

BREASTFEEDING / KUNYONYESHA (for children up to 6 months)

Note: depending on child's nutritional stage, adapt breastfeeding questions to the mother's situation:

1. What do women feed their children in the first 6 months?
Katika kipindi cha miezi sita ya mwanzo, wanawake huwalisha nini watoto wao?

- Probe: Any other food/drink else? *DADISI: Nini zaidi?*
- Probe: What happens when a woman is not able to breastfeed her child as much as she would like?

2. What do people in this community think about the first milk?

Watu katika jamii hii wanafikiri nini kuhusu maziwa ya kwanza?

- Probe: Are there traditional medicines (*dawa za kienyeji*) newborns should be given? When? Who decides? Could you refuse this? Why/why not?

3. Some mothers give only breastmilk for the first six months of life. What do you think about that?
Baadhi ya wakina mama wanawapa watoto wao maziwa ya mama pekee kwa miezi sita, mnamaoni gani kuhusiana na hili?

- Probe: Is breastmilk alone sufficient for a child's development?

4. What would make it easy for a woman to exclusively breastfeed her child for the first 6 months?
Unahisi mambo gani yanayomuwezesha wanamke kunyonyesha mtoto wake maziwa ya mama pekee kwa muda wa miezi 6 ya mwanzo?

5. What makes it difficult for a woman to exclusively breastfeed her child for the first 6 months?
Je kuna ugumu gani katika kumnyonyesha mtoto maziwa ya mama pekee kwa miezi sita ya mwanzo?

- Probe: What does the mother do for breastfeeding when she leaves the household? Who else looks after the child and when? What do they then feed the child when the mother is away?

6. Do most of the people in the community approve exclusively breastfeeding children for the first 6 months?
Je kuna watu wengine katika jamii wanakubaliana na utaratibu wa kumnyonyesha mtoto maziwa ya mama pekee kwa miezi sita ya mwanzo?

- Probe: Who approves? Who does not approve? Why?

7. At what age do women start giving their children other food or liquids other than breast milk, e.g. water, porridge, animal milk, juice etc.?
Katika umri gani wakina mama wanaanza kuwapa watoto wao vyakula au vitu vingine mbali na maziwa yako? Mfano; maji, uji, maziwa ya wanyama, juisi n.k.

- Probe: Why do they start at that time?
- Probe: What do they start giving as food/other liquid? How many times a day? Who decided on the type of food?

8. Are there any other reasons that you know of for or against exclusive breastfeeding of children for the first 6 months?
Je, kuna sababu nyingine mnazo zifahamu inayokubaliana au kupingana na unyonyeshaji wa maziwa ya mama pekee kwa miezi 6 ya mwanzo?

COMPLEMENTARY FEEDING (for children older than 6 months) / KUMLISHA CHAKULA MTOTO BAADA YA MIEZI SITA

1. Some mothers feed a child, older than 6 months, 3 or more times per day, in addition to breastfeeding. What do you think about this?
Baadhi ya wakinamama wanampa mtoto wa miezi sita chakula mara tatu au zaidi, pamoja na maziwa ya mama. Mnafikiri nini kuhusiana na hilo?

- Probe: Why/why not?

2. What are the advantages/disadvantages of mothers feeding their children 3 or more times food per day?

Kuna faida/manufaa gani au kuna hasara gani ya kumpa au kumlisha mtoto chakula mara tatu au zaidi kwa siku?

How do mother get resources (food, time) they need to feed their children 3 or more times per day?

Kuna ugumu gani kupata mahitaji (mfano chakula au muda ya kumlisha au kumpa chakula mtoto mara tatu au Zaidi kwa siku?

-

DIETARY DIVERSITY (for children older than 6 months)

1. In this community, how are decisions made regarding what to feed your children?
Kwenye jamii hii, uamuzi kuhusu ulaji wa mtoto unafanyikaje?

- Probe: who decides; role of fathers
Nani anaamua, majukumu ya baba

2. Are there any cultural rules or taboos that you know of for or against feeding children certain types of food?
Je, kuna taratibu za kitamaduni au kimila au miiko mnayoifahamu inayokubaliana au kupingana na kuwalisha watoto aina ya chakula kila siku?

- Probe: What kinds of foods are good/appropriate to be given to children 6-12 months? Why these foods? Any difference according to age of child (6-9 months vs 9-12 months)
- Probe: What kinds of foods are not good/appropriate for children 6-12 months? Why not?

