

Landscape analysis on Uganda's readiness to
distribute Micronutrient Power 'Sprinkles':
desk analysis of country readiness

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Abbreviations

DHS	Demographic and Health Survey
FP	Family planning
HH	Household
ID	Iron Deficiency
IDA	Iron Deficiency Anemia
ITN	Insecticide-treated net
IYFC	Infant and young child feeding
LLIN	Long lasting insecticide-treated net
KAP	Knowledge, attitudes, and practices
MAP	Micronutrient Action Plan instructional tool
MNP	Micronutrient Powder
MIYCN	Maternal, Infant, and Young Child Nutrition
MICS	Multiple Indicator Cluster Survey
MI	Micronutrient Initiative
PSU	Primary Sampling Unit
SBCC	Social and Behaviour Change Communication
UNICEF	United Nations Children's Fund
VAD	Vitamin A deficiency
VHT	Village Health Team
WASH	Water Supply, Sanitation, and Hygiene
WHO	World Health Organization
WRA	Women of Reproductive Age
Z	Z-score

1. Introduction

1.1 Background

Despite improvements in maternal and child nutrition over the past two decades, malnutrition is still a problem in several low- and middle-income countries (Development Initiatives, 2017). The first “1,000 days” are the critical period between contraception and age two – where sustained mineral and vitamin deficiencies can devastate the physical, cognitive, and behavioural development of a child (Black et al, 2008).

Children five years of age or younger are particularly vulnerable to the consequences of micronutrient malnutrition and are an important target group. Iron and vitamin A deficiencies are often prevalent among this age group in developing countries. A third of children 5 and under in developing countries are short for their age (i.e. stunted) due to undernutrition. For several decades it has been known that a long-standing micronutrient deficiency – the lack of key vitamins and minerals – can result in long-term illnesses, impair intellectual development, cause ill health and early death.

In the developing world, those living in poverty live mostly on a monotonous diet of starchy staples to which more nutritious foods are added as resources allow. The staple be it wheat, rice, maize, millet, or another grain, does not on its own provide enough vitamins and minerals. This results in many people including children having deficiency in several key vitamins and minerals such as vitamin B12, vitamin A, iron, zinc, riboflavin, and folate (WHO, 2013). Diversifying the diet is therefore most fundamental (but not comprehensive approach) towards controlling vitamin and mineral deficiencies. Unfortunately, this approach is most reliant on increased income and diversified agriculture farming.

This has left organizations and governments to adopt a comprehensive approach that focuses on diversified agriculture in addition to supplementation and fortification in common foods. Fortification is adding vitamins and minerals to foods or condiments that are regularly consumed. For example, flour, salt, cooking oil, and sauces. The cost of fortification is embedded into the purchase price of the product. Supplementation is vitamin and minerals supplements in the form of tablets, capsules, and powders. For example, a multivitamin, iron tablets, or micronutrient powders. In practice national and international efforts have focused on supplementation and fortification as a primary cost-effective method of offering access to vitamins and minerals to the population at large.

Micronutrient Powders (MNP)

Micronutrient Nutrient Powder (MNP) – frequently referred to as Sprinkles – were created as a low cost easily mixable product that could be used by caregivers in mixing into homemade foods (Bahl et al, 2013). MNP was developed to provide iron and other nutrients for treating nutritional anemia because iron tablets cannot be swallowed by young children. In 2011 the World Health Organization (WHO) formalized MNP guidelines as a strongly recommended public health intervention (WHO, 2011). The WHO updated the guidelines in 2016 to expand the original recommendations from 6 months to 23 months to include children 2 years to 12 years. The updated guidelines outline how iron-containing micronutrient powders can be used in populations where anaemia is a public health problem (WHO, 2016).

The efficacy of MNP to treat anemia has been confirmed (Klemm et al, 2009). MNP are single dose sachets that contain a mixture of minerals and vitamins in powder form that is ready to sprinkle and mix into any ready-to-eat semi-solid food consumed at home (Schauer et al. 2005). Most brands of MNP use a formulation containing 15 micronutrients, which is designed to provide one Recommended Nutrition Intake (RNI) of each micronutrient per dose for children 6-59 months old (HF-TAG, 2015). Table 1 provides a summary of the RNI for children 6-59 months. Micronutrient powder can be formulated with or without other vitamin and minerals in addition to iron, vitamin A and zinc.

