

Draft Nutrition Strategy for Rwanda
May 2013

"How can we have such preventable diseases today? ... How can children, even mature people suffer from malnutrition? ... I can't accept that!"

*His Excellency Paul Kagame President of the Republic of Rwanda on a Trip to the Eastern Region,
April 2009*

"We have no greater responsibility on this earth than to give each child a chance to make the most of his or her God-given potential."

Secretary of State Hillary Clinton at CARE national convention, May 2010

Table of Contents

I. Executive Summary 3

II. Malnutrition: The Problem..... 5

III. The Development of a Food Processing Industry is Challenging 8

 Global focus on quantity and not quality..... 8

 Challenges to increasing access to fortified complimentary foods 8

 Rwandan specific barriers for food industry development 9

IV. Why current approaches do not work 10

V. The Way Forward 11

VI. The Necessary Steps 13

 1. Product Development 14

 2. Creation of Local Food Processing 17

 3. Local Procurement and Promotion of Agriculture 20

 4. Organizing Comprehensive and Efficient Distribution 24

 5. Implementing Public Health programs on Nutrition 27

 6. Monitoring and Evaluation..... 30

Key decisions for Consideration:..... 31

Tentative Work-plan..... 33

I. Executive Summary

The Problem: Chronic Malnutrition

Chronic malnutrition is the single greatest predictor of death in children under five globally as malnourished infants are five times more likely to die in early childhood than their well-nourished counterparts.¹ If not addressed by age 2, the impact of this chronic malnutrition on physical brain development becomes irreversible. In Rwanda, chronic malnutrition or stunting, affects 44% of children under the age of five,² or 750 000 Rwandan³ children. This includes more than 207 000 children from 6 to 24 months. Ensuring that women have adequate nutrition during pregnancy and breastfeeding and children have adequate nutrition through complementary feeding at 6-24 months is the key to mitigate these devastating stunting rates.⁴

The Context: How we got here

In 2008, *The Lancet* published a series of articles on the global burden of malnutrition and the recommended interventions to reduce its impact. Since then, the global community has increasingly turned its attention to addressing malnutrition through pilot programs whose goal is to identify the suite of interventions that could effectively be scaled in developing countries. Thus far, however, the response has been insufficient to deal with the problem, due to a focus on quantity of calories rather than quality of diet, challenges to providing access to fortified foods for the populations who need them most, the infant formula tragedy in developing countries in the 1970s, and other challenges that prevent widespread impacts.

Specifically in Rwanda, the vast majority of the population lives in rural areas (81%) and do not have access to affordable, nutritious complimentary foods that prevent stunting. Despite efforts including staple food fortification, micronutrient powders, bio-fortification, education for mothers, and sanitation improvements, stunting rates remain stubbornly high.

¹ <http://www.who.int/bulletin/archives/78%2810%291207.pdf>

² Rwanda Demographic and Health Survey, 2010, pg. 141

³ Calculated applying MCH under-five index (16.2%) on the total population number (2012 Census provisional results)

⁴ JAPEM report, April 2013

The Proposed Solution: Locally-Sourced, Processed and Distributed Fortified Porridge for children in Rwanda

The Government of Rwanda, in partnership with the Clinton Health Access Initiative (CHAI) and various global nutrition experts, private sector investors and donors, will lead an effort to dramatically reduce stunting rates through developing a fortified baby food (BBF) product, as well as a fortified product for pregnant and lactating women, for the local context that is designed, sourced, produced and distributed in Rwanda. Due to this domestic value chain, the economic development benefits for smallholder farmers, the agro-processing industry and other cluster industries will also be significant.

In this partnership, the Government will take the lead in setting the direction and timelines of the program, coordinating the various government stakeholders, and providing relevant local context and expertise. CHAI will support the Government in designing and implementing this ambitious program through mobilizing donors, attracting investors, conducting relevant analyses, and partnering in strategic decision making. Other major partners like investors, donors or implementing agencies will also be included in the program with well-defined roles and responsibilities.

This strategy document is a working document that describes the proposed multi-sectoral program, composed of six critical components, outlined below. Each section describes the importance and possible impact of that particular component within the Rwandan context. The decisions that will need to be considered and made for each component are identified; as are the areas of work and analyses that will follow (attached annexes provide supplementary and more detailed information). The intent of the draft is to invite discussions among key stakeholders on how to create a dynamic, home-grown, Government of Rwanda-led solution to the problem of chronic malnutrition.

The Critical Components:

For this program to work effectively, six critical, interdependent components have been identified and are briefly described below.

1. Product Development: Working with global and local nutrition experts, the Government, CHAI and their private sector partners will develop a suite of nutritious food formulations that mimic local eating habits, are based on locally produced agricultural goods, can be affordable to

most families, and will provide the additional nutrition that women need during pregnancy and breastfeeding and all of the nutrition infants need in addition to breast milk between the ages of 6 months to 2 years.

2. Creation of Local Food Processing Manufacturer: a food company will be created locally to produce the nutritious foods at scale, in state-of-the-art factories, with impeccable quality control through a public, private, joint venture or public-private partnership (PPP) structure.

3. Local Procurement and Promotion of Agricultural Development: with the support of CHAI the Government and the local manufacturing company will cooperate to organize efficient local provision of agricultural inputs for the industry, while also ensuring sufficient farmer incomes and increasing smallholder farmer productivity, probably through cooperative structures.

4. Distribution: The highest prevalence of stunting exists in rural areas and therefore the products must be distributed efficiently to remote villages, in addition to towns and cities through a public, private or hybrid system.

5. Public Health Programs: National campaigns will be organized by the Government and relevant partners. CHAI will support them in promoting exclusive breastfeeding from birth to six months in line with national and international guidelines, and the use of the nutritious, locally-produced complementary foods for infants 6-24 months and pregnant and lactating women (PLWs). The Government of Rwanda will also organize a subsidy program for the households who cannot afford to buy the products.

6. Monitoring and Evaluation: with the support of CHAI and the Government will collect baseline data and develop an effective, routine monitoring and evaluation framework to track relevant indicators, including height-for-age of infants, the measurement used to determine stunting.

II. Malnutrition: The Problem

Chronic malnutrition

In most sub-Saharan African countries, over 40% of all children under-five years of age suffer from chronic malnutrition which manifests itself as a condition known as *stunting*, or a height-for-age that is at least two standard deviations below the average for children under five. A child's reduced height associated with stunting is only the *outward* sign of the damage that chronic under-nutrition inflicts on a child. A continued lack of sufficient micro- and macronutrients in a child's diet also results in cognitive impairment and a less effective immune

system, leaving the child unable to achieve his or her mental potential and at risk for repeated infections.

Chronic malnutrition is the single greatest predictor of death in children under five globally as malnourished children are five times more likely to die in early childhood than their well-nourished counterparts. Due to its debilitating impact on the immune system, malnutrition is considered to be a *contributing factor in over 50% of all childhood deaths* in developing countries.⁵ If not addressed by the age of two, the impact of chronic malnutrition on brain function is *irreversible*. Globally, over 175 million children currently under the age of five are stunted.⁶

Wasting

Stunting differs from severe acute malnutrition, or *wasting*. Severe acute malnutrition impacts 20 million children globally and results in 1.5 million deaths annually.⁷ It occurs as a result of famine, severe food shortages or illness such as diarrhea in a child already suffering from chronic malnutrition. Like chronic malnutrition, it is preventable as well as treatable.

Stunting in Rwanda

In Rwanda, malnutrition is a major public health concern. Chronic malnutrition or stunting, affects 44% of children under the age of five,⁸ or 750 000 Rwandan⁹ children. Of Rwandan children between the age of 0 and 6 months, 16.7% are stunted, but the prevalence of stunting increases dramatically during the 6-24-month window, when breast milk is no longer sufficient to provide the entire micro- and macronutrients required by growing infants.

Rwandan progress in fighting acute malnutrition

In recent years, Rwanda has made enormous progress in addressing and monitoring severe *acute* malnutrition, which has been consistently decreasing since 2010, with reported levels

⁵ Rice, A., Sacco, L., Hyder, A. & Black, E., "Malnutrition as an underlying cause of childhood deaths associated with infectious diseases in developing countries," Bulletin of the World Health Organization (WHO), 2000, 78 (10)

⁶WHO, 2011

⁷ Found in the nutrition strategy, but not sourced there and I cannot find these figures through online research

⁸ Rwanda Demographic and Health Survey, 2010, pg. 141

⁹ Calculated applying MCH under-five index (16.2%) on the total population number (2012 Census provisional results)

falling below 1% by April 2013.¹⁰ Efficient programs have been implemented, such as monthly growth monitoring of children using Mid-Upper Arm Circumference (MUAC) and weight-for-age; distribution of nutrition treatment and prevention commodities such as Plumpy'nut and Corn-Soya Blend; and the District Plan to Eliminate Malnutrition (DPEM) focusing on community-based nutrition programs. Programs to increase food security at household level, such as the promotion of kitchen gardens and livestock have played an important role as well.

Stunting continues

To date, no strategy to prevent *chronic* malnutrition in Rwanda has been implemented effectively or at a national scale. Although there is little empirical evidence, the major underlying causes of malnutrition in Rwanda are assumed to be poor household food availability, accessibility and utilization, intra-household food distribution, and inappropriate care for children, pregnant and lactating women (PLWs).¹¹

As nutrition experts and advocates, s9(2)(a) have noted, targeting interventions at the 1,000 day critical window from conception to an infant's second birthday is critical to an effective nutrition strategy.

s9(2)(a)

¹⁰ JAPEM report, April 2013

¹¹ JAPEM report, April 2013

III. The Development of a Food Processing Industry is Challenging

In 2008, *The Lancet* published a series of articles on the global burden of malnutrition and the recommended interventions to reduce its impact. Since then, the global community has increasingly turned its attention to addressing malnutrition through pilot programs whose goal is to identify the suite of interventions that could effectively be scaled in developing countries. Thus far, however, the response has been insufficient to deal with the problem. There are a number of reasons for this.

Global focus on quantity and not quality

Historically, focus in developing countries has been on providing sufficient quantities of locally available food for all people, not just children. The Green Revolution in the 70s and 80s helped to increase the yields of local, drought resistant crops to increase the availability of local foods. While this effort was largely successful in providing a sufficient quantity of food to most people, the locally available foods that have been targeted lacked sufficient amounts of the macro and micronutrients required for a growing infant. These foods, as much as they are in developed countries, need to be *fortified* or *supplemented* with a combination of proteins, fats, lipids and micronutrients for growing infants.

Challenges to increasing access to fortified complimentary foods

Chronic malnutrition in infants existed in the United States and Europe in the 20th century until food producers developed a suite of convenient baby food products to feed growing infants. Today, one might think that these global food producers could provide the solution to address chronic malnutrition in developing countries. But challenges exist that prevent their entrance into these emerging markets, not the least of which is the justified global outcry that occurred after the introduction and aggressive marketing of infant formulas as a replacement for breast milk by multinationals in developing countries in the 1970s. Where infant formula was introduced, lack of hygienic conditions to properly sterilize bottles, a significant number of infections and even deaths resulted. Even where ideal hygienic conditions exist, most mothers in rural settings aren't able to afford imported infant formulas, so aggressive marketing attempts to wean infants from mothers' milk to infant formulas result in mothers who no longer lactate but have no affordable method to sufficiently nourish their infants.

These tragedies, combined with a passionate opposition to anything other than breast milk for the first 6 months of life, led to the development of an International WHO-led Code¹² of Marketing for Breast-milk Substitutes¹³ to control the marketing of infant formulas as a substitute for breast milk. In the decades that followed, that code has been extended by governments in many countries to include the prohibition of the marketing of complementary foods for fear they might discourage the continued breastfeeding of an infant. This code has not been made into official legislation in Rwanda at this time.

Rwandan specific barriers for food industry development

In a country like Rwanda, 85% of households cultivate land and rely on agriculture or livestock as the main (and often only) livelihood activity.¹⁴ So governments prefer local food production based on local agricultural inputs, rather than imported baby foods that don't promote local economic development. In order to build a bridge between local farmers and national markets, governments in developing countries prefer a locally based solution and are not friendly towards the importation of packaged food products from abroad.

Eighty-one per cent of the population lives in rural areas. The poor quality of district roads in a county with only 37% of the roads in good condition represents a serious limitation in reaching rural households for commercially-produced food. As a result of these challenges, the global companies that possess the technical expertise, experience and capacity to introduce fortified complementary foods into developing countries find the risks of entry to be too great. Some companies import expensive products that reach a small, relatively wealthy segment of the population, but in most developing countries, nutritious foods are not available for the majority of people who need them most. Unfortunately, most countries lack the technical expertise and capital to develop nutrient-dense complimentary foods and to ensure the quality production standards necessary for food targeted at young children and pregnant and lactating women.

¹² More information on Annexes 7

¹³ Retrieve this document from: http://www.who.int/nutrition/publications/code_english.pdf

¹⁴ CSFVA, 2012

IV. Why Current Approaches Do Not Work

The global health community has been focusing on partial efforts to address the gap left by a lack of commercially available nutritious complementary foods. The most popular efforts include national fortification of major staples such as wheat, maize and salt; supplementation of local diet with micronutrient powders or lipid-based nutrient paste; bio-fortification; and education of mothers on how to prepare healthy foods and improvements in sanitation to lessen the incidence of diarrhea.

Food fortification programs in Rwanda

Food fortification programs are part of the Government of Rwanda's strategy to address the high burden of micronutrient deficiencies. A mass food fortification project is ongoing. The Ministry of Health with the support of its partners¹⁵ has prepared a law that will mandate the fortification of six staple products: maize flour, wheat flour, sugar, salt and cooking oil. Other fortification programs include bio-fortification to provide micronutrients such as Vitamin A, iron and iodine through commonly consumed staples. These efforts are commendable and beneficial to the adult population, but don't target the age window between 6-24 months, when an infant's stomach is too small to ingest large quantities of food and is therefore not able to ingest enough nutrients through food based on fortified staples.

The MOH and its partners are also working on an in-home food fortification program targeting children age of 6-24 months using micronutrient powders (MNPs). In July 2012, micronutrient powders (MNPs) were introduced in six districts of Rwanda to address children's micronutrient deficiencies like anemia, which affects 38% of children under five: MNPs, Vitamin A and mineral mixtures, are distributed by Community Health Workers to selected mothers of children between 6-24 months of age (approximately 25,000 in each of the six districts). MNPs present many advantages: these single-use bags are easy-to-use, and do not require any changes in food practices, as they can be mixed with any homemade foods and do not conflict with breastfeeding. While MNPs are primarily designed to reduce micronutrient deficiencies, their introduction is an opportunity to accelerate implementation of the recommended good complementary feeding practices as caregiver generally receives trainings for product use.

¹⁵ PHC interview, November 2012.

However, even if implemented on a national scale, MNPs do not provide the full suite of fats, lipids and proteins needed to eliminate chronic malnutrition.

Education of mothers vs. availability of nutritious food

Initiatives to educate women on proper complementary feeding practices¹⁶ have been helpful, but if locally-available food lacks adequate nutritional value and fortified products are unavailable or unaffordable, women are left empowered with information, but without the means to address the problem. This is especially true in rural communities, where access to the food with sufficient nutrients is almost nonexistent, and the rates of stunting among children under five (46.5%) are twice that of children in urban areas (23.1%).¹⁷

Clean water and sanitation

Attempts to improve sanitation in rural areas while valuable cannot solve the problem on its own. Fifty-three per cent of rural households don't treat water before consumption¹⁸. While nutrients can be lost when children frequently develop diarrhea potentially resulting in serious illness and death, if insufficient nutrients are ingested, the best sanitation control cannot prevent stunting.

V. The Way Forward

Movements such as SUN¹⁹ and the 1,000 Days Initiative²⁰ have been successful in raising awareness globally about stunting. The Government of Rwanda declared that large-scale action to improve nutrition in the first 1000 days is urgently needed in the 2012 JAPEM. According to the Economic Development and Poverty Reduction Strategy II (EDPRS II), reducing Rwanda's chronic malnutrition rates for children under two years old from 47% is a prerequisite for Rwanda's continued economic and inclusive development. Chronically malnourished (stunted) children perform less well in school and are economically less productive as adults. Research

¹⁶ Joint action plan to eliminate Malnutrition, 2012

¹⁷ DHS, 2010

¹⁸ DHS, 2010

¹⁹ Rwanda is a participating country in the SUN Movement since 2012.

²⁰ The Government of Rwanda launched a 3 years advocacy campaign in collaboration with UNICEF focusing on the 1000 days.

studies estimate that malnourished children risk losing 10% of their lifetime earning potential, while malnutrition can cause countries to lose up to 3% of GDP.²¹ After consulting with global nutrition experts, international NGOs and companies, the Clinton Health Access Initiative (CHAI) has developed this proposal with the Government of Rwanda. The proposal encourages the development of a local baby food processing industry that develops nutritious products for infants and pregnant and lactating women and which is distributed and accessed by all target populations.