3. Do children in this community eat (iron rich foods: give examples such as spinach, sukuma wiki) ?
Je watoto katika jamii hii wanakula chakula chochote chenye asili ya madini chuma, kama mchicha, mlenda, n.k.) ?

- Probe whether caregiver uses micronutrient powders/sprinkles (unga/maji maalum yenye mchanganyiko wa virutubishi) or lipid-based nutrient supplements (virutubishi vya ziada vyenye asili ya mafuta). Note: identify local packaging.

4. Some mothers give their children eggs starting at about 6 months of age. What do you think about that?
Baadhi ya wakinamama wanawapa watoto wao mayai wakiwa na miezi sita? Mnazungumziaje hili

5. Some mothers give their children meat, poultry, or fish starting at about 6 months of age. What do you think about that?
Baadhi ya wakinamama wanawapa watoto wao nyama, samaki au kuku wakiwa na miezi sita? Mnazungumziaje hili

-Probe: Would you be able to do this as well? Why/Why not?

6. In this community do children receive a vitamin A dose (show capsule) and/or deworming treatment?
Katika jamii hii watoto hupewa vitamin A na/au dawa ya minyoo pengine wakati wa kampeni, kwenye kituo cha tiba au kwenye mpango maalum wa lishe?

- Probe: When? Where?

WATER, SANITATION and HYGIENE

1. What are the main sources of drinking water in this community?
Kipi ni chanzo kikuu cha maji ya kunywa katika jamii hii?

2. In this community, what do people do to make water safe to drink?
Katika jamii hii, je watu huwa wanafanya nini ili maji ya kunywa yawe salama kwa kunywa?
- Probe: how do they know the water is safe to drink?

3. Can you tell me about all the occasions when people should wash their hands?
Tafadhali, niambieni ni wakati gani muhimu ambapo watu ama watoto wanatakiwa kunawa mikono (kama hakuna jibu, jaribu kuelekeza ila usitoe jibu)
- Probe: What do they use to wash their hands?
- Probe/ What makes it easy or difficult to wash hands?
- If critical hand washing times are not mentioned, ask why no hand washing at these times? (Before preparing food/before eating/after latrine use/after a child defecated/after touching waste)

4. When children defecate, what do people do with the stools?
Mtoto anapo jisaidia watu hufanya nini na kinyesi?
- Probe: reasons, perception of safety of infants/children's stools.

5. What kind of toilet facility do people in this community usually use?
Je, watu wengi katika jamii hii wanatumia vyoo vya aina gani?
- Probe: Why do they use the kind of toilet they have?

AGRICULTURE & LIVESTOCK

1. What livestock do people in this community keep?
Watu katika jamii hii wanafuga wanyama wa aina gani?
- Probe: How is it decided which crops to plant, which animals to keep?

2. What do people do with the milk and meat obtained from these animals?
Unafanyia nini mazao/bidhaa unazozalisha kutokana kuwa na wanyama hawa?

3. What kind of poultry do people keep?
Watu wanafuga aina gani ya jamii ya ndege?
- Probe: What do people do with the meat and eggs obtained from the poultry?
- Probe: Ease/difficulties of keeping poultry?

4. Do some people in this community practice fish farming or go fishing in a river, lake, or pond?
Je watu katika jamii hii wanafuga samaki wowote au wanaivua samaki katika mito au mabwawa?
- Probe: What do people do with the fish product?

5. What type of crops did people in this community produce in the last cropping season?
Ni mazao gani watu katika jamii hii walipata katika msimu wa kilimo uliopita?
- Probe: **seasonality**
Cereals (nafaka) / Root, tuber crop, plantain/banana: asili ya mizizi au linaloweka chakula chini ya udongo au ndizi / Green leafy vegetable: mboga za majani
Pulses and legumes: jamii ya mikunde / Oil crops: mazao ya asili ya mafuta
Spices: mazao ya viungo / Beverage or honey: mazao yanayotoa vinywaji au asali
- Probe for challenges in cultivation: e.g., seed selection/source, soil quality, irrigation, labour, …

6.What do people do with the produced crops?
Watu hufanyia nini mavuno yaliyozalishwa?
- Probe: why was this done/who decided?

7. Among the crops produced, which one is most commonly consumed at your home?
Kati ya mazao yanayozalishwa ktk kaya, ni zao gani linatumika sana katika nyumba yako?