MNP use become increasingly more common worldwide, especially in India and Bangladesh (UNICEF 2017; Jefferds, Irizarry et al. 2013) and is steadily gaining more interest in sub-Saharan Africa. With new evidence by the WHO and the creation of universal guidelines the Ugandan Ministry of Health has identified home? same as point of use to differentiate from usual industrial fortification pursued in-country? fortification as a complementary, community-level strategy to address the large burden of childhood malnutrition, especially in the population of those 6 to 59 months (Uganda MOH, 2018).

Table 1. Recommended Nutrient Intake (RNI) of each

In 2013 the Ugandan government created micronutrient guidelines covering fortification and supplementation. Most micronutrient programming within the country is focused around Vitamin A supplementation (VAS) most commonly in fortified oil and flour. Fortification is a popular strategy by the Ministry of Health in that the household coverage of fortifiable staple foods from salt, oil, flour, and flavouring cubes can easily reach a large portion of the country through existing supply and demand networks (Uganda MoH, GAIN, CDC, Makerere University 2017a).

The recommended target-group for MNP use by the WHO is those who are at risk of having an inadequate intake of micronutrients. The recommended period where children are at the highest vulnerability is six to 23 months when food variety and quantity are limited. Children 24 to 59 months may be at high risk of inadequate dietary intake of some nutrients.

The frequency and duration of MNP should be such that it contributes enough of the required micronutrients so that the combination of the diet and the MNP meetings the RNI for all micronutrients. When the sachets contain one RNI for each micronutrient giving 90 sachets over a six-month period (on average around 15 per month; equivalent to every other day or 3-4 sachets each week) is the suggested WHO frequency (HF-TAG, 2015).

Home Fortification & Point-of-Use

WHO has established that the effects and safety of the use of multiple micronutrient powders for point-of-use fortification of foods consumed by infants and young children aged 6–23 months and children aged 2–12 years is significant in reducing anemia (WHO, 2016). Point-of-use fortification is often referred to as “home fortification”; the word “home” has been substituted by “point-of-use”, to reflect the variety of settings where this intervention may take place.

Table 2. Suggested scheme for home fortification with micronutrient powders on foods consumed by infants and young children 6-23 months (WHO, 2013)

Composition per sachet	<i>Iron:</i> 12.5 mg of elemental iron, preferably as encapsulated ferrous fumarate <i>Vitamin A:</i> 300 µg of retinol <i>Zinc:</i> 5 mg of elemental zinc, preferably as zinc gluconate
Frequency	One sachet per day
Duration and time interval between periods of intervention	Minimum period of two months, followed by a period of 3-4 months off supplementation
Target group	Infants and children 6-23 months of age, starting at the same time as weaning (complementary) foods are introduced into the diet
Settings	Populations where the prevalence of anaemia in children 2 years or under 5 years is 20% or higher

Uganda context

The Uganda Demographic Health Survey (DHS) collected in 2016 reported that 29% of children 6-59 months are stunted (short for age), 4% are wasted (thin for height), and 11% are underweight (thin for their age). Over half (53%) of children aged 6-59 are anemic (Uganda Bureau of Statistics, 2018). Anemia prevention and control activities fall under the Ministry of Health (MOH). The MOH uses facility-level services provided by health workers and community-based VHTs to provide community-level nutrition services to women of reproductive age and children.

In response to the international communities focus on MNP, the MOH created a MOH-lead Micronutrient Working Group (MN-WG) to identify information on implementation to MNP to inform MOH’s policy decisions. A group of organized interested members participate in the community from Unicef, United Nations World Food Program (WFP), USAID-funded Strengthening Partnerships, Results, and Innovations for Nutrition Globally (SPRING) and relevant academics from various prestigious institutions from Uganda working in nutrition (SPRING, 2016).

micronutrient per dose for children 6-59 months old (HF-TAG, 2013)