Three necessary conditions to fight chronic malnutrition

There are three conditions that governments, the World Health Organization, academic experts and nutritionists agree should be in place in order for infants to grow properly and build healthy immune systems:

1. Pregnant and lactating women and infants must consume sufficiently nutritious food in sufficient quantities.
2. Exclusive breastfeeding for the first six months of life is the best method of delivering nutrition to an infant during this period of life.
3. Continued breastfeeding should be maintained after six months, but be accompanied by nutritious complementary foods for the first two years of life.

Development of a local suite of nutritious products

CHAI will support the Government of Rwanda and the private partners to develop a suite of nutritious products for young children and pregnant and lactating women that is produced locally, based primarily on local agricultural products and that suit local eating habits. CHAI, Government and partners will work to establish local production and distribution systems and possibly subsidy to ensure that these products reach the vast majority of mothers and children Rwanda.

Integrated sustainable approach that promotes rural economic development

Stunting correlates closely with poverty²², so chronic malnutrition is not only a health issue but also an economic one. To ensure sustainability, complementary nutritious foods must be produced affordably and must promote the economic development of rural populations in the

²¹ Economic Development and Poverty Reduction Strategy II, 2013 – 2018, Government of Rwanda, pp. 77-8

²² CSFVA, 2012

country, where a majority earn their livelihoods from smallholder farms. Developing nutritious foods through local production of local agricultural inputs is critical to ensure sustainable provision of food products in the country.

Education of mothers and behavior change

Public health programs will be supported that promote the use of these healthy foods by women during pregnancy and while they are breast feeding, exclusive breast feeding during the first six months of life, and the use of these healthy foods to complement breast feeding during the crucial period between six months and two years of life when a baby's brain and body are developing.

Promote better sanitation and effectively treat diarrhea

To complete this set of interventions, it will be important to design joint interventions around sanitation and hygiene such as promoting boiling of water to cook porridge and other means so that contaminated water is not consumed with the products. These measures will also help. But as a foundation to any strategy, the promotion of breastfeeding and the provision of nutritionally complete foods for infants, pregnant and lactating women are essential.

Creation of export opportunities

The strategy will also contribute to the creation of large-scale, globally competitive food processing companies in Rwanda that can provide employment and potential export opportunities while adding value to locally produced agricultural goods and provide needed sources of foreign exchange. And because the products will be produced locally and will be affordable, the solution will ultimately be sustainable within local economies and not dependent on foreign aid.

VI. The Necessary Steps

Global and local nutrition experts, and their private sector partners will develop a suite of nutritious food formulations that mimic local eating habits, are based primarily on locally produced agricultural goods, can be affordable to most families, and will provide all of the nutrients that pregnant and lactating women, in addition to the local diet, and infants need, in addition to continued breastfeeding, if eaten daily and in sufficient quantities.

The implementation of this project will require a multi-sectoral action plan that will be coordinated at government level. To this end, representatives from the Ministries of Local Government, Gender and Family Promotion, Agriculture, Commerce, Health, Finance and their depending agencies will form a Steering Committee that will support the operationalization of this strategy. The Steering Committee will report to their relevant Ministers. Key decisions will be taken at Ministerial level during monthly meetings of the Social Cluster, which reports to the Prime Minister.

Through these government bodies, a detailed work plan and timetable for implementation describing the specific steps that must be taken will be developed. The work plan will outline who will be in charge of making key decisions.

This section lists some of the decisions that need to be made and implemented by the Government and the companies that are brought in as partners in each of the six major areas above.

1. Product Development

To reduce the high stunting rates in Rwanda, a suite of nutritious food formulations based primarily on locally produced agricultural goods and can be affordable to most families will be developed. A factory producing those products meeting the complete nutritional requirements of children from the age of 6 to 24 months will be created. A nutritious product responding to national needs of Pregnant and Lactating Women (PLWs) will be developed as malnutrition can start as early as pregnancy.

These foods will mimic local eating habits so they can be easily integrated in existing local diets. The products will be designed so that they are of the highest quality and can be sourced, manufactured and distributed at an affordable price for most families.

Understanding the variety of eating behaviors of PLWs and infants across Rwanda is essential to developing appropriate products

CHAI has undertaken preliminary field assessments covering fifteen districts of the country to investigate existing eating habits, with a particular focus on infants and children. This study revealed that a grain-based (sorghum, maize or soya) porridge is the most prevalent complementary food for infants, usually starting between 4 and 6 months. Most children continue to eat 3 meals a day until adolescence while a majority of adults eat only 2 meals a day. The additional meal eaten by children is typically porridge in the morning. The nutritious product will be marketed and consumed so it does not conflict with breastfeeding recommendation.

Product Composition

A comprehensive diet which meets the infant's caloric, nutrient, fat, protein and lipid needs will promote the development of a healthy, cognitively unimpaired child with a strong immune system able to adequately defend itself against infection. Infants' foods will be nutrient dense complementary foods for children 6-24 months, in addition to breast milk. The first prototype for the fortified baby food (FBF) is a maize-based porridge.

Regulatory and Approvals Processes

The Rwanda Bureau of Standards (RBS) is currently the main regulatory body for all standards in Rwanda and the Ministry of Health will be the line ministry responsible for nutrient content and food safety. The FBF processing facility will need to comply with the Food Processing Law and the required accreditation, licensing and auditing. The FBF product will comply with the Food Substitute Law and the relevant approval processes required. If the Food and Drug Administration law is established, the food processor will also need to comply with that law and work closely with the FDA and RBS.

Key decisions:

In order to begin implementation of the above programs, the following decisions will need to be made:

- **Product type:** The Government of Rwanda will need to approve the product concept of cereal-based fortified porridge with maize and soy products as main ingredients. CHAI will support the Government to identify consumer preferences.
- **Product Formulation:** The Government of Rwanda will need to determine if the product formulation and related nutrient content of the FBF meets standards, and approve the

final product. CHAI and technical partners will support the Government to identify international nutritional standards

- s9(2)(b)(ii)

Additional information on those decisions can be found in Annex 1.

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

2. Creation of Local Food Processing

Developing a New Local Manufacturer for FBF and PLW Foods

This program maps out the plan for bringing a multi-player partnership to Rwanda to develop a Greenfield business to manufacture a fortified baby food and supplementary foods for PLW.

Developing a Greenfield business provides a number of benefits, including:

Ability to produce an affordable product

Rwanda can recognize a number of cost advantages through local sourcing of inputs, and local processing. An affordable product ensures wider access to populations most in need and reduced food insecurity risk

Self-sustaining Rwandan solution

Creation of a local manufacturing venture is aligned to Government of Rwanda's mission to create a self-sustaining country, as laid out in the Rwandan Joint Action Plan for Elimination of malnutrition (2012).

Guaranteed Quality

There can be zero tolerance for any defects in food that will be fed to infants and pregnant and lactating women. To achieve these exacting high quality standards it will be easier in green field plants, designed for quality from inception and optimized for production efficiency.

Potential Business Partnership to Undertake Food Processing Business

Within the next two months, the Government of Rwanda will need to decide the type(s) of partnership structure they wish to pursue for the joint ventures that will own and operate the food processing business. Options for these structures could include a wholly-owned government venture utilizing paid technical assistance from international companies; a public-private partnership (PPP) between the Government, multi-nationals and possibly local investors, local businesses or even successful primary cooperatives to facilitate their further growth and formalize the relationships for production. Alternatives may also include wholly private sector solutions involving a partnership between multinationals and local companies. The partnership structure may also evolve, moving from a PPP to a wholly private sector solution over time.

The final structure will be determined by the financial and business interests of each party.

s9(2)(b)(ii)

Potential International Business Partners for FBF Manufacturing

A number of International businesses have expressed an interest in initiating negotiations to develop a business partnership agreement. Each of these entities would bring an equity investment to the project. Potential partners include:

- A leading supplier of vitamins and other ingredients to the food, animal feed, industries
- A global market leader in the supply of flour production plants, pasta and chocolate production lines, animal feed manufacturing installations
- A major international producer of skimmed milk powder, an integral component of our baby-food product and the most significant driver of the overall cost of inputs.

The potential partners may provide equity investments, competitive pricing on essential component of the product (micronutrient powders & skim milk), and experience in food manufacturing.

Leveraging our International Business Partners

The skills and expertise of these companies will be leveraged to build out the key elements of the business plan CHAI will work with the Government of Rwanda. These may include:

- Developing an understanding of the capital requirements for building these facility
- Developing detailed financing plans
- Calculating the ongoing operational and overhead costs for production
- Identifying revenue sources and determining pricing strategy
- Identifying the responsibilities of the Manufacturing Business Entity
- Analyzing options for packaging and the associated costs

Key Decisions

- **Business Structure:** The Government of Rwanda will need to decide to enter a PPP, or be an advisor with no equity participation. CHAI can advise on potential business structures that are available to the Government of Rwanda
- **Management Structure:** The Government of Rwanda will need to identify optimal management structure for a business partnership/PPP, level of financial and non-financial investment that the Rwandan Government wishes to pursue. The method of profit allocation will also have to be determined. CHAI and potential investors will identify potential management structures, and potential non-financial contributions
- **Incentives:** The Government of Rwanda will need to determine if any incentives that will be provided to the business. CHAI can support the Government to determine high value incentives for the business
- **Stakeholders:** The Government of Rwanda will need to decide which Ministries and other government bodies should be a part of the preparation for negotiations, who will represent the Government in negotiations, and who else would need to be consulted in assessing the non-financial equity contributions of the Government of Rwanda.
- **Legal constraints:** The Government of Rwanda will need to identify business constraints or legal constraints will potential business partnership be required to operate under

Additional information on those decisions can be found in Annex 2.

3. Local Procurement and Promotion of Agriculture

To ensure reliable supplies, CHAI and partners recommended by the Steering committee will develop a supply chain for inputs that will guarantee sufficient quantity of the major ingredients of the FBF of quality. Those ingredients will be procured domestically from smallholder farmers when and where possible. The table below outlines the volumes needed to produce the FBF for children of 6-24 months for the whole country²³.

Product (MT)		Volumes ²⁴
Raw Materials	Maize	15.2 K
	Soya beans	5.3 K
Processed Goods	Sugar	2.4 K
	Soya Oil	0.8 K (~4.4 K beans)
Imports	Skimmed milk powder	2.1 K

The supply chain development strategies identified are different for agricultural raw materials, processed goods and dairy. Each strategy is outlined below.

Agricultural Raw Materials: Maize and soya beans

Our three primary goals for procurement of raw materials are to

- reduce costs of procuring local agricultural goods;
- ensure reliable quantity and quality of goods, and;
- increase smallholder farmer incomes.

The guiding hypothesis of this work is that increasing farmer yields and reducing post-harvest losses will achieve all three goals simultaneously.

²³ Volumes are subject to changes based on final product formulation and the addition of the volumes for the nutrition dense products for pregnant and lactating mothers

²⁴ Assumptions in table: volumes only include children of 6-24 months, approx. 621K total, not PLWs; assumes that current product formulation with average daily consumption of 50g and 150g for children of 6-11 months and of 12-24 months respectively; the soya bean: approximations in the soya oil line are based on 18% oil: bean conversion.

Financing

Through its network of stakeholders, CHAI will attempt to raise low cost international financing, including from development finance institutions, donors, and market investors, for a foreign currency revolving loan fund that will be implemented by a Rwandan financial institution. By leveraging the borrowing capacity of multinational organizations, low-interest loans could be provided through a local institution to farmers for the purchase of seed and fertilizer at

s9(2)(b)(ii)

The structure of the fund and its implementing institution will be chosen based on its ability to offer the lowest possible interest rates to farmers targeted, its understanding of agricultural loans and risks, its ability to reach the target customers of farmers and/or cooperatives, and its ability to transact and process these loans quickly. The timing of the disbursement of the loans for both inputs and raw material collections financing is critical to the successful implementation of the program.

An extensive analysis of the efficiencies and effectiveness of various structures and their suitability will have to be made. Once the analysis is complete, the Government of Rwanda will decide on the best structure and criteria for identifying partners and CHAI will communicate this to the relevant donors and investors to begin implementation.

Cooperative Forward Contracting and Procurement

The Ministry of Agriculture (MINAGRI), the Rwanda Agricultural Board (RAB), and the Rwanda Cooperative Agency (RCA) are currently driving agricultural the productivity of smallholder farmers in Rwanda. This includes supporting the World Food Program in setting up forward contracts with cooperative unions for local procurements, through their Purchase for Progress program. The food processor can learn from their successes and challenges.

Scaling up production to the volumes demanded by the food processor will take time. In the first few years, while building the capacity of and relationships with the cooperatives and farmers, the food processor can also consider procuring from the Rwanda Grain and Cereals Corporation, the traders and the large/commercial farms.

Processed Agricultural Goods: Sugar and soya oil

Sugar

The current national sugar demand in Rwanda is 50-70K MT. s9(2)(b)(ii)

s9(2)(b)(ii) in Rwanda. It currently produces ~10-13K MT annually, depending on the seasonal variation. A recent partnership with the Government of Rwanda and the s9(2)(b)(ii) to increase the production capacity to over 30K Mt. Despite the increased production capacity, Rwanda will remain with a 20-40K MT supply shortfall. The Government of Rwanda on an import substitution solution. The FBF processor will analyze the local sugar supplies as well as the imports possibilities.

Soya Oil

There is currently no soya oil produced in Rwanda. s9(2)(b)(ii)

s9(2)(b)(ii) identified this market opportunity and will be the first supplier for the Rwanda's market, when they complete their factory and begin production in July 2013. They will begin by producing ~40 MT of soya oil or ~90 MT of sunflower oil daily and hope to scale up production to the full capacity of ~200 MT daily (73K MT annually) within 3 years.

Dairy: Skimmed milk powder (SMP)

Skimmed milk powder will be a key ingredient of the FBF. Rwanda currently does not produce skimmed milk powder (SMP). Since the dairy industry is a key priority for the Government of Rwanda, at the recommendation of the s9(2)(b)(ii) CHAI agreed to bring along the expertise to conduct the in country feasibility analysis for this separate venture. Once that analysis is complete, CHAI will present the results to the Government of Rwanda.

Key Decisions

In order to begin implementation of the above programs, the Government of Rwanda and/or relevant partners will need to make the following decisions

- Revolving Fund Size: The Government and CHAI will need to determine the optimal size of the revolving fund. CHAI and partners will support by identifying the volumes

required for each crop, and determining the level of capital injection needed to ensure sufficient, low-interest financing for farmers and cooperatives within the supply chain.

- s9(2)(b)(ii) The Government of Rwanda will need to decide which s9(2)(b)(ii) will contribute to s9(2)(b)(ii) CHAI will support the Government by shortlisting potential fund investors. s9(2)(b)(ii) The s9(2)(b)(ii)
- **Finance Partners:** If the structure for input financing entails the need of financial institutions or other partners, the Government of Rwanda will determine the criteria for vetting partners and will choose those most capable of offering loans to farmers and coops at the lowest interest rates
- **Coop Strengthening Support:** The Government and the coop strengthening support partners will need to assess and coordinate the kind of support that will go to the appropriate coop, and the associated timelines.
- **Collection Logistics:** The food processor and the Government of Rwanda will determine the most efficient way to collect the product from the coop unions and to take them to the factory with inputs from government partners. CHAI will support by providing different options, and associated costs.
- **Sugar:** the food processor, s9(2)(b)(ii) and the Government of Rwanda will need to agree to a forward contract partnership . CHAI can support the Government by providing cost implications of the negotiation terms. **Soya Oil:** The food processor, s9(2)(b)(ii) and the Government of Rwanda will need to agree to a forward contract partnership. CHAI can support the Government by providing cost implications of the negotiation terms. **SMP Production Analysis:** An expert from a leading global dairy company will conduct an analysis to determine the viability of setting up a profitable SMP factory in Rwanda with the assistance of CHAI and the Government.

Additional information on those decisions can be found in Annex 3.

4. Organizing Comprehensive and Efficient Distribution

Developing an efficient distribution network will be essential to ensure that nutritious foods reach all children in the country. The highest prevalence of stunting exists in rural areas and therefore the products must be distributed efficiently to small, remote villages in addition of towns and cities. Some factors such as quality of roads and distance to markets dramatically impact the availability of food. A special effort will be made for the three regions characterized by higher stunting rates, higher poverty rates and poorer infrastructure facilities. Potential distribution channels include public health systems that deliver medical products out to rural areas augmented by community health worker systems, existing private distribution networks or a combination of public and private networks. Methods of packaging will also be developed that are low-cost, limit waste and that can prevent food spoilage and help maintain food quality in the home.