8. Within the last 12 months, are there months that people in this community did not have enough food for consumption?
Katika kipindi cha mwaka/ miezi kumi na miwili uliyopita, kuna miezi ambayo watu katika jamii hii hawakuwa na chakula cha kutosha?

- Probe: In which months of the last year did not have enough food for consumption?
- Probe: reason why/why not. s
- How did you cope?

9. Do people in this community have home/kitchen garden?
Je watu katika jamii hii wana bustani za mboga au matunda nyumbani?

- Probe: reason why/why not.
- Probe: type of vegetables/fruits in home/kitchen garden, crop selection choice.
- Probe: Who is mainly taking care of the garden?
- Probe: What do you mainly do with the crops produced in your vegetable garden?
- Probe: decision-making process.

10. If someone sells crops from the vegetable garden, who decides what to use the income for?
Kama mtu akiuza mazao kutoka kwenye bustani ya mboga nani anaamua juu ya matumizi ya fedha zitokanzo na mauzo?

11. Where do people in this community buy most of the fresh foods they do not produce? (For example, Fresh foods = fruit, vegetables, milk, milk products, meat, fish, eggs)
Ni wapi watu hununua vyakula ambavyo hawazalishi/hawalimi mwenyewe ? (Kwa mfano: matunda, mboga za majani, maziwa na chakula kitokanacho na maziwa, nyama, samaki, mayai)

12. When parents are working in the vegetable garden or field or you go to the market to sell/buy foods, where do they leave their youngest child?
Wazazi wanapo kuwa au shambani au ukienda sokoni kuuza au kununua chakula huwa wanaacha wapi watoto wadogo?

- Probe: If you take your youngest child with them, do they carry food for him/her?
- Probe: If child is left at home, who is taking care of him?
- Probe: If they leave the child at home do they prepare food in advance to be given to your child while you are away?

13. Do farmers in this village receive any advice on agricultural/livestock production?
Katika miezi mitatu iliyopita, niambie kuhusu ushauri wowote uliopokea kuhusu uzalishaji katika kilimo na ufugaji.

- Probe: source/content of advice. Wanapata kutoka wapi?
- Probe: what type of agricultural/livestock advice would they like to receive? Ni aina gani ya ushauri kuhusu kilimo/ufugani wanaopata

14 Are there any organized farmer groups in this village?
Je kuna vikundi vyovyote vya uzalishaji vya wakulima katika hiki kijiji?

- Probe: What do they do? How are they organized? Is there any farmer who volunteers to assist other farmers to improve their farming skills in this village?
- Follow-up with farmer interview if present.

EARLY CHILDHOOD DEVELOPMENT

Note: The following are potential questions. This new domain of inquiry needs to be piloted. These questions can also be integrated into other sections, e.g. during breastfeeding or complementary feeding, probe what type of interaction there is between caregiver and child. This theme will also be treated during observation.

1. Do families own children's books or picture books for their children?
Je kuna familia zingine zinamiliki vitabu vya watoto au vya picha kwa ajili ya watoto wao
    - Probe: why do some have and others do not have

2. I am interested in learning about the things that children plays with when they are at home.
Ningependa kujua ni vitu gani watoto huchezea akiwa nyumbani.
    - Probe: Do they play with:
    - Homemade toys (such as dolls, cars, or other toys made at home)? *(vidude vya kutengeneza nyumbani (mwanasesere, magari na vinginevyo vya kutengeneza nyumbani)*
    - Toys from a shop or manufactured toys? *Vidude vya kuchezea vya dukani*
    - Household objects (such as bowls or pots) or objects found outside (such as sticks, rocks, animal shells or leaves)?

3. Do people in your community consider it important to do the following things??
J*e, watu katika jamii yako wanafikiri ni muhimu kufanya mambo yafuatayo na mtoto?*
    - Probe: Why is (not) important? Does the age of the child play a role? Whose responsibility would it be to do these things?
    - Read books to or looked at picture books with (name)?
    Kusoma vitabu au kuangalia picha na (jina)
    - Told stories to (name)? Probe: type of stories
    Alimsimulia hadithi (jina)
    - Sang songs to (name) or with (name), including lullabies?
    Alimuimbia au aliimba na (jina), pamoja na nyimbo za kubembeleza
    - Took (name) outside the home, compound, yard or enclosure?
    Alimpeleka (jina) nje ya nyumba?
    - Played with (name)? Probe: type of games
    Alicheza na (jina)
    - Named, counted, or drew things to or with (name)?
    Alitaja majina ya vitu, kuhesabu, kuchora vitu na (jina)
    - Probe: If (not) done, why (not)? Who advised caregiver to do so?