Micronutrients	Children (6-59 months)
Vitamin A µg RE	400
Vitamin D µg	5
Vitamin E µg	5
Vitamin C µg	30
Thiamine (vitamin B1) µg	0.5
Riboflavin (vitamin B2) µg	0.5
Niacin (vitamin B3) µg	6
Vitamin B6 µg	0.5
Vitamin B12 µg	0.9
Folate µg	150.0
Iron mg	10.0
Zinc mg	4.1
Copper mg	0.56
Selenium µg	17.0
Iodine µg	90.0

1.2 Country assessment

Accelerating low-cost easily scalable nutrition programs have become the focus of the international development community and governments. Reducing malnutrition prevents other economic, social, and physiological problems associated with micronutrient deficiencies. In order to reduce nutritional deficiencies and stunting/wasting along with anemia rates in children from 6 months to 59 months, a systematic analysis of the country context is required to determine if there are potential barriers to successfully implementing an micronutrient powder project in Uganda.

The purpose of the assessment was to determine if there are any barriers that need to be overcome before starting the project. The aims of the country assessment were to:

- Establish the current status of MNP action in Uganda;
- Map the country context and readiness as part of developing insight into any potential barriers for implementing a private-sector MNP distribution intervention; and
- Make recommendations on where and how best to implement a private-sector MNP distribution intervention based.

The landscape analysis of readiness to distribute micronutrient powders (MNP) is a systematic and scientific approach to assessing where and how to best accelerate action in nutrition. This report focuses on a desk analysis of country readiness. This in-depth country assessment provides a way to scope gaps, constraints, and opportunities for integrating new and existing effective actions in nutrition, using a participatory approach. The assessment was undertaken by the research team at BRAC Uganda. It includes an analysis of the country's capacities and resources and identifies promising actions that could be scaled up or streamlined to better improve access to MNP.

2. Data and Methods

The country assessment took twenty days. During this time the country team reviewed existing reports from both academic, grey literature, and policy briefs. While the focus of this report is on summarizing and analysis of previous published reports, presentations, and documents focused on MNP programming in Uganda, it was further strengthened by triangulating findings from documents against informal discussions with key stakeholders.

The desk review data is used to assess the extent of which MNP intervention service readiness and provision of MNP is within Uganda. The readiness results represent NGO nutrition programs, international agency (e.g. WHO, World Bank, Unicef, etc.) and government.

2.1 Data (Desk review)

The desk review focuses on collecting data on the situational environment for both existing MNP programs and applicability for future programming. Most data sources are grey-literature program evaluation documents published by NGOs in Uganda. Academic literature was also searched for any articles focused on MNP in Uganda. Throughout the readiness assessment there was a large involvement of the MNP- Working Group (MNP-WG) in Uganda, which was an excellent source for providing copies of unpublished but internal working documents related to MNP.

2.2 Informal Discussions

Informal discussions were mainly ad hoc conversations with members of the MNP-WG, discussions during the meeting(s), and informal discussion meetings with two staff members from the Ministry of Health, Nutrition Department (Principle Nutritionist and Senior Nutritionist).

Members of the working group all have experience working in nutrition interventions. Since the committee discusses a range of topics outside MNP from food fortification to anemia in pregnancy to MNPs, the conversations were more around implementation challenges of nutrition programming in general and contextualizing the on-the-ground situation of anemia in children 6 to 59 months. No interview guide was used as discussions with MNP-TWG members was more informal during the meetings. The research team attended two MNP-TWG meetings held during the timeline of this report.

Three meetings with the Principle and Senior Nutritionist from the Ugandan Ministry of Health, Nutrition Division were conducted to learn more about the previous experience the department had running the SPRING trial. These

discussions were mainly to gather a list of the MNP programs that have been or were currently being implemented in Uganda by NGOs and/or the private sector. These meetings provided great insight into the few MNP projects that have been implemented in Uganda, and provided a starting point of where to start the document review.

2.3 Analytical framework

Available literature was reviewed for common themes related to assessing if Uganda was in a state of being prepared to implement an MNP program. Each article was read to estimate the importance of various factors required in rolling out a successful MNP program. The analytical framework focused on assessing the political commitment and available capacity in various factors.

Table 2 outlines the commitment and capacity framework that was used to frame the analytical review.