Low access to infrastructure

Road network connectivity in Rwanda between peri-urban areas is relatively well developed but food availability remains a challenge in some remote rural areas²⁵. The poor quality of district roads, with only 37%²⁶ of them in good condition, represents a serious limitation in reaching rural households. In many districts of the Southern and Western regions, the walking time to market is three times longer and the walking time to the health facility is more than twice as high as the one required in urban areas²⁷. Main roads accessibility has a significant impact on food consumption score²⁸, and distance to hospital, on the likelihood for a child to be stunted. An assessment of the key factors explaining these higher stunting rates has to be performed to evaluate the relationship between relative geographic exclusion and stunting to efficiently integrate these parameters within the distribution strategy.

²⁵The RSTMP Road Network (i.e. of national and regional importance) consists of approximately 2,837km (nearly 20% of the total road network) of which 1,171km are paved (40%) and 1,667km are unpaved/gravel roads (60%). 9,302 km of the network are unclassified unpaved roads for which no standard capacity analysis exist.

²⁶ Summary of Transport backward-looking Joint Sector Review for the financial year 2011/2012, September 2012

²⁷ CFSVA, 2012

²⁸ Food Consumption Score (FCS) is an internationally used WFP standard score calculated by weighting the frequency of consumption (number of days per week) of different food groups consumed by a household during the seven days that preceded the interview. CFSVA, 2012.

The choice of distribution network

This requires the identification of the cost and model of the existing channels to create a reliable distribution network for the suite of nutritious products, to ensure easy access to the target, while preserving quality, ensuring traceability, control for risks and maintaining low costs.

Public Network

In Rwanda, health facilities exist within close proximity of villages' clusters and health commodities are delivered to these facilities on a monthly basis. Complementing this system is a network of community health workers that operates effectively in every village. The Government is looking for ways to enhance the locally generated incomes of these community health workers. CHAI will support the Government in the development of a business model for the distribution of the nutritious foods on the same trucks carrying health commodities (MPDD network), using the same ordering system but adding storage at the community health centers to accommodate the added supplies of food. To ensure that the food products reach families in need, the Community Health Workers network of 45,000 people will essentially become the "sales force" for the product by helping to educate women on the value of nutritious foods and on how to prepare the foods. Through this method of distribution, the Community Health Workers system will be enhanced financially, while establishing an efficient and effective distribution system for the product.

Private Networks

The Government in cooperation with CHAI will also explore the private sector means of distribution, where these channels exist or can be created and where the private sector distribution channels are suitable. Some major companies in Rwanda possess sophisticated distribution systems that could be mimicked to deliver commodities nationwide. Companies like s9(2)(b)(i) have strong supply chain management systems able to continuously absorb important flows of products and dispatch them through their network of distributors and retailers.

Customized Distribution Network

Based on the assessment and evaluation of public and private options, customized solution for distribution will also be considered. CHAI will support the Government in estimating the costs

and benefits of relying on other distribution solutions. These options will include evaluation of both public and private solutions, and combination of the two.

Packaging solution

CHAI is investigating a low cost packaging system that would minimize waste while still protecting the quality and shelf life of the food. The strategy that is evaluated would require the use of large airtight sacks to store and distribute the product from the factory until local storage points (health centers, cooperatives of Community Health Workers or retailers) that will be reconditioned in reusable light weight sealed jar to be sold to final consumers. They will store a week's worth of flour and will preserve shelf life of product with airtight caps that contain drying agents. They will enable customers to bring it back to the retailer to be exchanged for a new-product filled jar with fresh drying agents. A system to clean and sterilize the jars will be implemented (at central or decentralized level) to ensure respect of strict hygiene conditions and to limit waste. As a result, the jars could be included as a portion of the capital cost of the project and would avoid the need of costly and expensive non-reusable individual packaging.

Key Decisions for Consideration:

- Set of networks to analyze: The Government, with support from CHAI, will have to define the sample of networks it will consider for this evaluation, in both public and private sector. s9(2)(b)(ii)
- Choice of distribution network: Based on the analysis of a pre-selected sample of public and private networks and the proposition of customized one, CHAI will support the Government of Rwanda in evaluating each choice by conducting the following analysis:
 - s9(2)(b)(ii) The Government of Rwanda, with support from CHAI, will s9(2)(b)(ii)
 - s9(2)(b)(ii) The Government of Rwanda will need to determine will be evaluated to assess the s9(2)(b)(ii)

- o s9(2)(b)(ii) An evaluation of s9(2)(b)(ii)
- s9(2)(b)(ii) The most appropriate s9(2)(b)(ii)
- s9(2)(b)(ii) The Government of Rwanda will have to determine an s9(2)(b)(ii)
- **Additional information on those decisions can be found in Annex 5.**

5. Implementing Public Health programs on Nutrition

Rationale for Developing a Public Health Awareness Campaign

Current levels of knowledge, behavior and practice of proper Infant and Young Child Feeding (IYCF) is poor in Rwanda. Approximately 17%²⁹ of Rwandan children aged 6 to 23 months meet the minimum standard with respect to IYCF feeding practices of appropriate frequency of feeding, adequate variety of food groups, and consumption of breast milk. Health care workers and caregivers often fail to recognize signs of malnutrition, and are unequipped to address malnutrition.

National campaign for product launch

To ensure product acceptance and consumption, a national campaign will take place concurrently to the launch of the product. The messages will provide information on the benefits of the products to the children health as well as their mothers'. It will be particularly crucial that the national campaign informs on the stunting and how the fortified products we promotes can prevent it to appear. Ensuring availability of the product nationwide will be a key part of the strategy. A special focus will have to be made on Community Health Workers and Healthcare providers to ensure the target is reached. This would include dedicated training sessions, documentations and communications to standardize the message consistency and efficiency. This campaign will be implemented via channels that are different from the

²⁹ DHS, 2010

commercial campaigns that will be organized and financed by the company producing the product.

Implementation of education campaigns

CHAI will support the Government of Rwanda and relevant partners in developing and strengthening existing campaigns to educate families on the recommended breastfeeding practices, good hygiene practices, on complementary feeding for the 6-24 months, as well as for pregnant and lactating women as well as for infants aged six months to two years. The campaign will be aligned with national actions promoting good nutrition habits, such as the 2012 Joint Action Plan to Eliminate Malnutrition (JAPEM), by focusing on the 1000 day window.

The rationale for developing a subsidy mechanism

In Rwanda, the product will be sold at a price that is affordable for most families. s9(2)(ba), s9(2)(b)(ii)

At least one underlying factor influencing food purchasing behavior is the inability to afford nutritious products.

Limited availability of FBF for the most vulnerable

The product will cost approximately s9(2)(b)(ii) per annum³¹, depending on the age and weight of the infant, and the success of efforts to lower the overall costs of producing locally sourced nutritious foods. National statistics indicate that the average amount spend on food for s9(2)(ba) is approximately s9(2)(b)(ii) for a household of approximately 6 people per annum³². At the market price of the FBF product, over 40% of the household food budget would be needed to purchase the product for some families, making it financially prohibitive.

³⁰ CHAI analysis based on population in s9(2)(ba)

³¹ CHAI analysis based on estimates of Ethiopian company data.

³² EICV 3 – Consumption report, page 21.

Leveraging this existing system for identifying and distributing subsidies for s9(2)(ba) and Vision 2020 Umurenge Program (VUP), CHAI will support The Government of Rwanda in designing and implementing a subsidy program for low income households.

Funding mechanisms for the subsidy scheme and its sustainability

Two key principles will guide the creation of the subsidy model. First, the subsidy model should include a sustainable financing strategy for the upcoming years ensuring that sufficient resources will be available. It might include government support and donor's aid in the first place, but analysis will investigate additional options to ultimately minimize their interventions.. Potential revenue sources to offset the cost of the subsidy include exports to large purchasers (i.e. WFP) or the sale of higher priced products in urban markets. If the government decides on equity (financial or non-financial) participation in the business venture, the government portion of the profits can be allocated to offset the cost of a subsidy.

The alignment of subsidy schemes with the national strategies

Secondly, the subsidy model should aim at strengthening the existing subsidy mechanisms, and not at creating a parallel system of disbursing subsidies to the population. As with other social protection programs, the subsidy design should be aligned to the Vision 2020 goals, and to systems set up by the Joint Action Plan 2012 for the Elimination of Malnutrition (JAPEM).

Key decisions for Consideration:

Public Health Campaign

- Generating Demand: How the Government and partners will generate demand among pregnant women and households for the products
- Communication Strategy document: The Government of Rwanda will need to determine key messages, a calendar and the implementation plan
- Fund mobilization: The Government of Rwanda will need to identify funds to implement it the strategy

Subsidies:

- Target population: The Government of Rwanda will have to identify the target populations that will require financial assistance. It will have to determine which

Ubudehe categories will be included in the scheme, if the subsidies will be provided in exchange of public works or in exchange of other value-added activities. The Government will also need to determine if the subsidies amount need to account for variations in seasonal income for certain populations. CHAI will support the Government by collecting and analyzing data on population's ability to pay.

- **Subsidy size:** the Government of Rwanda will need to determine which population and what level of subsidy will be provided. CHAI will support the Government of Rwanda by developing detailed costing estimates of various subsidy scenarios.
- **Subsidy delivery mechanisms:** The Government of Rwanda will need to prioritize the mechanisms to be investigated, and ultimately, decide on the appropriate delivery mechanism to ensure easy and effective access to the target population, while keeping management costs low and ensuring tracking and proper monitoring. CHAI will support the Government of Rwanda by estimating the costs and benefits of each prioritized potential delivery mechanism.

Additional information on these decisions can be found in Annex 5

6. Monitoring and Evaluation

In the recent years, the Government of Rwanda has installed strong health information monitoring systems on which this program will leverage to measure its impact. Health information is collected at community and health facility level. Key households surveys complement this set of indicators, such as DHS, EICV and MICS³³. CHAI and the health professionals of the Steering committee will work together in identifying what existing indicators we will be followed to measure our success and how we will capture the information on additional indicators, so that the progress of this program is adequately measured and evaluated.

Existing Malnutrition data

³³ Country Accountability Framework: Assessment, Rwanda. Dar-es-Salaam, Tanzania, February 13-15, 2012

Severe and Acute Malnutrition is measured routinely at community level. Each month, the Community Health Worker is performing a screening of the under-five years old population, nutritional status, in their catchment area. The children are weighted; MUAC is also used to assess their nutritional status.

Measuring Stunting

The Ministry of Health is currently implementing the first national measurement of stunting. The size of all children under five years old will be measured and the size-for-age information will be recorded. This exercise will happen each year with the goal of following up the progress made since the 2010 DHS. This will give a baseline for the project as well as the impact information after product distribution.

Broader health impact

Additionally, the program may track progress in comparison to the prevalence of other high burden mortality drivers, such as under-five years old diarrhea, anemia and pneumonia, since chronic malnutrition underscores up to half of all under-five deaths. Provision of nutritious complementary foods may prove to have broader impact beyond the reduction of stunting.

Measuring new indicators routinely

CHA will support the Ministry of Health through the inclusion of new indicators like anemia for the under two years population and amongst pregnant and lactating mothers.

Complete M&E Framework

Additional data should be collected for the evaluation and control of potential confounders; including: sex, sex ratio (affects practices due to sex preferences), socioeconomic status (including household income/assets, access to improved water sources), geographic location (affects food prices, food types available, and employment opportunities available), local health care infrastructure, family size and composition, maternal health, maternal education, and ethnicity or subculture.

Key decisions for Consideration:

- Design an M&E framework: Relying on the current information systems mapping, an M&E framework will be designed including existing indicators and those that still

needed. Once designed this Framework will be presented to the Steering Committee for review and approval.

- Costing and Funding M&E framework implementation plan: Once the Framework is approved by the Steering Committee, the Framework will have to be costed, and funds mobilized so that it can be implemented.
- Implementing M&E Framework: The Steering Committee will work with partners and other organizations, such as academic institutions, to devise the most efficient and effective way to track the necessary indicators on a regular basis. Work will done to improve patient registers and other reporting forms, and support training of health care workers in data reporting processes that allow for these key indicators to be collected more systematically in the future.

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

Tentative Work-plan								
Activity	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan
Product Development								
Official approval of formulation on paper	■							
Receipt in country and Government lab testing of first sample		■						
Organizing and coordinating product sampling / acceptability				■				
Implementing product sampling					■			
Design packaging			■					
Creation of Local Food Processing Manufacturers								
Food Processing Business								
s9(2)(ba)	■	■	■	■	■	■	■	■
Development of Business Plans for FBE Business								
Level of Government financial and non-financial involvement		■	■	■	■	■	■	■
s9(2)(ba)								
Business environment analysis		■	■	■	■	■	■	■
s9(2)(ba)								
Promotion of Local Agriculture and Procurement of Other Necessary Commodities								
Identify Volumes of Production				■	■	■	■	■
s9(2)(ba)	■	■	■	■	■	■	■	■
Value Chain Interventions								
Coop landscape analyzed and vetting criteria determined	■							
Coop due diligence and short listing			■					
Coordinating partners for coop support				■				
Signing coop forward contracts					■			■
Ensure seeds get to farmers						■		
Ensure fertilizers get to farmers							■	
Post-Harvest Handling & Quality								
Coop storage capacity field assessment					■			
Storage intervention organized (if any)						■		
Logistics systems analyzed & chosen							■	
Quality assurance strategy analysis								■

Dairy										
Assessment of SMP production potential										
Begin SMP investment (if relevant)										
s9(2)(ba)										
Organizing Comprehensive and Efficient Distribution										
Areas with High Prevalence of Stunting										
Assessment of factors explaining high stunting rates										
Evaluation of the role played by these factors in the relative geographic exclusion										
Development of strategies addressing challenges to ensure coverage efficiency										
Distribution Networks										
Identification and analysis of a preselected sample of public and private networks										
Networks shortlisting for complementary analysis										
Detailed cost and benefit analysis for short list										
Proposition of customized distribution solution (if relevant)										
Decision on distribution network to use for nutritious product										
Design of Implementation strategy										
Implementing Public Health Programs on Nutrition										
Public Health Awareness Campaign										
Costed communication strategy										
Funds mobilization										
Implementation plan										
Training / workshop with local authorities, CHWs and other network members										
Campaign launch										
s9(2)(ba)										
Implementing Effective Monitoring and Evaluation										
Mapping of existing information system										
Design an M&E framework										
Costing and funding of M&E framework implementation plan										
Implementing M&E framework										

ANNEX

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

Contents

Annex 1: Information on Product Development	37
Annex 2: Creation of local food processing manufacturers	40
Annex 3: Local Procurement and Agricultural Development	44
Annex 4: Organizing Comprehensive and Efficient Distribution	48
Annex 5: Public Health Programs – Subsidy Mechanism	54

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

Annex 1: Information on Product Development

The baby food processor must provide a fully nutritious food for the infant and pregnant and lactating women (PLWs) markets meeting their complete nutritional requirements. These foods will compliment local eating habits so they can be easily integrated in existing local diets. The products will be designed so that they are of the highest quality and can be sourced, manufactured and distributed at an affordable price for most families. The major components (the base) of these food products will leverage local agricultural inputs, like maize in Rwanda, which will inherently reflect existing eating habits. In addition to the economic benefits of a low-cost product, the farmers and surrounding communities will also realize the economic benefits of being part of the value chain of inputs.

Understanding the variety of Eating Behaviors of PLWs and Infants across Rwanda is Essential to Developing Appropriate Products

CHA has undertaken preliminary field assessments covering fifteen districts of the country to investigate existing eating habits, with a particular focus on infants and children. This study revealed that a grain-based (sorghum, maize or soya) porridge is the most prevalent complementary food for infants, usually starting between 4 and 6 months. Most children continue to eat 3 meals a day until adolescence while a majority of adults eat only 2 meals a day. The additional meal eaten by children is typically porridge in the morning.

Breastfeeding Practices

UNICEF and WHO recommend that children be exclusively breastfed during the first 6 months of life and that children be given solid or semisolid complementary food in addition to continued breastfeeding from 6 months to 24 months. In Rwanda, 85% of children under age 6 months are exclusively breastfed. 86% of Rwandan children continue to breastfeed until age 2. The median duration of any breastfeeding is 29.4 months, and the mean duration is 27.2 months. The median duration of exclusive breastfeeding among Rwandan children is 5.3 months, and the mean duration is 5.9 months.

Complementary Feeding Practices

61% of children begin eating complementary foods at 6-8 months. 91% of breastfed children age 6-23 months receive solid or semisolid complementary foods in addition to breast milk. Consumption of foods made from legumes and nuts (66 percent), fruits and vegetables rich in

vitamin A (68 percent), food made from roots and tubers (45 percent), and food made from grains (31percent) is high. Consumption of food made from animal sources (meat, fish, and poultry) is low (17 percent). There is no complimentary food in Rwanda that provides a sufficient daily nutrient suite like the fortified baby food will.