4. Are there specific things a mother or father could or should do to be sure a baby learns and develops ?
Kuna mambo gani maalum wazazi hufanya kuhakikisha mtoto anajifunza na anakuwa vizuri kwa wakati?
    - Probe: explore the reasons for the caregiver's response.

5. Where do children spend most of her time while at home? What do parents do with them?
Mara nyingi watoto huwa anakuwa wapi anapokuwa nyumbani? Wazazi hufanya nini na watoto?
    - Probe for opportunities for play in the house.
    - Observation: Depending on the child's age, observe caregiver-infant (and/or sibling-infant and household-infant) interactions and the language environment of the infant.

6. Do children in this village attend any organized learning or early childhood education programme, such as a private or government facility, including kindergarten or community child care?
Je, katika kijiji hiki watoto wanahudhuria masomo yoyote ya watoto wadogo kama chekechea na shule za jamii yanayoandaliwa na watu binafsi au serikali?

STUNTING

1.Have you heard about 'stunting'?
Mmeshawahi kusikia kuhusu udumavu wa watoto?

2. Can you tell me what it means to you in your own words?
Mnaweza kuniambia kwa maneno yenu inamaanisha nini?

- Probe: Suspected causes.
- Probe: What do people call children who do not grow as well as they should : or who stay short? Why do they call them such?

3. How would one know if a child is stunted / does not grow well?
Je, ni kwa namna gani mzazi/mlezi na mtu mwengine yeyote anaweza kujua kama mtoto ana udumavu?

4. What can one do to prevent stunting?
Kuna njia ipi mzazi/mlezi na mtu yeyote anaweza kuitumia kuzuia mtoto kudumaa?

5. What can one do when a child is stunted?
Je, mzazi/mlezi na mtu yeyote anaweza kufanya nini kama mtoto ameshadumaa?

- Probe: treatments (traditional or modern)

Observation Guide

Theme/topic	What to observe
Household status	▪ Type of house ▪ Kitchen- food storage place or containers
Nutrition - Breastfeeding - Complementary feeding	▪ Observe for interactions while a mother is breastfeeding- ▪ Peoples' reaction (FGD) on the topic of breastfeeding and especially exclusive breast feeding ▪ Any children above 6 months being fed when you are around? What foods, preparations, who is helping a child to eat? ▪ What the family is eating or preparing to eat while you are around?
Water, sanitation and hygiene	▪ Presence of hand washing facility with water and soap and evidence of use ▪ Cleanliness of the compound ▪ Cleanliness of the toilet and if it is an improved latrine ▪ Observe if members of the household wash their hands on critical moments of hand washing
Early Childhood Development	▪ People's reactions on ECD discussion ▪ Children's play area: cleanliness/safety; what type of games do they play; do they play with parents/caregivers? ▪ Observe interactions between child and caregiver/siblings and households interactions ▪ Language interactions with infants/young children ▪ Who is mostly playing with the child (male or female caregivers)?
Agriculture & livestock	▪ Distance of the home garden from the house ▪ Available foods in the household and storage ▪ Costs of food at the market in the area ▪ Where do people get meat? ▪ Presence of livestock/poultry in the compound and community: coop/roaming ▪ Presence of vegetable/and fruits home garden ▪ Types of vegetables, fruits and other foods grown in households gardens/near house plots
Health facility	▪ Cleanliness of the toilets ▪ Presence of hand washing facilities ▪ Presence of pregnant mothers and mothers with U5s on clinic day/days-and if men are accompanying them or not ▪ Presence of messages/posters on maternal and child care and nutrition
Media habits	▪ What radio and program is being listened to at the moment, who is listening and timing? ▪ Mobile phones use, available local cinema halls ▪ Any nutrition posters in the area

NOTE: Wherever possible, and after permission is granted, also do visual documentation.

Appendix 3: Informed consent form

CONSENT FORM TO PARTICIPATE IN QUALITATIVE RESEARCH ON MATERNAL AND CHILD NUTRITION

(One copy for ASTUTE/DMI Staff – One copy for participant)

Surname and Name of participant : _____
Village : _____
Date : __ __ / __ __ / __ __ __ __

This form informs you about the research and its objectives.
When this information has been explained to you, you can decide to participate or not in the research. If you agree to answer our questions, we will ask your signature (or thumbprint) and you will receive a copy of this form.