Table 2. Analytical Framework used for the readiness assessment for community-based distribution of micronutrient powders (MNP)

Assessment of commitment (willingness to act)	
Political commitment and policies	
Political commitment and awareness of MNP	<ul style="list-style-type: none"> Awareness among stakeholders of nutrition problems in the country, and underlying causes of those problems Awareness among stakeholders about the benefits and role MNP can play in reducing nutrition problems Public statements by senior politicians and high-level stakeholders in support of MNP Importation of MNP product
Focused policies and regulation at central level, with supporting plans and protocols at subnational level	<ul style="list-style-type: none"> Specific and appropriate classification of MNP at central level Clear focused, evidenced-informed, and appropriate MNP interventions in national policy Stakeholder awareness of MNP Availability of updated protocols that include MNP
Coordination, involvement of partners and support at subnational levels	
Coordination of MNP activities at all levels	<ul style="list-style-type: none"> Coordination mechanisms for discussion and planning of MNP activities at central level Involvement of government sectors and partners in MNP coordination
Involvement of Partners	<ul style="list-style-type: none"> Evidence of partnerships and joint projects Commitment of partners to work together to scale-up MNP programs Proportion of nutrition funding going towards MNP Scope of MNP interventions implemented by NGOs
Assessment of capacity (ability to act)	
Human resources and quality	
Distribution of staff	<ul style="list-style-type: none"> Evidence of community health workers across Uganda
Capacity of staff	<ul style="list-style-type: none"> Specific and appropriate training materials for health workers on MNP contextualized within IYFC, nutrition, deworming, and malaria prevention
Staff motivation	<ul style="list-style-type: none"> Commitment to promote MNP within community
Supply Management	
Supplies	<ul style="list-style-type: none"> Commitment to provide regular stock of MNP Importation of MNP sachets taking into consideration cost/benefits
Demand-side factors	
Client knowledge and satisfaction	<ul style="list-style-type: none"> Clients' knowledge about MNP Presence of MNP materials in the community Clients regular use of MNP
Purchase of Product	<ul style="list-style-type: none"> Appropriate cost for MNP
Community engagement	<ul style="list-style-type: none"> Community mobilization campaigns and systematic outreach activities about MNP

Table 3. Reviewed MNP policies and program documents in Uganda

Title of Document	Type of Document	Published by	Location	Target Age		Areas covered																		
				Nutrition Problems		IYCF		Vitamins and minerals				Other				Confounders								
				6mths- 23 mths	23mths-59mths	Underweight (<5 years)	Stunting (<5 years)	Wasting (<5 years)	Breastfeeding	Complementary feeding	Vitamin A	Iron	Iodine	Zinc	Other vitamins & minerals	Food security & agriculture	Food aid	Nutrition (Diversified diet)	NCD	Gender	Vulnerable groups	Malaria Prevention	Malaria Treatment	Deworming
MNP and IYCF Intervention Endline Survey and Impact Evaluation, Uganda, 2015-16. 2018	Endline Report	Uganda MOH, UN WFP, Makerere University, & CDC	Amuira Soroti	✓	✓					✓	✓	✓	✓	✓	✓		✓		✓					
Uganda Vitamin mineral powder implementation guide. 2018	Guideline	MOH	Nation wide	✓	✓						✓	✓	✓	✓	✓		✓				✓	✓		
A qualitative review of micronutrient powder distribution in Namutumba District, Uganda	Midline Assessment	SPRING, USAID	Namutumba	✓		✓	✓	✓	✓	✓	✓	✓					✓	✓		✓				
Comprehensive costing in Micronutrient supplementation: findings from SPRING's MNP Distribution Pilot Program in Uganda	Cost Benefit	SPRING, USAID	Namutumba	✓		✓	✓	✓	✓	✓	✓	✓					✓	✓		✓				
The Power of Powders in Uganda Micronutrient powders help reduce iron and vitamin deficiencies among young children. 2017	Case-study	SPRING, USAID	Namutumba	✓		✓	✓	✓			✓	✓					✓	✓		✓				
Facility- and community-based delivery of micronutrient powders in Uganda: Opening the black box of implementation using mixed methods, 2019	Academic Article	D Agostino et al	Namutumba	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓				