Partnership for Successful Product Development

To effectively design a product that would be able to meet all of an infant's nutritional needs within a portion size that can be consumed by infants, the expertise of experienced nutritionists and food scientists is required. In partnership with DSM and the World Food Program, a selection of products formulations is being developed for input and approval by Government of Rwanda. Through a series of focus group studies a number of different product formulations and flavors will be tested for acceptability by the target markets.

Product Composition

Nutrition Requirements and Other Considerations for Infants (6-24 months of age)

A comprehensive diet which meets the infant's caloric, nutrient, fat, protein and lipid needs will promote the development of a healthy, cognitively unimpaired child with a strong immune system able to adequately defend itself against infection. Infant's foods will be nutrient dense complementary foods for children 6-24 months, in addition to breast milk. The first prototype for the infant food is a maize-based porridge, similar to a fortified corn-soya-blend product which mimics the types of complementary foods that are commonly being fed to infants in Rwanda.

Nutrition Requirements and Other Considerations for PLWs

PLWs have increased nutrient needs compared with non-pregnant, non-lactating women. Targeting this group requires an assessment of iron, folic acid, calcium, essential fatty acids, protein and energy requirements and the best way to comprehensively integrate them into a product. Depending on the number of servings required for both the infant and PLW food, minimizing preparation time is paramount since women's time is a serious constraint.

Packaging Requirements

The high-quality of ingredients and manufacturing must be matched by high-quality packaging. This will be essential to meet final regulatory approval and to protect the quality and safety of

the food. This program cannot tolerate any quality issues. Packaging will need to ensure that the product is resistant to light, moisture and exposure to oxygen and airborne bacterium. When designing packaging to comply with safety and affordability objectives, the baby food processor work within the relevant legislation in Rwanda, including plastic use constraints.

Regulatory and Approvals Processes

The Rwanda Bureau of Standards (RBS) is currently the main regulatory body for all standards in Rwanda and the Ministry of Health will be the line ministry responsible for nutrient content and food safety. The Fortified Food processing facility will need to comply with the Food Processing Law and the required accreditation, licensing and auditing. The nutritious product will comply with the Food Substitute Law and the relevant approval processes required. If the Food and Drug Administration law is established, the food processor will also need to comply with that law and work closely with the FDA and RBS.

Decisions

In order to begin implementation of the above programs, many analyses will need to be conducted and Government of Rwanda will need to make the following decisions:

- Porridge: approval of product concept of cereal porridge with maize base
- Product Formulation: Inputs to and approval of the product formulation and related nutrient content of the product for initial product testing as well as approval of the final product formulation, post testing.
- Product Testing: organizing, approving and implementing acceptability testing with target markets
- Regulations: approval of licensing/certification/approval processes through RBS or other relevant international and/or Government agencies

Annex 2: Creation of local food processing manufacturers

Objective:

To develop a business venture that takes advantage of government and potential investor's expertise, and to create a business plan.

The nature and extent of the Rwandan government involvement will be determined by the investment and the nature of the ownership of the business. CHAI will partner with the Government of Rwanda to understand what ownership/partnership structures, financial investments and non-financial contribution the Rwandan government would be interested in pursuing. CHAI will also support the Government of Rwanda and investors to develop a business plan for the set up and on – going operations of the business venture.

Progress to date:

Non-financial contributions and incentives have been identified if the Government of Rwanda chooses to have an equity investment in the business venture

A Public Private Partnership (PPP) may be preferred by the Government of Rwanda. A PPP may enable the government to allocate a portion of the profits from the business venture towards offsetting the cost of subsidization of the product for those that are unable to afford it.

Land

Site for factory is required before construction can begin; government can assist with acquisition / donation of suitable plot. Analysis will be made to identify the location of the land.

Questions to be resolved on the issue of land location, allocation and valuation

- Identify the best location for the land and factory
- Evaluate market value of the land
- Evaluate availability and accessibility to infrastructure
- Comply with potential local regulations and evaluate amenability of local government to build a factory

Access to infrastructure

Roads, electricity, gas, sewage and other support structures will be required to successfully develop a site for manufacturing the product.

- Time estimation to build the necessary infrastructure, including roads, electricity, sewage, etc.
- Mapping and evaluation of cost for the various infrastructure options.
- Assessment of the possible level of integration with existing infrastructure development programs run by the Government of Rwanda and ways of valuation as part of the capital
- Costing of each of cost components build up (e.g., CapEx and ongoing maintenance and operational costs)

Tax exemptions

Significant components of business operational costs are due to product taxes including import taxes and taxes applied to the finished products sold within country

- Evaluation of taxes that would apply for the PBF product produced in country, including import duties such as packaging materials and milk powders
- Investigate the value of tax exemptions or tax breaks for the business and determine if it can be considered as government contribution
- Time required to adjust taxation rates in case this option is followed

Marketing and product promotion The Government may choose to introduce a seal of approval for baby-foods meeting agreed standards (e.g., logo on product packaging) to encourage mothers to purchase and use product and provide funding to promote education about the product

- Government willingness to promote product by creating a "seal of approval"
 - Identification of criteria to be developed so that multiple companies have the ability to achieve this standard
 - Cost evaluation for Government to implement this type of approval process

In addition the Government of Rwanda will potentially choose to run education campaigns to increase awareness of the product and its quality and importance for infant development, as well as programs on how to prepare and feed the product to the child, which provides inherent value to the business venture

- Estimation of cost to be supported to implement a marketing campaign
- Investigation on the best avenues that would be used to run marketing campaign (e.g., Community Health Workers, pamphlets, media)

The components of the business plan that must be developed have been identified

The skills and expertise of these companies will be leveraged to build out the key elements of the business plan CHAI will work with the Government of Rwanda. These may include:

- Developing an understanding of the capital requirements for building these facility(ies)
 - The size of the factory, square footage of land required
 - Capital costs for production equipment, land and infrastructure
 - Onsite storage requirements
 - The production processes to be used, number of production lines and cost of these equipment
- Selecting the number of factories required
 - Underlying costs of establishing a new site: land, infrastructure, civil works, storage
 - Evaluation of production efficiencies
 - Available of raw materials in each of the potential sites
 - Required production volumes to achieve economies of scale, efficiency dividend achieved at and above scale, determination of upper boundaries these efficiencies
- Developing detailed financing plans to determine
 - The appropriate ratios of debt to equity
 - Identifying favorable debt sources (ie. World Bank)
 - Strategies for securing low cost debt financing for construction and working capital
- Calculating the ongoing operational and overhead costs for production
 - Optimizing operation efficiency of the factory to minimize production cost
- Identifying revenue sources and determining pricing strategy
 - Estimating revenues from exporting, outsourcing, urban markets etc
- Identifying the responsibilities of the Manufacturing Business Entity
 - Procurement decisions and relationships with cooperatives and supported agricultural entities
 - Positioning and integration into the distribution component (commercial and government owned)
- Analyzing options for packaging and the associated costs

- Cost-benefit and environmental analysis on re-usable containers versus disposable packaging and associated capital and ongoing operational costs
- Environmental impact assessments

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

Annex 3: Local Procurement and Agricultural Development

Objective

The overall goal of this work stream is to develop affordable, reliable supply chain models that guarantee sufficient quality and quantity of the major ingredients of the FBF and PLW products, procuring domestically from smallholder farmers when possible. The supply chain development strategies identified are different for agricultural raw materials, processed goods and dairy.

Our three primary goals for procurement of raw materials are to (1) reduce costs of procuring local agricultural goods; (2) ensure reliable quantity and quality of goods, and; (3) increase smallholder farmer incomes. The guiding hypothesis of this work is that increasing farmer yields and reducing post-harvest losses will achieve all three goals simultaneously. For processed goods, namely soya oil and sugar, the goal is to procure from a domestic producer. For dairy the goal is also to procure skim milk powder from a local producer, but currently there is no production in Rwanda, so CHAI brought in an expert to analyze the market viability of an SMP plant in Rwanda. The dairy plan will be designed after the results of that analysis.

Progress to Date

CHAI has made some progress to date on the below areas, but the progress is limited because much of the analysis and decision making relies on significant involvement from the Government of Rwanda and could not be done without guidance from the steering committee. This section describes some of the main components of this work in more detail.

Post-Harvest Handling: Storage, logistics and quality assurance of crops

In many staple crops supply chains, low productivity farmer incomes result from both poor yields and significant post-harvest losses; this part of the program will exist to minimize those losses.

Storage: since Rwanda is such a small country with very impressive road infrastructure, the food processor will plan to setup sufficient storage on site to ensure quality, fumigate regularly, and reduce pest and disease infiltration. However, bacterial infections, like aflatoxins, and other compromising agents can originate on farm, so the cooperatives may also have to develop higher quality storage facilities. The Government of Rwanda and CHAI will need to carry out an assessment of the storage capacities of its partner cooperatives to determine

whether increased capacity or improved hygienic standards are needed and then work with the coops and other partners to come up with solutions to this constraint.

Logistics: the FBF and PLW Food processor and CHAI will need to determine the most cost effective way of transporting the product from the coop stores to the factory (ies) without compromising the quality. Some options include paying the coops a higher price to deliver to the factory, outsourcing the logistics to a trader or other third party, or make upfront and ongoing investments in managing an internal logistics system within the processing company.

Quality Assurance: in addition to storage and logistics, the baby food processor and CHAI will determine other ways of assuring quality through the post-harvest supply chain, including but not limited to extensive pre-purchase product testing, working with farmers and coops to increase their Q/A systems, and paying a premium for better quality. Quality absolutely cannot be compromised in this program because of the negative impacts it could have on the infant consumers of the product.

Dairy: Skim milk powder

Rwanda currently does not produce skim milk powder (SMP); however, the dairy sector has a lot of potential. [REDACTED]

Once that expert analysis is complete, CHAI will present the results to Government of Rwanda and agree on a way forward regarding local procurement, importation if necessary, and import duties.

Key Decisions

In order to begin implementation of the above programs, many analyses will need to be conducted and Government of Rwanda and/or relevant partners will need to make the following decisions

- **Volumes:** the food processor will need to finalize volumes demanded for each crop during the planting season of 2014 based on final product formulation and factory capacity.
- **Revolving Fund Size:** the Government and CHAI will need to determine the optimal size of the revolving fund by conducting an analysis of what level of capital injection is

needed to ensure sufficient, low-interest financing for farmers and cooperatives within the FBF and PLW food supply chain.

- Revolving Fund Investors: CHAI will need to determine the partners/investors/donors to target for investing in/contributing to the revolving fund in consultation with the Government
- Revolving Fund Structure: the Government and CHAI will need to choose how the revolving fund is structured to provide easy access to timely, low-interest loans
- Finance Partners: if the structure for input financing necessitates financial institution or other partners, the Government and CHAI will determine criteria for vetting partners and choose those most capable of offering loans to farmers and coops at the lowest interest rates
- Coop Strengthening Support: the Government, CHAI and the coop strengthening support partners will need to assess and coordinate what coops receive what support, on what timelines in order to bolster production and storage capacity of partner coops
- Collection Logistics: the food processor and CHAI will determine the most efficient way of collecting the product from the coop unions and take them to the factory with input from government partners
- Sugar: the food processor and a domestic sugar producer will agree to a forward contract partnership with assistance from CHAI
- Soya Oil: the food processor and a domestic soya oil company will agree to a forward contract partnership with assistance from CHAI
- SMP Production Analysis: an expert from a global dairy company will conduct an analysis to determine the viability of setting up a profitable SMP factory in Rwanda with assistance from CHAI and government

Tentative Workplan

Below is a tentative outline of a workplan for the agricultural inputs work. The relevant stakeholders can use this draft to develop an improved version.

Annexes – Draft Nutrition Strategy – May 2013

Activities	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Responsible Party(ies)
Volumes									
Determine 2015 volumes/plant capacity									s9(2)(ba)
s9(2)(ba)									
Value Chain Interventions									
Coop landscape and vetting criteria									
Coop due diligence and short listing									
Coordinating partners for coop support									
Signing coop forward contracts									
Ensure seeds get to farmers									
Ensure fertilizers get to farmers									
Post-Harvest Handling & Quality									
Coop storage capacity field assessment									
Storage intervention (if any)									
Logistics systems analyzed & chosen									
Quality assurance strategy analysis									
Processed Ingredients									
Assessment of sugar landscape									
Forward contract agreement with sugar co									
Forward contract agreement with Soya oil co									
Dairy									
Assessment of SMP production potential									
Begin SMP investment (if relevant)									
Determine SMP cost reduction strategy									

Annex 4: Organizing Comprehensive and Efficient Distribution

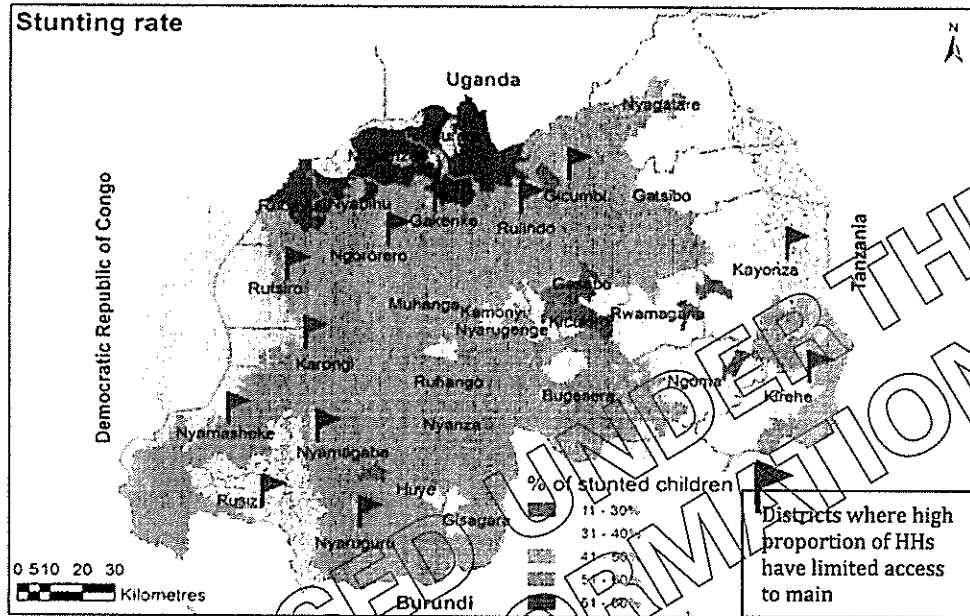
Objective:

The overall objective of this section is to develop an efficient distribution network that will ensure that nutritious foods reach all villages in the country. The highest prevalence of stunting exists in rural areas and therefore the products must be distributed efficiently to small, remote villages in addition to towns and cities. Some factors such as quality of roads and distance to markets dramatically impact the availability of food. A special effort will be put on three regions characterized by higher stunting rates, higher poverty rates and lower access to infrastructure. Potential distribution channels include public health systems that deliver medical products out to rural areas augmented by community health worker systems, existing private distribution networks or a combination of public and private networks. Methods of packaging will also be developed that are low-cost, limit waste and that can prevent food spoilage and help maintain food quality in the home.

Progress to Date:

To develop an efficient and reliable distribution strategy for the nutritious product, the following points have to be addressed:

1. *Evaluation of factors explaining high level of stunting in specific geographic areas*



Source: CFSVA and Nutrition Survey 2012

Three Rwandan regions are particularly affected by stunting: the Northern region - 60% in rural areas - the Lake Kivu areas - 51% - and the Congo Nile Crest - 50%, where more than half of households living with stunted children live in the Western and Southern provinces³⁴.

Despite the fact that road network connectivity in Rwanda is relatively well developed between peri-urban areas, food availability can be challenging in some remote rural areas³⁵. The poor quality of district roads, with only 37%³⁶ of them in good condition, represents a serious limitation to reach rural households. In many districts of the Southern and Western regions (red flags), a high proportion of households are living in villages located more than 5 km from main road³⁷ which is reflected by a walking time to market three times higher and a walking time to

³⁴ CFSVA, 2012

³⁵ The RSTMP Road Network (i.e. of national and regional importance) consists of approximately 2,837km (nearly 20% of the total road network) of which 1,171km are paved (40%) and 1,667km are unpaved/gravel roads (60%). 9,302 km of the network are unclassified unpaved roads for which no standard capacity analysis exist.

³⁶ Summary of Transport backward-looking Joint Sector Review for the financial year 2011/2012, September 2012

³⁷ CFSVA, 2012

health facility more than two times higher than for urban areas³⁸. Main roads accessibility has a significant impact on food consumption score³⁹ and, distance to hospital, on the likelihood for a child to be stunted. Also, relative market exclusion is expressed by the low levels of freight exchanged between the Western and Southern regions with other Rwandan cities⁴⁰, creating potential physical barriers for processed food producers to reach final consumers.

These two areas are also the ones with the highest poverty rates: 44.9% of people are considered as poor in Rwanda while this rate reaches 56.5% and 48.4% for the South and the West, respectively⁴¹.