Research Description
This research on maternal and child nutrition is being carried out by ASTUTE/DMI staff. Many women and men in villages in the Lake Zone are being asked questions like these. These people have been chosen randomly. Your village was chosen randomly among a list of villages in the district. This research will help to develop a radio and community campaign on maternal and child nutrition. The information we collect is important so that we know how to improve health and nutrition programs that benefit people like you.

Confidentiality
All your answers will remain confidential: this means that they will not be communicated to any person outside the research team, and your surname/name will not appear in any report.

Consent

I understand the information in this form, which has been read and explained to me. I was able to ask questions about this information and I received satisfactory answers to my questions.

I agree to participate in this research and I received a copy of this consent form. My participation in this research is completely voluntary and no financial compensation will be paid for my participation.

Name and signature (or thumbprint) of the participant :
Name and signature of the ASTUTE/DMI staff person :

Contact Information for ASTUTE/DMI :

Contact person:

Address:

Phone:

Supplemental Tables: Summary Findings from DMI Formative Research and Application to Programs

1. Adolescent nutrition

Optimal behaviors: 1) Nutritious diets that include animal source foods, and 2) Appropriate and timely care seeking for antenatal care

Current practice	Facilitators and barriers to changing the practice	What target audiences need:	What ASTUTE will do to help change the practice
Diets - Adolescent girls' diets are not diverse. In particular, they lack animal source foods (ASFs) ANC - Adolescent girls do not seek antenatal care (ANC) or seek it late	Facilitators - Few food taboos to keep adolescents from consuming ASFs Barriers - Poverty and other factors keep adolescents from consuming ASFs, green, leafy vegetables, etc. - Adolescent girls lack clear information on pregnancy - Adolescent girls are often expected to care for younger siblings and lack time - Because of unfavorable social norms, parents talk to girls only when pregnancy is revealed - Fear of disclosing pregnancy stops adolescent girls from obtaining early ANC - Generally, adolescent girls do not receive moral and other support from fathers of the unborn child nor their own parents	Adolescent girls need: - Support from parents and health facility workers to make informed decisions about diet, pregnancy, delivery, and post-partum care Community health workers need: - Ideas about nutritious foods adolescents can consume - Training to be able to negotiate for behavior change (a specific methodology which helps CHWs understand individual mothers' constraints to practicing ideal behaviors, present options for improving behaviors that mothers can try, and support mothers in their choice of behaviors they intend to practice Community members need: - Capacity building to identify how some resource-poor families are able to 1) provide nutritious foods to adolescent girls 2) reduce their workload—especially caring for younger siblings, and 3) involve the	Design and conduct positive deviance/hearth (PD) programs to identify how some resource-poor families are able to provide nutritious foods to adolescent girls and reduce their workload Work with existing men's and women's groups (e.g., unions, credit associations, self-help groups), to ensure that adolescent girls' nutrition and health needs are discussed Equip CHWs with the behavior change skills needed so that during support groups and home visits they can negotiate behavior change with adolescents and their mothers Train health facility workers to counsel pregnant adolescents about nutrition, workload, and health, including IFAs

Current practice	Facilitators and barriers to changing the practice	What target audiences need:	What ASTUTE will do to help change the practice
		partners of adolescent girls in caregiving Health facility workers need: - Training to more effectively counsel pregnant adolescents about nutrition, workload, iron folic acid (IFA), etc.	

2. <u>Nutrition and health care during pregnancy</u>

Optimal behaviors: 1) Appropriate nutritional intake 2) Reduced workload during pregnancy, and 3) antenatal and post delivery care-seeking