IYCF, infant and young child feeding; NCD, noncommunicable disease

Summary of Micronutrient Powder and Infant and Young Child Feeding Intervention Endline Survey and Impact Evaluation, Amuria and Soroti Districts, Uganda 2015-16

The MNP program ran in collaboration with the MOH and World Food Program was able to show that after the intervention of providing knowledge of MNP and access to MNP, almost all caregivers in the study had heard about MNP. The information about MNP was spread across different sources from VHTs to the central health team as well as neighbours and family members. The study found that over half of the caregivers reported that MNP was a 'powder added to young children's food' and the other half described it as a vitamin and mineral powder (Uganda MOH et al, 2018). Only three quarters were able to state the correct age, 6 months, of when to start providing MNP. Almost all of the respondents stated that a child should consume one sachet a day. The most common reported number of boxes (30 sachets) received was three or four, with only a small percentage receiving boxes five or more times. Generally, caregivers reported that most children consumed the MNP that was mixed into foods.

Summary of Uganda Vitamin and Mineral Powder Implementation Guide

The guide integrates the World Health Organization (WHO) and Home Fortification Technical Advisory Group (HF-TAG, 2015) to create guidelines that supplement the National Micronutrient and National IYCF Strategy Guidelines. The guide provides a list of key implementation pillars that should be taken into consideration when designing an MNP program. The key implementation pillars are around planning and coordination; distribution and logistics management; capacity building including the importance of social and behaviour change communication (SBCC); and monitoring and evaluation. The guide provides a useful overview for any organization considering the steps of rolling out a program aimed at providing MNP to children in Uganda.

Summary of SPRING Qualitative MNP Distribution in Namutumba District Midline Report

The midline review showed that MNP implementation was successful by the VHTs. The two different delivery methods facility and community distribution arms both had caregivers who did and did not provide MNP to their children 6 to 59 months. In terms of effectiveness the facility-based method was overall more cost-effective for disbursement of MNP but had lower rates of adherence to MNP protocols of use. If effectiveness is measured by more effective use of MNP, including regular provision of one sachet per child aged 6 to 50 months every other day for a minimum of 90 days, then the community distribution arm was more effective. The community distribution arm had a higher proportion of use. The community distribution arm had a higher costing ratio and was therefore not as cost-effective as the health facility arm. Overall, SPRING concluded that the community-based distribution was more effective in preventing anemia and malnutrition due to the regular and proper use of MNP. The SBCC component of the intervention left people aware of MNP and ensured caregivers knew how to use MNP appropriately. The study also found that the MNP pilot increased the workload of the VHTs.

Summary of Comprehensive Costing in Micronutrient Supplementation: Findings from SPRING's MNP Distribution Pilot Program in Uganda

The costing summary looks at the cost efficiency of the Uganda MNP disbursement by facility or community-based VHTs. The program integrated IYCF into all activities in addition to offering information on MNP. The study found that community-based delivery platforms are overall more costly but they were more cost-efficient than the facility-based distribution platforms when considering the number of children reached and also adherence to recommended protocol.

Summary of Facility- and community-based delivery of micronutrient powders in Uganda: Opening the black box of implementation using mixed methods

This academic article uses the SPRING MNP project in Namutumba district to look at different ways to document implementation lessons of MNP projects. The pilot project used a mixed methods approach to gather evidence regarding the uptake of MNP implementation.

3. Study findings

The results of the review of existing MNP programs in Uganda have identified three areas that influence the readiness of uptake of MNP. Figure 1 outlines the triangulation between the assessment of the need, the fit, and the capacity for establishing MNP programming. The first area is the demand readiness or the need for MNP programming through the eyes of the government and the larger population. Is there a request for nutritional supplementation in children 6 to 59 months? The second area is the resource readiness or the fit of MNP programming within the existing health care system. Are there easy opportunities to integrate MNP within existing community-health based programs that have a strong IYCF program? Last is delivery readiness which is the capacity of on-the-ground organizations to administer a successful MNP program.