A proper assessment of the key factors explaining these high levels of stunting has to be performed to evaluate to which extent relative geographic exclusion explicates this situation. A set of indicators will have to be developed to provide consistency in the analysis. Field visits in target areas might be useful to complete first set of information.

2. Choice of Distribution Network

One essential decision to be made concerns the choice of distribution network. This requires to identify, cost and model existing channels to create a reliable distribution network for the suite of nutritious products to ensure easy access to the target while preserving quality and maintaining costs low. A list of key evaluation criteria will also have to be developed to guide assessment and decision making (see below for a proposed set of criteria)

Proposed list of networks to be studied

Public Distribution Networks

³⁸ The map of Distance to main roads in Rwanda (CSFVA, 2012) shows that parts of the Western and Southern areas have relatively lower access to roads network.

³⁹ Food Consumption Score (FCS) is an internationally used WFP standard score calculated by weighting the frequency of consumption (number of days per week) of different food groups consumed by a household during the seven days that preceded the interview. Source: CFSVA, 2012.

⁴⁰ The detailed map of freight volumes exchanged between Rwandan areas (Strategic Transport Mater Plan, Rwanda, 2012) shows exclusion of the Western and Southern regions, where the volumes shared can be five times lower than for the other regions.

⁴¹ Statistical Year Book, 2012.

- MPDD network: Public Health Institutions possess their own network of distribution that dispatches medical products from the central level to the health facilities level through an active distribution system, via a network of 30 district pharmacies, supplemented by the network of 45,000 CHWs and/or 450 CHWs cooperatives or 450 health centers permanently connected to households in their community. Whether the Community Health Worker system should be the primary (or one of) the distribution vehicles should be assessed.
- Specific channels have been implemented to reach Community Health Workers or their Cooperatives with goods and services – example of PSI that provides SurEau to people through via CHWs network.

Private distribution Networks

Some major companies in Rwanda possess sophisticated distribution systems that deliver their products nationwide. Companies like s9(2)(a) have strong supply chain management systems able to continuously absorb important flows of products and dispatch them through their network of distributors and retailers.

- Ad hoc distribution networks for specific products imported to Kigali by distributors, stored at central level, sold to wholesalers that operate at district level (e.g. cosmetics).
- Mimic major companies' network: big companies possess sophisticated distribution systems (partially outsourced) to deliver their products nationwide. E.g.: s9(2)(a)
- Study the cases of SACCOs and Rwandan Women Network as example of networks with high level of coverage.
- Example of fertilizer system for farmers: subsidy with voucher system to ensure availability of product to vulnerable farmers (3 companies/organizations are in charge of distribution in the 30 districts)⁴²

Design or own the Network

Based on the assessment and evaluation of public and private options, customized solution for distribution will be envisaged as well. Estimated costs and benefits of possessing own network / outsource this activity will be considered.

⁴² Source: <http://headlines.rw/private-sector-takes-up-fertilizer-distribution/>.

- Design customized network: based on assessment and evaluation of public and private options, customized solution for distribution will be evaluated. Combination of both public and private networks might be an alternative.
- Study the possibility to create a market for new specialized logistics companies - don't exist yet in Rwanda

Proposed list of key evaluation criteria (not definitive) to be used to evaluate each distribution channel:

Table 1. Evaluation criteria to assess distribution networks

Evaluation criteria	Description
Preserve product quality and nutritious characteristics	Warehousing capacity to respect optimal storage conditions (temperature, humidity and prevent potential microbiological contamination with other food products).
Market coverage	Ability to reach efficiently all households, even the most remote places (incl. sales force) and during all seasons
Robustness, reliability and flexibility	Control risks and to face and react adequately to unplanned demand and supply shocks, without affecting production and products availability
Transportation of products	Capacity to reach all areas during all seasons while preserving products quality
Management of financial flows within the scheme	Centralization vs. decentralization of payments, costs of transaction and certainty
Monitoring and evaluation mechanisms	Forecasting and control of potential disturbances and ensuring optimal and timely response
Tracking tools	Ensure total traceability of food from the field to the plant, until the final consumer
Volumes of investments required	Launch distribution activity (might varies a lot depending on the chosen solution and existing transport and storage capacities)
Distribution and management costs evaluation	Incl. transportation costs(physical characteristics of goods delivered, distance), handling costs (function of the volume moved), inventory costs (capital and opportunity costs, storage space costs, inventory risks cost) and information costs (management of information between partners involved in the network)

Loading capacity and inventories	Aptitude to absorb substantial quantities of products (volume per region) and to manage efficiently inventories and buffer stocks from central to decentralized level to ensure continued availability of products
Integration with other activities	Creation of synergies with other activities to increase the overall efficiency of the system
Other key concerns	To be defined

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

Clinton Health Access Initiative

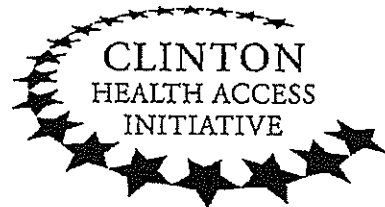
**Agricultural Strengthening for
Nutrition and Development**

Proposal

Submitted to the New Zealand Aid Programme

September 2013

RELEASED UNDER THE
OFFICIAL INFORMATION ACT



Executive Summary

Project Duration: 2013-2018 [s6(a)]

Location: Ethiopia, and [s6(a)]

Budget: US

[s9(2)(b)(ii)]

Project Goals: In the context of CHAI's nutrition initiative, a) to ensure a reliable, high-quality supply of ingredients for the local production of highly nutritious foods; and b) to substantially increase the productivity of smallholder farmers and lower post-production costs and waste, thereby raising farmers' incomes while accessing best possible prices for crop inputs.

Rationale and Approach:

CHAI is undertaking a multi-country initiative to help governments dramatically reduce the incidence of chronic malnutrition, or stunting, among children under five. In order to reduce stunting levels, households need access to highly nutritious foods for pregnant and lactating women; encouragement to exclusively breastfeed in the first six months of life; and access to nutrient-dense complementary foods for children from six months to two years of age. In partnership with governments and the private sector, CHAI intends to establish food-processing facilities that can produce nutrient-dense foods for pregnant/lactating women and for infants, by using locally available crops as the main ingredients.

In order to ensure the quality and quantity of these crops and boost the income of farmers – CHAI intends to work closely with Ministries of Agriculture and other partners to strengthen the agricultural practices of approximately 7.2 million smallholder farmers who will supply the food processing plant(s). Smallholder farmers' yields are constrained by lack of access to the credit and information necessary to buy the recommended packages of agricultural inputs like fertilizers and improved seeds, and losses are compounded by inadequate infrastructure for harvesting, storage, and transportation. CHAI intends to work through farmer cooperatives to address the root causes of yield constraints: developing financial tools to ensure access to credit, promoting uptake of the recommended packages of inputs, and improving harvesting and storage techniques to reduce crop contamination and loss. By working with farmers to substantially increase yields and lower waste, thereby enabling farmers to bring greater volume of crops to market, CHAI intends to lower the cost of the main ingredients for production while boosting farmers' annual household incomes by an estimated \$367, \$357, and \$254 per farmer in Ethiopia, [s6(a)], and [s6(a)] respectively by 2018. Intervention in post-harvest storage and transportation will additionally reduce the risk of contamination and other quality issues in input crops.

CHAI intends to launch this effort in partnership with the Government of Ethiopia, which has strong public systems and a firm commitment to tackling both nutrition and agricultural development. In Ethiopia, CHAI will work closely with the Federal Ministry of Agriculture and the Agricultural Transformation Agency, and leverage the network of agricultural extension workers who operate at the community level under the Regional Ministries of Agriculture. At the same time, CHAI will work with the Ministries of Agriculture of [s6(a)] and [s6(a)] to identify appropriate partners and formulate program plans to support the launch of similar efforts. All three countries have a rich landscape of NGOs supporting agriculture; rather than duplicating efforts, CHAI will collaborate with the appropriate partners to drive the targeted objectives of this agricultural strengthening work.

By engaging with the cooperative structure that underpins agricultural production in Ethiopia, [s6(a)], and [s6(a)], CHAI can ensure the supply of affordable, high-quality ingredients for the production of nutritious foods, while contributing to national economic development. Successes using this model may be applied across CHAI partner countries, and to other businesses relying on agricultural growth.

Table of Contents

1. Background on CHAI's Nutrition Initiative 4

2. Agricultural Strengthening: Introduction and Goals 6

3. Current Situation 10

4. Partner Landscape 16

5. Objectives & Activities 23

6. Monitoring and Evaluation 28

7. Budget 29

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

1. Background on CHAI's Nutrition Initiative

The Clinton Health Access Initiative (CHAI) is undertaking a multi-country effort to help governments dramatically reduce the incidence of chronic malnutrition, or stunting, in children under five. In CHAI's partner countries, more than 40% of children are stunted, due in large part to inadequate quantity and quality of nutritional intake in the critical first 1,000 days of life, between conception and a child's second birthday. Children who are stunted suffer from impaired cognitive development and have weakened immune systems, substantially increasing the risk of sickness and death from common childhood illnesses. Due to its debilitating impact on the immune system, malnutrition is considered to be a contributing factor in over 50% of all childhood deaths in developing countries.¹ While nutrition has gained attention in recent years through the organization of the Scaling Up Nutrition (SUN) Movement and accompanying advocacy efforts, large-scale programs to tackle stunting in a comprehensive way have yet to be implemented.

Building on strong relationships developed through CHAI and the Clinton Foundation's work in health care and agricultural development, CHAI will be partnering with Ministries of Health and Agriculture to establish comprehensive programs which fill all identified dietary gaps in early development: improving the nutritional status of pregnant and lactating women; promoting exclusive breastfeeding in the first six months of life; and promoting nutrient-dense complementary foods, alongside continued breastfeeding, for children from six months to two years of age. Since most households lack year-round access to sufficiently nutritious foods, CHAI plans to work with governments and private partners to develop a suite of nutritious products for infants and for pregnant and lactating women that is produced locally in state-of-the-art food processing factories, based primarily on local agricultural products, and aligned with local eating habits. To ensure sustainability, complementary nutritious foods must be produced affordably and promote the economic development of rural populations, where livelihoods rely heavily on smallholder farming.

CHAI plans to roll out this nutrition strategy urgently in numerous countries. The population of the country will determine the size and number of factories needed. In some larger countries like Ethiopia and [s6(a)], the initial factories will target the most strategic geographic areas first and scale up nationally over time. Each factory will take one year to build, from ground breaking to production of nutritious foods. CHAI anticipates [s9(2)(b)(ii)] market coverage of the target population of each factory by the end of its third year of production. In [s6(a)], the factory will begin producing in mid-2015 and reach [s9(2)(b)(ii)] of the country's entire population by mid-2018. In Ethiopia, the factories will be producing food in early 2015 in two regions that together make up of [s9(2)(b)(ii)] of Ethiopia's population. By the end of 2017, the nutritious food will reach [s9(2)(b)(ii)] of those two regions, or [s9(2)(b)(ii)] of the total population of Ethiopia. In [s6(a)], a factory will open in early 2016 targeting a region that encompasses [s9(2)(b)(ii)] of [s6(a)] total population; by the end of 2018 [s9(2)(b)(ii)] of its catchment area will be served, or [s9(2)(b)(ii)] of the population of the country. CHAI will seek to launch new factories in 2017 in Ethiopia and in 2018 in [s6(a)] to expand the program nationally and serve [s9(2)(b)(ii)] of the entire populations of the two countries three years after they launch.

CHAI will initiate this program in partnership with the governments of Ethiopia, [s6(a)] and [s6(a)]. All three governments have expressed their strong commitment to this program given their deep concerns about the impact of chronic malnutrition on their human and economic development.

¹ Rice et al., *Malnutrition as an underlying cause of childhood deaths associated with infectious diseases in developing countries*. Bulletin of the World Health Organization, 2000, 78: 1207-1221.

Government partners are intent on implementing practical solutions that can produce results urgently as this program has been created to do. In Ethiopia, a strong network of government-supported cooperatives and health extension services that reach the community level provide channels for both agricultural support and ensuring that nutritional products reach the population in need. In s6(a) and s6(a) , a mix of public and private sector channels may be used to reach the rural populations. All three countries support public-private partnerships that can provide socially beneficial products while creating jobs and promoting economic development. These three countries represent an opportunity to achieve impact rapidly while demonstrating the efficacy of a comprehensive approach to tackling chronic malnutrition.

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

2. Agricultural Strengthening: Introduction and Goals

CHAI's agricultural strengthening work will focus on supporting the cooperatives that will supply the ingredients for the production of nutrient-dense foods for pregnant and lactating women and infants. The table below shows the estimated annual maize and soya volumes needed to produce the fortified baby foods; these volumes will increase once the formulations for supplementary foods for pregnant and lactating women are finalized and these production volumes are included. At current levels of marketed smallholder yields, approximately, ^{s9(2)(b)(i)} smallholder farmer households will be engaged to supply the necessary volumes. Given the range in size of cooperatives within each of the countries, the number of cooperatives CHAI will partner with in each country will be determined over the next few months during the process of identifying and assessing partner cooperatives.

Figure 1: Total Farmers Required and Annual Crop Volumes Used in Production

Country	Total Farmers	Crop	% Marketed	% Consumed or Wasted	Annual Crop Volumes Used in Production of FBF (MT)			
					2015	2016	2017	2018
Ethiopia	s9(2)(b)(i)		28%	82%	s9(2)(b)(ii)			
			39%	61%				
s6(a)	s9(2)(b)(ii)	s9(2)(b)(i)	13%	87%				
			40%	60%				
s6(a)			28%	72%				
			40%	60%				
Total	s9(2)(b)(i)		20%	80%				
			40%	60%				

In order to create sustainable food processing businesses and for these foods to be affordable to a majority of the population without extensive government subsidization, crop ingredient prices will need to be on par with internationally competitive crop prices. At the same time, the crops need to meet a high quality standard in order to ensure that no contamination is introduced, particularly for the vulnerable population – pregnant and lactating women and infants – the program targets. CHAI anticipates that it will be possible to bring down costs and improve quality by working closely with smallholder farmers to overcome common barriers to production, which are outlined in more detail in the following pages. CHAI's approach hinges on driving substantial increases in smallholder farmer yields and lowering post-production costs and waste. By increasing the efficiency of crop production through targeted investments, CHAI expects to be able to keep crop prices low for the food production facilities while increasing profit margins for smallholder farmers. The table below outlines the yield and income increases anticipated for the farmers participating in this initiative.

Figure 2: Expected Yield and Income Increases Resulting from the Agriculture Strengthening Work

Country	Crop	Yields / Farmer		Annual Income / Farmer		
		2013 Baseline	2018 Projected	2013 Baseline	2018 Projected Increase (\$)	2018 Project Increase (%)
					(b)(2)(ii)	

* Income assumptions used maize only in Ethiopia. Model will be adjusted to account for wheat for factory.

One of the major constraints that smallholder farmers face in investing in agricultural inputs, and thereby increasing yields, is limited access to credit. CHAI plans to work with government counterparts to establish "facilitated contract farming" arrangements with cooperatives, (b)(2)(ii)

The parties agree to (b)(2)(ii) often with terms for (b)(2)(ii) the market price changes substantially. When arrangements are facilitated by the government, (b)(2)(ii) and (b)(2)(ii)

(b)(2)(ii) In addition to building loans into these agreements for agricultural inputs, CHAI intends to provide forward payments where feasible and efficacious to farmers in advance of the harvest season, to smooth farmer incomes over the year and reduce the impact of the "lean season" on the constrained household budget. CHAI will examine various options for establishing a low-interest revolving fund to ensure access to these types of credit.

By engaging directly with the suppliers of the crop ingredients for the food processing facilities, CHAI can better control the quality of the incoming goods, which is critical to ensuring a final product free of contaminants. Due to limited infrastructure for transportation and storage, crops may be exposed to mold, rot, bacteria, pests, animals, mycotoxins, and other contaminants between the field and the market. CHAI will work with the food processing facilities and government partners to establish a transportation and storage system that minimizes the time that ripe crops are exposed to potential contaminants. With influence over the package of agricultural inputs that farmers are using, CHAI will also be able to monitor the use of any harmful pesticides or other chemicals that could be damaging to human health, and particularly-sensitive infants, in the final product. CHAI will also consider establishing arrangements whereby crop payments are differentiated by quality standards, incentivizing farmers to reduce the risk of contamination in their harvested crops.

The specific goals of CHAI's agricultural strengthening work will be a) to ensure a reliable, high-quality supply of ingredients for the local production of highly nutritious foods; and b) to substantially increase the productivity of smallholder farmers and lower post-production costs and waste, thereby raising farmers' incomes while accessing best possible prices for crop inputs. CHAI will pursue these goals via

four major streams of work: 1) strengthening cooperatives; 2) developing financial tools; 3) expanding access to agricultural inputs; and 4) improving harvest and post-harvest technologies.