Current practice	Facilitators and barriers to changing the practice	What target audiences need:	What ASTUTE will do to help change the practice
Diet - Women eat the same amount and type of food during pregnancy as they do before pregnancy - Foods consumed include maize, sweet potatoes, groundnuts, rice, cassava, beans, chickpeas and *dagaa*. Green leafy vegetables are also eaten. But, aside from mangos, fruits are rarely eaten - Pregnant women eat three times a day Workload - Women continue to be primary laborers and work throughout pregnancy	Facilitators - Some women eat nutritious foods during pregnancy and breastfeeding - There are few food taboos related to ASFs - Many pregnant women get information from a variety of sources including health facility workers during ANC; CHWs during group counseling and home visits; mothers, and mothers-in-law; and radio - Some husbands support women during pregnancy (but mostly in the last trimester) through reduced time spent on farming and fetching water, etc. Barriers - Few financial resources to buy foods such as meat, chicken, eggs, larger fish, and fruits - Lack of knowledge regarding nutritious foods, even when easily available and at low cost - Families fear that eating more food causes complications during pregnancy and delivery	Pregnant/breastfeeding women need: - Support (favorable social norms; access to information) from spouses, community members, and health facility workers to improve their diets, reduce their workload, and seek ANC early - Ideas for improving crop varieties - Rest during pregnancy and breastfeeding - Information about when to seek ANC - Reduction of stigma attached to "admitting" one is pregnant - Testimonials from women who overcame concerns about IFAs Men need: - Reminders about accompanying their wives to ANC visits along with statements about the benefits of accompanying them - Testimonials from fathers who accompany their wives and how they overcome their fear of being tested for HIV - Small, doable actions they can perform to support their wives so as to reduce workload	In existing men's and women's groups, support groups, and home visits, provide ideas about crops families can raise and nutritious foods women can eat. Can be done through Mwanzo Bora's media kit, playing cards depicting crops, seasonal planting calendars, etc. Reinforce positive behaviors through SMS and other forms of mHealth Train on maternal nutrition and improving counselling skills (e.g. through negotiating for behavior change and action cards in clinics, home visits, and group counselling) Discourage current messages from health workers who advise primiparous mothers and those who have more than four children to go to hospitals for delivery Counselling and action cards on the importance of eating more foods, and diverse, healthy foods

Current practice	Facilitators and barriers to changing the practice	What target audiences need:	What ASTUTE will do to help change the practice
(farming, fetching water, cooking, etc.) Care seeking - Women do not normally receive ANC in the first trimester - Most women deliver their babies at health facilities	- Incomplete counselling during ANC (ad-hoc when problems occur; not routine) - No clear recall of media-based nutrition messages - Work during pregnancy is considered protective; reduction of workload is "potentially dangerous" - Most women do not know the best time to start ANC. Many arrive only when 4-6 months pregnant - If baby is moving inside the womb, women might not go for all ANC visits - Husbands refuse to accompany wives due to HIV testing delays - Pregnancy supplements "add problems, not resolve them" (e.g., bad smell induces vomiting) - Poor women fear high costs of delivery	Mothers and mothers-in-law need: - Ideas about how to provide inexpensive, nutritious foods - Real life examples of PD mothers, mothers-in-law, and husbands who have offered women improved diets, reductions in workload, and prompter ANC - Reinforcement from others (e.g., CHWs, health facility workers) to encourage them to accompany women to health facilities Health facility workers need: - Encouragement to continue providing support to mothers during pregnancy, delivery, and post-partum - Training, including use of job aids and checklists to ensure that counseling is thorough CHWs need: - Training on interpersonal counseling and negotiating for behavior change ("negotiation") - Mobile phones to refer women with difficult labor and delivery to appropriate health facilities	Encourage ASFs that are readily available and cheaper than meat such as eggs, milk, and fish SMS messages to fathers reinforcing the benefits of accompanying their wives to ANC Messages about seeking ANC as soon as women know they are pregnant, not just when they are sick or when they feel the baby move inside the womb

3. <u>Breastfeeding</u>

Optimal behaviors: 1) Initiate breastfeeding immediately after birth or in the first hour of life and 2) avoid giving the newborn anything except breastmilk

Current practice	Facilitators and barriers to changing the practice	What target audiences need:	What ASTUTE will do to help change the practice
Colostrum - Most women give their babies colostrum after being advised by health workers rather than mothers and mothers-in-law who advise otherwise Exclusive breastfeeding (EBF) - Most women are aware of the importance of EBF but don't breastfeed exclusively for six months - Women who claim to EBF still give water to their children at 3-4 months (water not considered "supplementary" food) - Breasts that become light have no milk - Complementary foods introduced at 3-4	- Mothers and mothers-in-law perceive the first milk to be dirty - Mothers feel they cannot produce enough milk - Women resume work outside the house (under pressure from husbands) which interrupts EBF (infrequent feeding and insufficient time for correct breastfeeding) - Incomplete or incorrect advice from health workers	Mothers need: - Support to overcome the belief that they do not have enough milk - Ideas from other mothers about how to manage multiple demands on their time including work outside the household - Confidence in how to recognize when a baby is hungry; confidence in knowing when a baby is ready for foods in addition to breastmilk Husbands and mothers-in-law need: - Recognition of their roles in helping children be well-nourished and smart - Confirmation that mothers can produce enough milk; ideas about how to encourage mothers to breastfeed on demand; ideas about actions they can take to 1) reduce mothers' workloads, and 2) make sure mothers get enough rest and eat nutritious foods Health facility workers and CHWs	Training of health facility workers and CHWs on infant and young child feeding (IYCF) and improving counselling skills (through negotiation and action cards in clinics, home visits, and group counselling) Training in positive deviance inquiries (PDIs) and hearth sessions Coaching in how to conduct home visits such that mothers-in-law are the first point of contact Training in facilitating support groups at health facilities Mapping of existing men's and women's groups so that topics such as breastfeeding can be incorporated into meetings Training on how extenders can be used within existing women's groups to achieve larger scale Using negotiation and action cards in group counselling and home visits to improve health practices