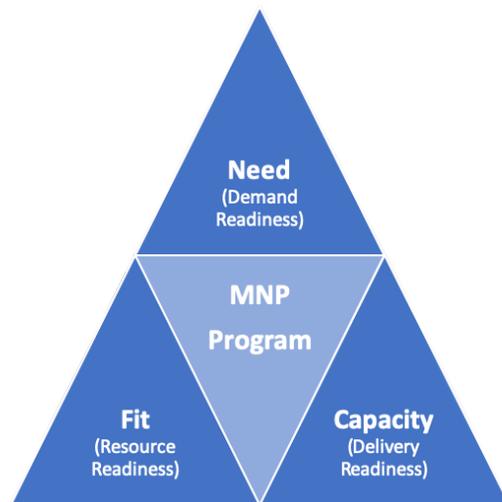


Figure 1. Domains of readiness assessment for MNP Programming

3.1 Need (Demand Readiness)

The need for sustainable low-cost but effective nutritional supplementation for children 6 months to 59 months is high. The large number of children 5 and under combined with the high proportions of births and a larger portion of the population living below the poverty line highlight the need for nutritional supplements at the household level.

Uganda has had National IYCF Strategy guidelines since 2009 (MOH, 2009). Expanding upon these with a specific vitamin and mineral powder implementation guide (VMP) is evidence that the Government of Uganda is aware of the beneficial aspects introducing MNP in a scalable manner may have towards improving the nutritional needs of children 6 to 59 months. The guide focuses on establishing that any MNP programming must be delivered within an IYCF framework. This guideline is an excellent resource by the Ugandan MOH for any implementing partner to use as a framework for MNP distribution.

The VMP guidelines suggest that MNP could be distributed through child health programs, reproductive programs, and nutrition sensitization programs using a variety of different intervention frameworks. There is ample opportunity for MNP distribution to be in conjunction with child immunization, during antenatal or prenatal care visits, and alongside nutrition knowledge sensitization programs.

Within the districts where MNP has been provided with strong SBCC components the up-take by primary caregivers is high. Findings from pilot MNP programs in Uganda have shown that a strong focus on SBCC in relation to IYCF is mandatory to ensure the wellbeing of children. Furthermore, any SBCC strategy needs to contextualize MNP within a larger conversation of diversified dietary feeding practices by covering basic nutritional knowledge. Primary female caregivers within the pilot studies have embraced the knowledge and over the study period started accepting MNP as one positive method that would provide their child with required nutrients porridge or the daily food might be missing.

However, one limitation within the existing pilots was that the demand created for MNP was based on a free model, where MNP was distributed to targeted caregivers and children as a government subsidy program. Further research is required to determine the market demand for purchasing MNP and what an affordable price point might be for low-income households.

3.2 Fit (Resource Readiness)

MNP programs will have the following supply options of importing the finished project, packing of bulk imported premix, or importing raw materials and mixing and packaging locally. The availability of MNP products in Uganda is limited. To date there is no facility that is able to import raw materials to mix and package MNP. Therefore, of

these three options, at the moment, the most reliable national and district supply would be for programs to import the finished product. Importing MNP into Uganda will have to be from an WHO approved supplier from India, South Africa, USA, or China.

Importing the product incurs additional charges that overtime will become the burden of the consumer. The cost of shipping in addition to the value added tax (VAT) of 18 percent plus a 15 percent withholding tax, which is not reclaimable (Uganda Country Commercial Guide, 2019). Together these taxes effectively charge a 33 percent tax on all foreign goods. For local pharmacies the additional 33 percent mark-up increases the cost of each sachet.

While importation incurs a large tax, it is fairly easy for larger organizations and companies to import MNP into Uganda following the rules and regulations associated with importation. Since MNP is not classified as a medication or drug but as a food supplement it has less rigorous checks and approvals making it slightly easier to import. There is potential for larger wholesalers have the financial capacity to order MNP in bulk, but there would need to be a strong enough market demand and delivery strategy for it to be profitable. Without a high market demand MNP product imported in large quantities in Uganda risks expiring. MNP has a recommended shelf-life of two years. Over time, if community-based disbursement models can increase awareness of and demand for MNP the private sector might be more inclined to import.

The MNP project by the Ugandan MOH imported MNP from South Africa was able to obtain a tax exemption certificate since it was a government-led initiative. Other MNP projects are unlikely to benefit from such incentives under the current tax laws.