CHAI will be the overall facilitator and project manager of the nutrition program as well as the agricultural strengthening activities described within this proposal. However, partners will be critical to successful implementation. These partners and their proposed activities and responsibilities include:

- Ministries of Agriculture: Partner governments will provide overall support to program design and implementation including, but not limited to: s9(2)(b)(ii) and

regulatory support to cooperatives and sector strengthening through public extension networks; and political will behind agriculture-driven economic development, underpinning national development frameworks and policies.

- Donors: Donors are contributing to the agricultural strengthening work directly as well as potentially capitalizing the revolving fund that will provide affordable credit to farmers for inputs and to cooperatives for collecting and aggregating the harvest.
- World Food Programme (WFP): WFP is a partner in CHAI's Global Nutrition Program and has provided significant support to the development of the program, particularly in designing the formulations for the nutritious food products. WFP has indicated their intention to

s9(2)(b)(ii) Additionally, WFP is sharing information and experiences from their Purchase for Progress program, which will provide an additional offtake for surplus volumes of crops from partner cooperatives.

- Investors in the Food Processing Company: Investors will fund the establishment of joint ventures to run the food processing factories in each country.

s9(2)(b)(ii) i. These joint ventures, backed by the guaranteed purchases by WFP and the local governments, will guarantee the local market demand for soya and maize through forward contracting with cooperatives for the volumes they demand at a negotiated price, which will serve as collateral to enable low-cost financing to farmers and cooperatives. Investors will also be responsible for product development and market testing.

Technical Partners: s9(2)(b)(ii) is a global leader and specialist in plant and processing equipment for the food processing industry. They have extensive experience in Africa, providing processing and post-production harvest equipment and designing optimal workflows from farm to factory. s9(2)(b)(ii) is a technical partner in CHAI's Global Nutrition Program and has already begun designing optimal harvest, storage and delivery workflows for the factories in Ethiopia, to help minimize loss and potential for crop contamination.

- Local NGOs: CHAI is in the process of identifying and vetting the most qualified and experienced partners in each country to implement the cooperative strengthening and extension work directly; CHAI will also leverage opportunities to partner with other NGOs who are already funding work in these areas and will collaborate with CHAI without receiving direct support.
- Financial Institutions: CHAI is in the process of identifying and vetting financial institutions in each country to implement the revolving fund loan products at below market interest rates for the farmers and cooperatives in this supply chain.
- Cooperatives and Cooperative Unions: Cooperatives and their unions will be responsible for overseeing the planting and harvesting of their farmers, delivering inputs, accessing and possibly distributing loans, and finally aggregating and temporarily storing the crops post-harvest.

CHAI is building guarantees and accountability mechanisms into this structure to mitigate the risks involved in coordinating partners and ensuring they deliver on their responsibilities. For example, this program will be a strategic priority for the national governments in all of the partner countries with significant buy-in and political will behind its success. Ministries of Agriculture will also be members of the national steering committees the governments will establish to implement the program, so their input and expected responsibilities will be agreed upon from the outset. During the negotiations to set up the food processing companies, s9(2)(b)(ii)

s9(2)(b)(ii) s. The food processor and/or ^p weather and other risks relevant to crop production and harvest. While it will not be possible to eliminate all potential risks, CHAI will continue to seek opportunities to mitigate and proactively manage risks throughout the design and implementation of this initiative.

In Ethiopia, CHAI has completed preliminary analysis and scoping of the agricultural sector and is in the process of transitioning into project implementation in collaboration with the Ministry of Agriculture, the Agricultural Transformation Agency, and the World Food Programme. In s6(a) and s6(a), the scoping work is still in progress in partnership with the Ministries of Agriculture and with some support from the World Food Programme country offices. CHAI teams are in the process of analyzing: a) crop pricing, including inter- and intra-annual price variability, to determine whether the prices are internationally competitive and understand the best times of year and areas in which to buy; b) crop quantity and quality, analyzing whether it will be possible to procure the quantity demanded from cooperatives at the quality needed; and finally c) a landscape mapping of existing partners, cooperatives, input access, financial tools, and post-harvest handling and storage infrastructure, with the goal of identifying local capacity which may be leveraged through CHAI's agricultural strengthening support. In s6(a) and s6(a), the plans outlined below will be reviewed and updated following the completion of this scoping effort. ^p has been identified as a potential implementing partner for the cooperative strengthening and extension work in both countries.

s9(2)(b)(ii)

3. Current Situation

3.1 Economic Growth and Development Depend on Agriculture

Agriculture forms the foundation of the Ethiopian, [s6(a)] and [s6(a)] economies, making increases in agricultural productivity and profitability essential to economic growth and development. For all three countries, agriculture plays the dominant role in economic production and employment. Ethiopia's agriculture sector, which is growing at 8.5% per year,² accounted for 41% of GDP and 90% of exports in 2010, and employed 85% of the population.³ Agriculture is the most important sector of [s6(a)] economy, employing about [s6(a)] of the workforce, while more than [s6(a)] of the rural population ([s6(a)] million households) consists of smallholder farmers.⁴ In [s6(a)], the agriculture sector accounts for about [s6(a)] of the national income and [s6(a)] of merchandise exports, serves as the primary source of food, and provides employment opportunities to about [s6(a)] of [s6(a)].

Recognizing the centrality of agriculture to economic development and transformation, all three countries have concentrated efforts to further agricultural growth. Ethiopia has made immense economic and strategic commitments to agriculture, allocating 13-17% of government expenditures to sector development,⁵ and positioning it at the center of its national Growth and Transformation Plan.

[s6(a)] and the [s6(a)] provide the overall framework for national development, while the [s6(a)] [s6(a)] of 2006 guides implementation.⁷ The Government of [s6(a)] has elevated agriculture and nutrition as key national policy priorities and developed an [s6(a)] [s6(a)] through a consultative process with stakeholders and made targeted commitments under the Comprehensive Africa Agriculture Development Program.⁸ All three countries are signatories of the Comprehensive Africa Agriculture Development Programme (CAADP) that commits them to spending at least 10% of their national budgets on agriculture and ensuring at least a 5% raise in productivity annually.⁹

3.2 Opportunities to Increase Agricultural Productivity and Profitability

Reinforcing agricultural sector growth means improving productivity and profitability for the millions of smallholders who make up the backbone of these agriculture economies, but who currently produce at

² World Bank, *Country Partnership Strategy for the Federal Democratic Republic of Ethiopia*, Ethiopia Country Management Unit, Africa Region, 19 August 2012; CAADP, *Rwanda Agricultural Growth, Poverty Reduction, and Food Security*, available at: www.resakss.org/index.php?pdf=39445 accessed 28 June 2013.

³ Techane Adugna, Director, Planning and Programming Directorate of the Ministry of Agriculture, "Ethiopia's Agriculture Sector Policy and Investment Framework (PIF), Dec 6, 2010.

⁴ "Rural Poverty in [s6(a)]" International Fund for Agricultural Development Rural Poverty Portal, retrieved Aug 2013, from: [http://www.ruralpovertyportal.org/country/home/tags/\[s6\(a\)\]](http://www.ruralpovertyportal.org/country/home/tags/[s6(a)])

⁵ [s6(a)] Government website on agriculture, retrieved Aug 2013, from: [http://www.\[s6\(a\)\]/agriculture.html](http://www.[s6(a)]/agriculture.html)

⁶ Federal Republic of Ethiopia, Ministry of Finance and Economic Development and Ministry of Agriculture and Rural Development, "Global Agriculture and Food Security Programme Request for Funding Public Sector Window, Agricultural Growth Programme" 29 Sept 2010 [s6(a)] [s6(a)]

⁷ "Private Sector Development Mapping: Final Report,"

[s6(a)], World Bank/FAO Cooperative Programme, 31 Oct 2008, p. 12

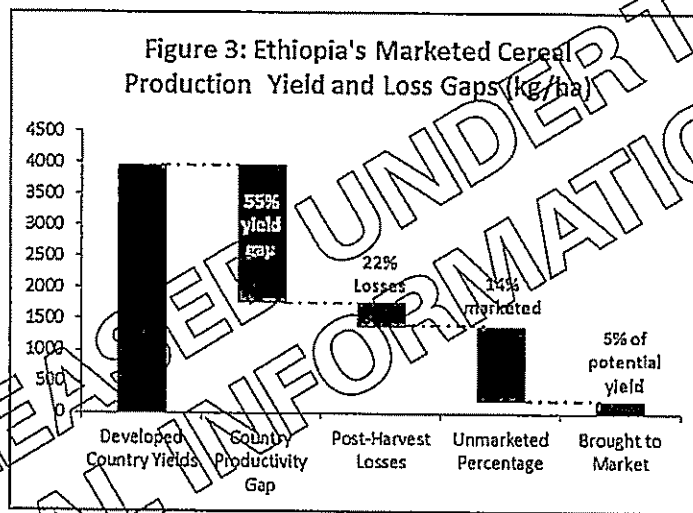
⁸ [s6(a)] Country Context, Feed the Future website, retrieved Aug 2013, from: <http://www.feedthefuture.gov/country/>

⁹ The New Partnership for Africa's Development (NEPAD)'s Comprehensive Africa Agriculture Development Programme [s6(a)] (CAADP) official website, retrieved Aug 2013, from: <http://www.nepad-caadp.net/about-caadp.php>

s6(a)

only subsistence levels. Average plot sizes in all three countries are extremely small: in Ethiopia 55% of farmers operate on one hectare or less, in s6(a) of small-scale farmers operate on less than two hectares, and in s6(a), average landholdings have fallen from s6(a) hectares in 1968 to s6(a) hectares today.^{10,11,12} Poor yields and limited profitability of these small plots often prevent smallholders from making sufficient income. Partly as a result, 29.6% of Ethiopia's population, s6(a) of s6(a)'s population, and s6(a) of s6(a)'s population live below the national poverty line.^{13,14,15}

Fortunately, there is significant room to improve the productivity and profitability of smallholder farmer cereal yields, which are the largest portion of production in all three countries.¹⁶ Currently, the production brought to market in these countries only represents a fraction of potential yields, as measured by benchmarks in developed, upper-middle income countries. As can be seen in Table 1, the productivity and profitability of crop yields is reduced at several stages as crops are brought to market.



Overall, cereal production in all three countries falls far below international benchmarks. Due to a variety of factors, Ethiopia produces only 45% of the cereal yields, or kilograms per hectare, of developed countries.¹⁷ In s6(a), yields have not improved since the 1970s.¹⁸ Average yields per hectare in s6(a) over a seven year period (1996-2003) range from s6(a) metric tons (MT) per hectare. This average is well below an achievable potential, as yields of 6 MT per hectare are achieved

s6(a)

¹⁰ MINAGRI Ministry of Agriculture and Animal Resources: Annual Report FY 2011-2012.

¹¹ "Private Sector Development Mapping: Final Report," s6(a), World Bank/FAO Cooperative Programme, p. 9.

¹² "Rural Poverty in s6(a)" International Fund for Agricultural Development Rural Poverty Portal, retrieved Aug 2013, from: [http://www.ruralpovertyportal.org/country/home/tags/s6\(a\)](http://www.ruralpovertyportal.org/country/home/tags/s6(a))

¹³ World Bank Data, Ethiopia, retrieved Aug 2013, from: [http://data.worldbank.org/country/ethiopia/s6\(a\)](http://data.worldbank.org/country/ethiopia/s6(a))

¹⁴ World Bank Data, s6(a), retrieved Aug 2013, from: [http://data.worldbank.org/country/s6\(a\)#cp_wdi](http://data.worldbank.org/country/s6(a)#cp_wdi)

¹⁵ World Bank Data, s6(a), retrieved Aug 2013, from: [http://data.worldbank.org/country/s6\(a\)](http://data.worldbank.org/country/s6(a))

¹⁶ 48.14% of total production in Rwanda (CARANA Corporation 2010) and 70% of agricultural GDP in Ethiopia (Dercon, S. and R.V. Hill, *Growth from Agriculture in Ethiopia. Identifying Key Constraints*, DFID 2009)

¹⁷ CHAI analysis of FAO, FAOSTAT, available at: <http://faostat.fao.org/site/339/default.aspx> accessed: 28 June 2013.

¹⁸ "Rural Poverty in s6(a)" International Fund for Agricultural Development Rural Poverty Portal, retrieved Aug 2013, from: [http://www.ruralpovertyportal.org/country/home/tags/s6\(a\)](http://www.ruralpovertyportal.org/country/home/tags/s6(a))

by some farmers under field conditions without irrigation.¹⁹ Therefore, increasing yields on existing plots represents a major opportunity to bolster economic returns for smallholder farmers.

A significant portion of yields is lost during and after production due to sub-optimal harvest and post-harvest practices. In Ethiopia and [s6(a)], harvest and post-harvest losses are estimated to range from 20% to 40% of total production,^{20,21,22} the estimate of losses in [s6(a)] is 25-35%.²³

Finally, poor market coordination, a lack of sources of reliable demand, and variable prices discourage farmers from actually selling their crops at market. As a result, many farmers use their crops for subsistence, feed, seed, or wages-in-kind. Often only a fraction of production is brought to market: 14% and ~25% in Ethiopia and [s6(a)] respectively.^{24,25}

Together, these problems drive down the agricultural productivity and profits of smallholders across all three countries. Across the following pages, the major root causes of these problems will be further examined.

3.3 Suboptimal Input Utilization Drives Poor Agriculture Yields

In Ethiopia, [s6(a)] and [s6(a)], inadequate use of fertilizer and seed limits yields. In Ethiopia, only 4.7% of farmers used improved seed and 39% used chemical fertilizers during the 2007-2008 season.²⁶ For maize production, where fertilizer and seed use tend to be highest, only 11% of farmers use both improved seed and fertilizers simultaneously, a method which would maximize proven compounded productivity gains.²⁷ In [s6(a)], about 58% of all farms use at least some improved seed, but most of these continue to use non-improved seed as well.²⁸ In a recent survey in [s6(a)], less than 15% of farmers were using fertilizer and 77% of farmers could not afford improved seed.²⁹

Three major factors limit access to these fundamental tools for increasing agricultural productivity:

- Supply of improved inputs for production is less than potential demand;
- Farmers often can neither afford improved inputs nor access affordable credit; and
- Many farmers currently lack the necessary knowledge to appropriately apply these inputs.

¹⁹ "Private Sector Development Mapping: Final Report," [s6(a)] [s6(a)]
[s6(a)], World Bank/FAO Cooperative Programme, 31 Oct 2008, p. 17

²⁰ IFPRI, *Maize Value Chain in Ethiopia: Constraints and Opportunities for Enhancing the System*, Washington DC, 2010.

²¹ Estimated Post-Harvest Losses (%) 2003-2012 for maize in [s6(a)] "African Postharvest Losses Information System, retrieved Aug 2013, from:

http://www.aphlis.net/index.php?form=losses_estimates&co_id=30&prov_id=416&c_id=324&year=2012

²² [s6(a)] [s6(a)] Toward an African Green Revolution," PLoS Biologues, [s6(a)] retrieved Aug 2013, from: [s6(a)]

²³ "Improving Market Access and Value Addition for Sustainable Agricultural Development," [s6(a)] retrieved Aug 2013, from: [s6(a)]

²⁴ National Institute of Statistics of Rwanda, 2011; Central Statistics Agency Ethiopia, *Agriculture Sample Survey 2011/2012: Report on Crop and Livestock Utilization*, Volume VIII Addis Ababa: August 2012.

²⁵ "Private Sector Development Mapping: Final Report," [s6(a)] [s6(a)]
[s6(a)], World Bank/FAO Cooperative Programme, 31 Oct 2008, p. 16

²⁶ Dercon 2009.

²⁷ IFPRI, 2010.

²⁸ "Drivers of improved maize variety adoption in drought prone areas of [s6(a)]" *Journal of Development and Agricultural Economics*, [s6(a)], from:

[s6(a)]
²⁹ "Private Sector Development Mapping: Final Report," [s6(a)] [s6(a)]
[s6(a)], World Bank/FAO Cooperative Programme, [s6(a)] [s6(a)] [s6(a)]

Supply Constraints Limit Improved Input Use

The supply of improved inputs has been highly variable in these partner countries. For example, in Ethiopia, seed and fertilizer sales are dominated by the public sector and often face shortages. Current seed supply meets only 50% of demand in country,³⁰ and fertilizer is imported at high prices through an erratic and complex supply chain.³¹

Farmers Cannot Afford Improved Inputs nor Access Affordable Financing

On the demand side, farmers often cannot afford improved inputs due to both high prices and the seasonal nature of smallholder farmer income. Often, farmers do not have the cash on hand to afford inputs during the planting season due to the nature of one-time, bulk sale of crops at the harvest season.³² Adverse events, including inflation and bad weather, can cause poor harvest returns and subsequent capital shortages, leading farmers into a downward spiral of poor productivity.