Current practice	Facilitators and barriers to changing the practice	What target audiences need:	What ASTUTE will do to help change the practice
months		need: - Ideas for how to conduct support groups at health facilities - Greater training in managing breastfeeding	Trials for Improved Practices (TIPS) to identify small do-able actions mothers, husbands and mothers-in-law can take to breastfeed on demand, reduce mothers' workloads, and get them nutritious foods Messages around EBF and it being sufficient for baby's needs until the age of six months; more frequent breastfeeding to maintain sufficient supply Phone in shows about fully emptying both breasts, building women's confidence in breastfeeding, etc.

4. <u>Complementary Feeding</u>

Optimal behaviors: Feeding frequently (varies by age), feeding the right amount, giving foods that are of the right consistency, giving diverse foods, and feeding responsively

Current practice	Facilitators and barriers to changing the practice	What target audiences need:	What ASTUTE will do to help change the practice
- Porridge (mostly maize flour, water and sugar) fed in addition to breastmilk - Children who eat what other family members do have *ugali*, sweet potatoes, green leafy vegetables - Meat is introduced at 18-24 months - Women decide what to buy and cook for the family while men provide money - No taboos on feeding children certain foods; whatever is available locally is used for cooking (maize, rice, cassava, beans, chickpeas, sweet potatoes, pumpkin) - Eggs not a part of people's diet even though available locally	- Nutritious foods are expensive - Little local knowledge of what is nutritious - More meals for children is bad - Current porridge not nutritious - Children do not get special preference; they eat what others in the household eat - Incomplete/incorrect advice on complementary feeding from health workers - Poverty, male authority, and low access to diverse foods constrain women's autonomy to prepare food - Chicken and eggs are for emergency cash, not nutritious source of food	Mothers, husbands, mothers-in-law need: - Information on nutritious foods and how to prepare them; demonstration of how to feed responsively - Ideas from other mothers about which nutritious foods can be added to porridge - Possibly coaching of mothers-in-law in how to facilitate support groups Health workers and CHWs need: - Greater training in complementary feeding; job aids to remind them of age-specific IYCF requirements and information on ECD milestones	Training of health workers and CHWs on IYCF and improved counselling skills (negotiation and action cards in clinics, home visits, and group counselling) Positive deviance to identify then spread successful feeding behaviors of other families in the community (for example, consumption of sweet potatoes, green leafy vegetables and meat and fish soup, especially starting around 6 months) Recipes that are tasty, easy and quick to prepare Job aids for CHWs (modeled after Alive & Thrive) Messages on feeding at least 3 meals per day plus dietary diversity

5. <u>Water, Sanitation and Hygiene (WASH)</u>

Optimal behaviors: Wash hands at critical points and keep compounds clean with children separated from animals/animal feces

Current practice	Facilitators and barriers to changing the practice	What target audiences need:	What ASTUTE will do to help change the practice
Drinking water - Sources of drinking water are open wells, community boreholes with hand pumps, and lake water - Women and children 12 years and above fetch water for household use twice a day - Water is not treated because of time and taste constraints Hand washing - Respondents some but not all critical points of hand washing - Adults wash hands using same bowl before meals; children normally don't wash hands (not monitored at all times) - Soap rarely used - Hand washing after using the toilet or disposing of children's feces is not common Disposal of infant stools - Toddlers commonly defecate around the household compound - Stools are normally disposed of in the latrine by an adult	- Fetching water is time consuming - Rare treatment of drinking water - Hand washing knowledge is somewhat adequate but practice is poor - Lack of running water - Little supervision of the child - Poor recognition of the danger of contact with infant stools - Unconfined poultry and livestock in the yard	Mothers need: - Visible evidence that cleanliness is beneficial; information that soap is good for handwashing; opportunity to practice handwashing at home and in groups; reduced workload to enable hand washing Husbands and mothers-in-law need: - The above plus norms that reinforce handwashing; commitment to try a few do-able actions to reduce mothers' workload - Ideas for separating children from dirt and animals Health workers and CHWs need: - Greater training and reinforcement on WASH	Training of health workers and CHWs on WASH and improving counselling skills (e.g. through negotiation and action cards in clinics, home visits, and group counselling Home-based and group-based demonstrations on proper hygiene. Opportunities to practice hand washing frequently. Regular counseling on handwashing at critical points Information about importance of handwashing at all critical points