3.3 Capacity (Delivery Readiness)

MNP programs in Uganda have been largely conducted through international development organizations. A pilot test for a home fortification project through VHTs led by MoH is the most notable study to date offering insight into the potential for larger scale-up of MNP projects in Uganda.

The study highlighted how the decentralized method more rooted in community visits is paramount in the delivery of preventive health services in Uganda (Uganda MoH, 2018). Delivery through a larger scale community-based health promotion and delivery model for micronutrient powders in addition to providing beneficiaries with pertinent information, education, and communication (IEC) behavior change packages about childhood nutrition is critical for promoting SBCC. Sales delivery of MNP without contextualizing it within the larger social behaviour change communication (SBCC) on IYCF leaves only half the work done. Both knowledge about nutrition and plausible, low-cost but effective, methods for primary caregivers of children 6 to 59 months is critical in creating an environment where there is demand (and uptake) of micronutrient powders.

4. Summary

The Government of Uganda has paved the way for MNP programs by creating policies around use and guidelines for implementation. This first step is critical in making sure there is regulation around the various pathways organizations may choose when designing MNP programmes. These guidelines help ensure the correct information is disseminated regarding MNP and childhood nutrition.

Previous MNP programming in Uganda suggests there is not only a need for MNP programming but also a willingness of caregivers to try MNP creating a demand for the product. As MNP becomes more common and available, reaching a larger proportion of caregivers, the demand is only expected to increase. While the Government of Uganda only tested a free-distribution model the uptake provides insight that caregivers are interested in providing the best for their children and interested in dialogue on nutritional feeding practices.

MNP programming aligns with the government's focus on addressing malnutrition in children 6 to 59 months creating demand readiness. MNP is easily imported into Uganda creating resource readiness. Lastly, previous MNP programs have shown that MNP delivery by VHTs or community health centres is possible creating delivery readiness. Altogether, via the three areas of readiness, MNP shows high promise as a home fortification for malnutrition in children 6 to 59 months method in Uganda.

4.1 Limitations

The main limitations of this study was the use of secondary data/information from published and unpublished program reports and policy documents

4.2 Recommendations

1. There needs to be a shift from government provided free distribution to more of a market based sustainable approach that is driven by consumer demand. The VHT distribution model showed that it was possible to create demand for MNP but after the free product was consumed there were no opportunities for caregivers to continue purchasing locally. While free distribution of MNP promotes up-take and use of the product there needs to be a sustainable where caregivers have continued access to MNP after the program ends. MNP programs should integrate a continuation plan on how members will be able to continue to access to MNP beyond the project lifespan. The Government of Uganda or any MNP programming by NGOs or CSO should develop a link to the private sector to ensure MNP is available in the market for continued access beyond the project completion date.
2. The Government of Uganda's pilot on MNP created a demand which showed that MNP is accepted by caregivers under the right awareness raising and communication strategies. It is very important that any MNP programming uses the guidelines created by the government and embeds MNP into larger discussions on childhood nutrition and infant feeding practices.
3. MNP has shown to be an avenue to continue the discussions on IYCF and promote nutritious rich foods. It opens a door for health workers to continue sharing information about the importance of vitamins and minerals in a child's first 1,000 days. Engaging primary caregivers and other community stakeholders in conversations can help solidify knowledge of children's nutritional needs and help increase the awareness of the important role nutrition plays in childhood development.
4. BRAC Uganda is looking at addressing the demand and supply side of MNP by using BRAC's low-cost model of providing access to health-related products through volunteer community health promoters (CHPs). BRAC will expand the CHPs products to include MNP powders that will be sold by CHPs at an affordable rate. The CHP low-cost model is based on a revolving fund, where sales of products is diverted back into repurchasing and restocking. BRAC is also looking at integrating community conversations around assessing a caregiver's willingness to pay for MNP.
5. There is vast amount of information on MNP programming including lessons learned from other sub-Saharan Africa countries. Any MNP programming by government or private sector in Uganda or elsewhere should look into the findings of other interventions. Promising approaches have been documented in neighbouring East African countries with opportunities for learning and improving MNP programming through knowledge sharing.

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