Such affordability issues could normally be alleviated through access to credit, savings, insurance, or other financing, but these mechanisms are only sparsely available in CHAI's partner countries. In particular, credit is constrained across all three countries. Although microfinance organizations exist in Ethiopia, [s6(a)] and [s6(a)], loans to farmers are often supplied only under high interest rates with prohibitive conditions. In Ethiopia, interest rates can range from 12-23%³³ and most often require collateral of 100% of the loan plus interest³⁴ in [s6(a)], access to financial services is severely restricted, especially for smallholder farmers. Only 12% of households have access to credit and the interest rates are often prohibitively high.³⁵

Farmers Lack Information on Improved Input Use

Even when improved inputs are available and affordable, farmers may lack access to the information necessary to use them appropriately. In particular, tailoring fertilizer and seed products to soil and weather conditions can be difficult. In recognition of this problem, Ethiopia has rapidly expanded its public agricultural extension services, reaching more farmers with technical capacity-building support, and has suggested bundling improved inputs upstream for more optimal use.³⁶ In [s6(a)], extension services have traditionally been provided by the government with minimal involvement of the private sector; recently, several NGO- and farmer-led initiatives have started to assist the government in reaching farmers. More than 200 NGOs are now involved in agricultural extension programs, either as a primary activity or as part of an integrated rural development program. The [s6(a)] continues to work toward building an effective, national public extension network with an extension worker in every village.

Cooperatives Take Center Stage in Enhanced Input Use

Across all three partner countries, cooperatives provide a primary interface to farmers for improving marketing, distribution, technical assistance and access to financing for improved inputs, but these

³⁰ Interview with MoARD Input Marketing Directorate

³¹ Rashid S et al, *Fertilizer in Ethiopia, The Policies, Value Chain and Profitability* Addis Ababa: USAID/IFPRI, June 2012.

³² Van der Laan, J, "Going Local, the case of Minimex: a report on how Minimex can source from small scale farmers in Rwanda," Agri-Profocus, January 2011.

³³ Meeting with Mr. Yared G. Michael, Program Manager, Association of Ethiopian Microfinance Organizations, March 2013

³⁴ USAID, *Development Credit Authority Overview*, available at:

http://transition.usaid.gov/our_work/economic_growth_and_trade/development_credit/ accessed 28 June 2013.

³⁵ "Rural Poverty in [s6(a)]" International Fund for Agricultural Development Rural Poverty Portal, retrieved Aug 2013, from:

[http://www.ruralpovertyportal.org/country/home/tags/\[s6\(a\)\]](http://www.ruralpovertyportal.org/country/home/tags/[s6(a)])

³⁶ ATA, *Agricultural Cooperatives Sector Development Strategy: 2012-2016*, Government of Ethiopia, June 2012.

services are underutilized. In Ethiopia, cooperatives currently market nearly all fertilizer and seed to farmers in country, but face challenges with procurement and access to financing.³⁷ Because of these challenges, Ethiopia is considering a policy change whereby microfinance institutions would be responsible for the financial component of input procurement.

3.4 Harvest and Post-Harvest Losses Limit the Production Brought to Market

Harvest and post-harvest losses of goods are endemic throughout sub-Saharan Africa and occur in several stages as goods are brought to market. To begin, production may be harvested and dried using suboptimal techniques. During the threshing or shelling process for cereal, product may be lost. Goods may also be lost during handling and transport of the product, or optimal means of handling and transport may be unavailable. Finally, inadequate storage facilities may lead to rot or quality losses.

These losses fall under two categories: weight losses and quality losses. Weight losses involve loss of physical product, for instance through poor handling or threshing techniques. Quality losses involve changes to the product itself that reduce the crop to an unmarketable state through rot, mold, pests, or other damage. Such quality losses may or may not be identified prior to market. Recognizing the extent of these losses, Ethiopia, [s6(a)] and [s6(a)] are making extensive efforts to address these problems.

Across all three countries, losses may be attributed to both financial and informational gaps: farmers typically have poor access to capital for purchasing the equipment and facilities necessary to improve harvesting efficiency and reduce post-harvest losses, and farmers lack access to information regarding best practices for harvest and post-harvest loss reduction.

Infrastructure Requires Investment to Reduce Harvest and Post-Harvest Losses

In Ethiopia, [s6(a)] and [s6(a)], inadequate infrastructure for the storage, transportation, drying, and mechanization of production lead to losses across the various stages of harvest. In all three countries, farmers lack high-quality storage facilities, often forcing them to sell crops at market immediately after harvest in order to reduce spoilage. Poor storage conditions may lead to infection of cereals with the fungus *aspergillus* that produces aflatoxin, a toxic by-product hazardous to consumers' health. Aflatoxins present a major problem in Ethiopia, [s6(a)] and [s6(a)], where levels have been detected at 30 – 500 parts per billion (PPB), significantly above EU standards of 4 PPB.

Other infrastructure investments are also required. Increasing access to mechanized threshing and automated harvesting machinery has been identified in Ethiopia as a strategy for reducing loss during the harvesting process.³⁸ [s6(a)] is endowed with an area of [s6(a)] million hectares of land, of which 47% is classified as suitable for agriculture. However, about 70% of [s6(a)]'s crop area is cultivated by hand hoe, 20% by ox plough and 10% by tractor; and [s6(a)] relies almost entirely on rainfed agriculture.³⁹ Across all three countries, there has been explicit recognition of the need for better and more timely crop transportation systems to bring crops to market, which currently add significantly to marketing costs (76% regionally)⁴⁰ and cause losses due to delays and poor handling of products.

³⁷ *Agricultural Cooperatives Sector Development Strategy: 2012-2016*, 2012

³⁸ Sasakawa Africa Association, "Theme 2: Post-Harvesting and Agro-Processing," available at <http://www.saa-safe.org/wvd/theme2.html>, accessed 28 June 2013. [s6(a)]

³⁹ [s6(a)] Government website on agriculture, retrieved Aug 2013, from:

⁴⁰ IBRD, *Eastern Africa: A Study of the Regional Maize Market and Marketing Costs, Agriculture and Rural Development Unit*, World Bank: Volume 49831, (December 2009).

Farmers Lack Access to Information on Optimal Harvest and Post-Harvest Techniques

Knowledge of appropriate harvest techniques is as important as access to infrastructure. Engrained traditional techniques for harvesting, alongside recent improvements in agricultural practices and technologies, have created a changing landscape for farmers. As a result, Ethiopia, [s6(a)] and [s6(a)] have recognized the need for dedicated agricultural technical assistance to expand access to enhanced knowledge of harvest and post-harvest techniques.⁴¹ In the three partner countries, the governments are in the process of capacitating agricultural extension services to promote the spread of appropriate post-harvest techniques.⁴²

Cooperatives are Best Positioned to Reduce Post-Harvest Losses

As production is aggregated post-harvest, cooperatives are well positioned to provide the necessary investments in and financing for infrastructure necessary to minimize losses. The size of smallholder plots makes affordability of large capital investment for individual farmers unlikely. By supplying the appropriate infrastructure, cooperatives stand to achieve better prices for their members due to better quality and reduced pressure to sell.

3.5 Access to Reliable Markets Boosts Marketed Outputs

The incentive to improve crop production and sell surpluses on the market depends on farmers' access to reliable agricultural markets. In rural areas, market access is limited by transportation infrastructure, and information on demand is often asymmetrical. In particular, these countries are challenged by the lack of reliable purchasers for crop output. Demand for much of the output, taken up by households and not larger production facilities or reliable forward purchasers, cannot be accurately predicted.

In all three countries, problems with insufficient market information and expensive methods for crop transportation drive up prices and create market inefficiencies. In Ethiopia in particular, insufficient crop transport and information about regional demand is a major contributor to the importation of 500,000 MT annually of food aid.⁴³ The lack of reliable demand and highly seasonal supply of crops also causes substantial intra-annual price fluctuations in Ethiopia, [s6(a)] and [s6(a)]. In Ethiopia, intra-annual price variation was about 25% nationally during 2012-2013.⁴⁴ Fluctuating prices reflect an unstable market.

Cooperatives as Marketers of Crop Production

Enhancing the marketing of agriculture outputs is one of the primary functions of farmer cooperatives. By aggregating agricultural outputs and contracting with reliable sellers at more favorable times of the year, cooperatives can pay farmers more for their agricultural outputs by providing more reliable access to market demand. In Ethiopia, for instance, it is reported that cooperatives achieve 7-9% better prices for farmers than their market counterparts on average. Despite this market advantage, however, cooperatives are often reported to have poor management and require business improvement to reduce losses and enhance marketing functions.⁴⁵

⁴¹ National Post-Harvest Staple Crop Strategy, 2011.

⁴² ATA, *Supporting Agricultural Transformation in Ethiopia: P4P contribution*, PowerPoint Presentation by Khalid Bhomba, January 2013

⁴³ USAID, Ethiopia, "Feed the Future Multi-Year Strategy, 2011-2015," June 2011, p. 48

⁴⁴ Calculated from *Ministry of Agriculture and Animal Resources: Annual Report FY 2011-2012*; Central Statistics Agency Ethiopia, *Producer Price Index*, available at www.csa.gov.et/ accessed June 28 2013.

⁴⁵ *Ministry of Agriculture and Animal Resources: Annual Report FY 2011-2012, 2012.*

4. Partner Landscape

4.1 Governments Leading in Agricultural Development

In Ethiopia, [s6(a)] and [s6(a)], government agencies set strategy and coordinate national efforts toward agricultural development. The Ministries of Agriculture lead the way in policy oversight and national strategy development at the federal level, guided by regional and global goals. In particular, all three countries ascribe to the Comprehensive Africa Agriculture Development Program (CAADP), which established a common framework for addressing agricultural strengthening and sets growth and budgetary targets for agricultural development across the African Union, and all the partner countries aim toward achievement of the UN's Millennium Development Goals (MDGs), which aim to eradicate extreme poverty and hunger.

Ethiopia

In Ethiopia, the Federal Ministry of Agriculture (FMOA) supervises daily activities and implementing directorates within the agricultural sector, and oversees the Regional Ministries of Agriculture in a federalized system. The Agricultural Transformation Agency (ATA), overseen by the Agricultural Transformation Council (ATC), which is chaired by the Prime Minister, provides an inter-agency platform for coordination and further development of agricultural strategy. The mandate of the ATA is to provide technical support to the FMOA by leading problem-solving and implementation efforts in high-priority areas.

The FMOA coordinates two reporting directorates that provide extensive agricultural services to farmers throughout the country: the Input Marketing Directorate and the Agriculture Extension Directorate. The Input Marketing Directorate, in collaboration with the public Agricultural Import Supply Enterprise (AISE) imports, develops, and coordinates sale of improved inputs domestically. For fertilizer, the FMOA has begun building domestic fertilizer factories and currently imports and distributes all fertilizer in-country. For seed, the FMOA coordinates seed distribution and sale through private and public enterprises, including the government's Ethiopian Seed Enterprise (ESE). The Agriculture Extension Directorate manages a massive network of 54,000 government-employed and -trained agricultural extension workers, deployed across Ethiopia. Extension worker expansion has been accompanied by the establishment of 18,000 Farmer Training Centers, each staffed with three workers with a range of agricultural skills.

The Agricultural Transformation Agency leads the way in innovative strategy development and is currently focusing on the development of wheat and maize value chains throughout Ethiopia. In particular, the ATA has focused on the development of appropriate support services, post-harvest techniques, and access to high-quality inputs for these crops. Their efforts support the development of new major sources of demand, called 'sinks,' to make maize and wheat farming more profitable. In addition to these efforts, the ATA has recently engaged in more extensive programs in cooperative capacity building, input markets, last mile distribution, and development of the seed provision market.

In addition to the ATA's efforts to strengthen cooperatives, the Federal Cooperative Agency of Ethiopia recognizes and regulates cooperatives across sectors.

[s6(a)]

[s6(a)]

The [s6(a)]

[s6(a)] coordinates implementation of

[s6(a)]

[s6(a)] which comprises 60% of its overall budget. The program currently provides subsidies for fertilizers and improved maize and legume seeds, with a plan to reach 1.5 million

farm families in the 2012-2013 farming season at a cost of US\$123 million.^{46,47} Established in 2005, the program has been credited with spurring major maize production increases.⁴⁸

[s6(a)], through its [s6(a)], supports a Rural Development Program in each district that administers extension work in the areas under the district. However, the extension work faces staffing and resource constraints, and only 17% of smallholder farmers reportedly benefit from extension services.⁴⁹ The [s6(a)] supports research into improved agricultural inputs and methods and certifies seed as well as other inputs.

In June 2012, the President launched the [s6(a)], which aims to enhance sustainable food security through improving productivity, empowerment through farm mechanization, promotion of dairy and small stock livestock development, promotion of special crops for exports, and promotion of irrigation farming.⁵⁰ This project is supporting both formation and strengthening of cooperatives, as well as providing a parallel subsidy on improved inputs. Additionally, the [s6(a)], [s6(a)] in the [s6(a)] also supports nutrition-oriented interventions and coordinates non-governmental actors working to improve agriculture in [s6(a)].

The [s6(a)] promotes and registers cooperative societies in [s6(a)]. The [s6(a)] holds and manages a strategic grain reserve of maize, equaling 120,000 tons in 2011.⁵¹ Other agriculture-related Ministries include the [s6(a)], and the [s6(a)]. All actors are guided by the [s6(a)] and other relevant policies.

[s6(a)] At an institutional level, the [s6(a)] is the main Ministry responsible for the agriculture sector. [s6(a)] is structured into eight divisions, including: crop development, national food security, agricultural mechanization, agricultural land use, planning and management, training, administration and human resources management, policy and planning.⁵² Other relevant government bodies include the [s6(a)]; the [s6(a)]; the Prime Minister's Office; regional administrations; and local government.

The [s6(a)] [s6(a)], formed by the Government of [s6(a)], is responsible for procurement and storage of an emergency food stock of 150,000 MT that could address a food disaster

⁴⁶ [s6(a)] "Minimising Post Harvest Maize Losses" [s6(a)] News Agency. Retrieved from:

[s6(a)] Used exchange rate of [s6(a)] retrieved Aug 2013 from: <http://www.oanda.com/currency/converter/>

⁴⁸ [s6(a)] "Measuring the Impacts of [s6(a)]'s Farm Input Subsidy Program," paper presented at the [s6(a)] April 2011.

⁴⁹ Imani Development, "Feasibility Assessment of the Production of [s6(a)]" October [s6(a)]

⁵⁰ "The [s6(a)]" [s6(a)] Brochure, retrieved Aug 2013, from:

[s6(a)] ⁵¹ Missing Food: The Case of Postharvest Grain Losses In Sub-Saharan Africa, The World Bank, Report No. 60371-AFR, retrieved Aug 2013, from: http://siteresources.worldbank.org/INTARD/Resources/MissingFoods10_web.pdf

[s6(a)] ⁵² The [s6(a)] official website, retrieved Aug 2013, from:

[s6(a)]

for three months during which the government could order and secure food imports from abroad.⁵³ The agency is also responsible for stock re-cycling and stock release to stabilize food prices in the market. This could be a beneficial tool to the government in helping to guarantee prices and quantities of the food processor's supply chain.

The [s6(a)] [s6(a)] is the national cooperative umbrella organization that promotes, serves and coordinates the development and prosperity of all cooperative societies in mainland [s6(a)].⁵⁴ [s6(a)] replaced the [s6(a)] [s6(a)] and is an autonomous, non-governmental and non-partisan body that is member-owned and -managed.

The largest cross-sector agricultural strengthening initiative currently in [s6(a)] is the [s6(a)] [s6(a)] [s6(a)], an inclusive, multi-stakeholder partnership to rapidly develop the region's agricultural potential.⁵⁵ [s6(a)] was initiated at the World Economic Forum (WEF) Africa Summit 2010 with the support of founding partners including the [s6(a)] [s6(a)], farmers, agri-businesses, NGOs and companies with an overall goal of improving agricultural productivity, food security and livelihoods in [s6(a)]. [s6(a)] objective is to foster inclusive, commercially successful agribusinesses that will benefit the region's small-scale farmers, and in so doing, improve food security, reduce rural poverty and ensure environmental sustainability. The risk-sharing model of a public-private partnership (PPP) approach has been demonstrated to be successful in achieving these goals and [s6(a)] marks the first PPP of such a scale in [s6(a)] agricultural history. [s6(a)] objectives are well aligned with the goals of CHA's agricultural strengthening initiatives.