Current practice	Facilitators and barriers to changing the practice	What target audiences need:	What ASTUTE will do to help change the practice
member of the household or older children - Infants' nappies are washed in water and the water is poured near the household compound Cleanliness of the yard - Mothers older children clean their compounds every morning and evening - Infants younger than 6 months who do not crawl are placed on plastic bags or pieces of cloth - Crawling children explore around the yard, touch the soil and play on the ground where chicken, ducks, and goats roam			

6. Early Childhood Development (ECD)

Optimal behavior: Talk to and stimulate children from birth

Current practice	Facilitators and barriers to changing the practice	What target audiences need:	What ASTUTE will do to help change the practice
- Children under five years do not have children's books nor toys at home and parents do not read books to their children - Mothers start talking to their children right from birth and interact using gestures, small talk, and smiles - Older children (girls aged 6-14 years) routinely interact with their siblings through singing, talking, walks, counting, playing and storytelling - Fathers hardly interact with their young children as they are not home much - Day care schools are not present in villages - Children aged 5-7 years are normally enrolled in nursery schools that are co-located in government primary schools	- No explicit awareness of the importance of child stimulation for children under 2-3 years - Little or no involvement of fathers due to time constraints and employment away from home - Few local structured resources (e.g. community day care centers)	Mothers need: - Ideas for how to make toys from locally available materials Husbands and mothers-in-law need: - Age-specific tasks they can carry out to stimulate their (grand)children (e.g., dress children at 2 y of age) - Ideas for engaging the child when they try to keep the child out of the dirt and away from animals Health workers and CHWs need: - Greater training and reinforcement on WASH	- How-to books for mothers (via support groups) to make toys from locally available materials - Training of health workers and CHWs on ECD and improving counselling skills (e.g. through negotiation and action cards in clinics, home visits, and group counselling) - Household members and especially fathers need information on ECD and need to be made aware of the benefits of ECD (e.g., how ECD can make a child smarter in school and more successful in the future) - Radio messages on how toalk to and stimulate children from birth - Use of mobile technology to convey reminders to fathers regarding how to stimulate their children (reminders will be specific to the ages of their children) -

7. **Agriculture**

Optimal behavior: varies.

Current practice	Facilitators and barriers to changing the practice	What target audiences need:	What ASTUTE will do to help change the practice
Livestock: - Common livestock include goats, sheep, cattle, chicken, ducks, and pigeons - Ownership of livestock and poultry is divided: fathers, mothers, and children own separate livestock. In some cases there is collective ownership - Livestock is usually an income generator and only eaten during important events - Milk and yoghurt are widely consumed in Shinyanga Home gardening: - Homestead gardening is not common due to water availability and accessibility - Some households near lakeshore (Sengerema) and in valleys (Geita) practice gardening - Mostly vegetables are grown; fruits are uncommon and for those who do grow them, are sold in towns Availability of different food types: - Maize, sweet potatoes, paddy rice, millet, sorghum, cassava, lentils cowpeas, beans, sunflower, groundnuts, and pulses usually grown for household consumption on land that is either owned or rented	- Fish less accessible in Shinyanga - Due to high cost of land rental and equipment, cultivated plots are small, resulting in small harvests - Poor agricultural extension support	Community members: - Positive deviants who have already identified a way of growing nutritious foods on small plots of land or in niches near their home or in valleys as some individuals are already doing - Ideas from others in the community about farming practices that yield greater output of nutritious foods for women and children - Hands-on demonstration about post-processing, including solar drying as practiced in some areas - Opportunities to learn how to make and apply fertilizer	- Training in positive deviance, including positive deviance inquiries - Training and on-going support for agriculture extension officers in the production of nutritious foods, solar drying, etc. - Possibly mobile phone-based videos to help farmers overcome challenges raising diverse foods, for example, micro-irrigation