4.2 Central Role of Cooperatives

Ethiopia, [s6(a)] and [s6(a)] are all currently supporting the transformation of the cooperative sector into engines for smallholder farmer economic development. The Federal Cooperative Agency (FCA) reports approximately 40,000 cooperatives in Ethiopia, of which about 10,000 are agricultural cooperatives. Three thousand focus on a single agricultural commodity, like coffee, dairy, or livestock, and 7,000 are multipurpose cooperatives concentrating on agriculture. By membership, about 70% of the 6.7 million cooperative members throughout Ethiopia are members of agricultural or multipurpose cooperatives (~4.7M people).⁵⁶

In [s6(a)], there were [s6(a)] cooperatives registered as of January 2012, out of which [s6(a)] are agricultural. Membership is still low; it is estimated that 5% - 30% of the population are officially members of formal cooperative organizations, though a much larger number of farmers participates in less formal associations.^{57,58} The [s6(a)] of [s6(a)] [s6(a)] is the most prominent farmer association in the country, with over 100,000 members organized into farmers'

⁵³ The [s6(a)] official website, retrieved Aug 2013, from: [http://www. \[s6\(a\)\]](http://www. [s6(a)])

⁵⁴ The [s6(a)] official website, retrieved Aug 2013, from: [http://www. \[s6\(a\)\]](http://www. [s6(a)])

⁵⁵ The [s6(a)] official website, retrieved Aug 2013, from: [http://www. \[s6\(a\)\] com/](http://www. [s6(a)] com/)

⁵⁶ "Agricultural Cooperatives Sector Development Strategy of Ethiopia, 2012 - 2016," Ministry of Agriculture, Federal Cooperative Agency & Agricultural Transformation Agency, June 2012=.

⁵⁷ [s6(a)] MBA Dissertation to Exploits University. December 2012.
⁵⁸ [s6(a)] "Cassaava Value Chain Assessment [s6(a)] May 2012.

groups, providing services such as extension work to cooperative members and access to improved seed and markets.⁵⁹

The system of cooperatives in [s6(a)] was originally made up of primary societies, coordinated by regional cooperative unions, and organized nationally by the [s6(a)]. However, this structure was not effectively serving the farmers, so [s6(a)] cooperative reform program promoted Savings and Credit Cooperative Societies (SACCOs) and agricultural marketing co-operative societies (AMCOS) through which farmers would have an opportunity to receive financial support. Cooperatives and particularly their membership numbers are quickly expanding. By May of 2009, there were 5,332 SACCOs with over 820,000 members, up from 3,400 SACCOs with a total membership of 5,200 in 2005.⁶⁰ The [s6(a)] supports cooperatives with business development services and credit guarantee mechanisms.

Cooperative strengthening efforts have evolved over the past decades through many periods of experimentation, and current initiatives reflect these lessons learned. The large-scale introduction of mandatory agricultural cooperatives in the 1970s and 1980s in many countries across the continent was associated with declining agricultural output per capita. In Ethiopia, when farmers were allowed to join or leave cooperatives at will in 1991, cooperative membership fell drastically and yields rose.⁶¹ However, Ethiopia, [s6(a)] and [s6(a)] have come a long way since mandatory cooperative policies. Governments have recognized the importance of pro-farmer laws and policies governing cooperatives and have worked to put these in place and regulate the sector. Efforts to support cooperatives now focus on voluntary participation and bottom-up, grass-roots organizing which are much more likely to produce positive results for farmers. Rather than instituting farmer associations from above, they are creating structures that incentivize participation. Groups have also realized the importance of good governance and have held numerous management trainings and developed ways for farmers to hold their leaders accountable. Cooperatives have great potential to provide significant value, services and shared bargaining leverage to their members, and CHAI is designing this initiative to make the most of that opportunity. CHAI continues to learn from these lessons and to incorporate the general themes in the overall strategy while adapting to the specifics of the local context when customizing the priorities and implementation in each country.

4.3 Non-Governmental and Organizational Partnerships

In addition to government involvement, the agricultural landscape is rich with potential partners working on programs closely aligned to CHAI's agricultural strengthening goals in Ethiopia, [s6(a)] and [s6(a)]. A few examples are discussed below. CHAI will carefully evaluate the experience and reach of relevant organizations to identify appropriate partners for each piece of the agricultural strengthening strategy.

Cross-Cutting Programs

In Ethiopia, [s6(a)] and [s6(a)], the World Food Program (WFP) has deployed its Purchase for Progress (P4P) program. This program leverages the buying power of the WFP to purchase goods directly from cooperatives that support smallholder farmers in developing countries. The WFP program works on the demand side with innovative forward contracting; on the supply side to improve yields and crop quality,

⁵⁹ [s6(a)]

⁶⁰ Agricultural Statistics, The Ministry of [s6(a)]

official website, retrieved Aug 2013, from:

[s6(a)]

⁶¹ Agricultural Cooperatives Sector Development Strategy 2012 – 2016, co-authored by the Federal Democratic Republic of Ethiopia Ministry of Agriculture, the Federal Cooperative Agency and the Agricultural Transformation Agency, June 2012, pg. 12.

provide cooperative technical assistance, and reduce post-harvest losses; and shares its expertise with other partners entering the market. In all three countries, WFP is one of the largest existing buyers of maize products from participating cooperatives. As a partner across several areas of CHAI's nutrition program, CHAI will work closely with WFP to learn from its experiences.

Cooperative Strengthening

In Ethiopia, Agricultural Cooperative Development International / Volunteer Overseas Cooperative Assistance (ACDI/VOCA) administers a Cooperative Development Program which fosters cooperative leadership and business management skills. TechnoServe has a presence in all three countries and a long track record of providing extensive technical assistance in agriculture across value chains to cooperatives and farming organizations. In Ethiopia, for instance, TechnoServe supports WFP's Purchase for Progress by bolstering nine maize-producing cooperative unions' business skills. In [s6(a)], Technoserve is finalizing registration in-country in order to initiate a project on improving agricultural value chains. USAID's Feed the Future Initiative is supporting cooperative development in seven districts in [s6(a)]⁶² and the [s6(a)] and [s6(a)] also support cooperatives. In [s6(a)], cooperatives are supported by the [s6(a)] and some NGOs. [s6(a)] as well as the [s6(a)].

[s9(2)(b)(x)] is another potential lead partner for cooperative strengthening in [s6(a)] and [s6(a)]. [s9(2)(b)(ii)] is a not-for-profit distribution agricultural development company operating in sub-Saharan Africa. Acting as principal, it invests "social venture capital" to create commercially viable agribusiness investment opportunities, bringing them to the point where they can attract private investment from domestic and overseas investors.⁶³ They have significant experience in agricultural supply chain development with cooperatives and smallholder farmers like this one and their goals are well aligned with the goals of this program.

Financial Tools

In CHAI's partner countries, the International Finance Corporation's warehouse receipt system provides storage and a means for collateralizing production to lend to smallholder farmers, though often on a small scale, sometimes still at a pilot level. In Ethiopia, the Development Bank provides a loan portfolio facility for agricultural products across four banks with 50% credit guarantees; the R4 Rural Resilience Initiative provides weather-index insurance through the country's food-for-work programs; World Vision provides more than 250,000 rural farmers with savings accounts; and the World Council of Credit Unions (WOCCU) supports rural savings and cooperative credit organizations. The microfinance sector in Ethiopia is relatively well developed and divided by regions. The Amhara Savings and Credit Institution (ACSI) and the Dedit Credit and Savings Institution of Tigray (DECSI) are both partially owned by the regional governments and are two of the largest and most successful microfinance institutions in Africa.⁶⁴ The Association of Ethiopian Microfinance Institutions (AEMFI) provides support to the sector and offers coordination and guidance to supporters of the sector.

⁶² Feed the Future: [s6(a)] Fact Sheet, retrieved Aug 2013, from: [http://www.feedthefuture.gov/sites/default/files/country/strategies/files/ftf_factsheet\[s6\(a\)\]_jan2013.pdf](http://www.feedthefuture.gov/sites/default/files/country/strategies/files/ftf_factsheet[s6(a)]_jan2013.pdf)

⁶³ "About Us," AgDevCo official website, retrieved Aug 2013, from: http://www.agdevco.com/about_us.php

⁶⁴ According to this article, ACSI was # 6 and DECSI was #31 in the world in 2007: "The Top 50 Microfinance Organizations," Forbes Magazine, 20 Dec 2007, retrieved from: http://www.forbes.com/2007/12/20/microfinance-philanthropy-credit-bitz-cz_ms_1220microfinance_table.html

[s6(a)]'s largest credit movement, the [s6(a)] ([s6(a)]), had over 115,000 members and over 39 partner SACCOs in 2012; it then established [s6(a)] ([s6(a)]) which had 4,000 members with active loans as of April 2013, however this is a very small portion of the population.⁶⁵ Some private banks provide capital to associations and cooperatives. Microfinance institutions in [s6(a)] receive donor funds and technical support from a variety of sources. In addition, many NGOs such as CARE and ACDI/VOCA have worked with communities to establish SACCOs and Village Savings and Loans. However, limited access to credit is seen as a key constraint to agriculture development in [s6(a)] —in one study, 90% of farmers reported that they did not have access to any financial facilities.⁶⁶

In [s6(a)], cooperatives receive some financial support from commercial banks, most notably the [s6(a)] ([s6(a)]) and [s6(a)]. Other sources of credit for cooperatives and smallholder farmers include microfinance institutions like [s6(a)], farmers' organizations such as [s6(a)], Savings and Credit Cooperative Societies (SACCOs), and cooperative banks. Sometimes cooperatives themselves provide financial support to their member farmers through input supply and market support.

Improved Inputs

In Ethiopia, the four-year USAID Capacity to Improve Agriculture and Food Security program has done extensive research on bottlenecks to government fertilizer supply chains and appropriate fertilizer use. The International Livestock Research Institute (ILRI) and the International Maize and Wheat Improvement Center (CIMMYT) similarly support input access for farmers.

In [s6(a)], many households are eligible for subsidies through the [s6(a)] ([s6(a)]) introduced by the former President in 2005 or through the parallel subsidy program introduced in 2012 for the poorest households, driven by NGOs. The International Crops Research Institute for Semi-Arid Tropics (ICRISAT), the Agriculture Development Marketing Corporation (ADMARC), and [s6(a)] support the development and marketing of improved seed.⁶⁷ Both Feed the Future (FTF) and FAO are also funding projects to improve access to inputs.^{68,69}

In [s6(a)], the USAID-supported [s6(a)] ([s6(a)]) works with small-scale farmers to improve agriculture practices, strengthen agriculture inputs, strengthen supply chains and expand access to local, national and export markets. Through the Agriculture Food Agency (AFA), the Government intends to expand seed production and distribution networks to meet farmers' demand for improved seed.⁷⁰ The [s6(a)] ([s6(a)]) also has a significant fertilizer subsidy, implemented through the [s6(a)] ([s6(a)]).

Harvest and Post-Harvest Losses

In Ethiopia, Sasakawa Global 2000 provides investment and loan programs for improved infrastructure and machinery to reduce post-harvest losses, while also providing agricultural extension services

⁶⁵ Transparent Pricing [s6(a)] MF Transparency, retrieved Aug 2013, from: [s6(a)]

⁶⁶ [s6(a)] "Cassava Value Chain Assessment: [s6(a)] May 2012

⁶⁷ [s6(a)] retrieved Aug 2013, from" http [s6(a)]

⁶⁸ [s6(a)] Multi-Year Strategy," USAID, Feed the Future, 2011

⁶⁹ [s6(a)] Multi-Year Strategy," USAID, Feed the Future, 2011

⁷⁰ [s6(a)]

focused on improving post-harvest techniques. In [s6(a)], the country's three urban centers have high-quality storage facilities, but in the rural areas the quality and quantity of storage facilities are inadequate. Care's PHASE project is disseminating information to farmers on post-harvest processing and storage. The Effective Grain Storage for Sustainable Livelihoods of African Farmers (EGSP), funded by Swiss Development Cooperation, is in its second phase and supports adoption of improved technologies for grain storage, including distribution of [s6(a)] metal maize silos and [s6(a)] maize storage bags in [s6(a)] through 2016.⁷¹ The [s6(a)] [s6(a)] in northern [s6(a)], a collaboration with the University of California, serves as a hub for post-harvest research, training of post-harvest trainers and extension workers, post-harvest technology, and training of local farmers in cost-effective post-harvest handling practices. The [s6(a)] may provide access to post-harvest tools, supplies, equipment and services required to implement post-harvest improvements.

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

⁷¹ Project aiming to reduce post-harvest losses launched in [s6(a)] International Maize and Wheat Improvement Center, retrieved Aug 2013, from [s6(a)]

5. Objectives & Activities

The specific goals of CHAI's agricultural strengthening work will be: a) to ensure a reliable, high-quality supply of inputs for the local production of highly nutritious foods; and b) to substantially increase the productivity of smallholder farmers and lower post-production costs and waste, thereby raising farmers' incomes while accessing best possible prices for crop inputs. CHAI plans to approach agricultural strengthening through four major streams of work: 1) cooperative strengthening; 2) financial tools; 3) agricultural inputs; and 4) reducing harvest and post-harvest loss.

5.1 Cooperative Strengthening

CHAI intends to work through the cooperative structure to establish forward contracting arrangements for the procurement of input crops, which will serve as the platform for the delivery of financial tools, agricultural inputs, and improved harvesting and post-harvest technologies. The underlying strength of the cooperative structure will be critical to the effective delivery of these services and tools. The objective of the cooperative strengthening work is therefore to support cooperatives so that they are able to deliver on contracts, receive and manage credit, and provide extension and input distribution services to their farmers.

Activity 1.1: Identify and engage partner cooperatives

Once the crop demands for the nutrient dense foods are finalized, CHAI will work with governmental agencies to determine the appropriate number and type of cooperatives to engage. CHAI will then conduct field visits to meet the leadership teams of cooperatives and gauge the level of interest in and capacity for partnership. During initial engagement with cooperative leadership, CHAI will review the cooperatives' quality, productivity, and management skills, with the goal of identifying gaps that will need to be addressed. CHAI may use rapid field tests to measure aflatoxin levels in stored crops; survey farmers to capture previous years' yields; and ask cooperative leadership for a self-assessment to identify training needs.

Activity 1.2: Provide targeted skills training to cooperative leadership

CHAI will collaborate with partners who have the relevant technical expertise to provide cooperative leadership with training and support in one or more of the following areas:

- **Management and Governance:** Cooperative managers may need practical training in areas such as communication with and mobilization of large numbers of farmers; record-keeping; accountability systems; project and program management; and conflict management.
- **Financial Training:** In order to access the significant credit resources that this program will offer, cooperative leadership will likely need support in developing business plans and completing the paperwork needed to qualify for the loans. Financial managers should be trained on simple methods for accounting, financial management, and loan tracking.
- **Technology Training:** Cooperative leadership may need targeted training to understand new technological options for harvesting and post-harvest storage. This can be delivered to elected members of the cooperatives in a "training of trainers" model so that leadership can pass this knowledge on to all the members.

Activity 1.3: Link cooperatives and agricultural extension services

In order to effectively select agricultural input packages, manage adverse events, and utilize appropriate technologies for harvest and post-harvest storage, cooperative members will need ongoing access to agricultural extension services that can provide the latest information and train on new skills as needed. Ongoing access to information will further enable cooperative members to be well-informed consumers of financial products, such as weather index insurance. Currently, members of cooperatives have inconsistent access to these support services. CHAI will negotiate with the appropriate governmental and non-governmental partners to provide continued access to extension support for partner cooperatives.

Activity 1.4: Establish contracts with partner cooperatives

Establishing well-structured contracts with partner cooperatives is often identified as one of the biggest challenges for organizations that procure large volumes from cooperatives. If done well, it includes developing relationships with the cooperative leadership, structuring the contract to provide the correct incentives to all parties, negotiating with government to be a third party on the contract, and ensuring that the cooperatives are capable of delivering on their responsibilities in a timely fashion. The practice of working through such "facilitated contract farming" or "cooperative forward contracting" agreements is well established in Ethiopia, as facilitated by the Agricultural Transformation Agency. Initial scoping identified a few outgrower schemes in s6(a) and s6(a), but mostly for export crops and none with advance payments like CHAI is considering. CHAI will manage this process in order to ensure a beneficial relationship for both the cooperatives and for the food processing facilities.

Activity 1.5: Proactive monitoring, trouble-shooting and support

Ongoing performance monitoring is particularly important in the initial years of the forward contracting relationships. Proactive monitoring allows inevitable challenges and hurdles to be flagged and overcome at an early stage. CHAI will work with cooperatives to track key indicators, particularly around crop quality and yields, so that CHAI can mobilize the necessary partners or support to overcome challenges before they compromise the quality or quantity of the crops, and likewise share program successes with other partner cooperatives.

5.2 Financial Tools

CHAI will collaborate with cooperatives, farmers, government agencies, and domestic and international financial institutions to develop tools for increasing farmers' and cooperatives' access to financing for improved inputs, infrastructure, and other investments that enhance agricultural productivity.

Activity 2.1: Assess baseline farmer and cooperative access to financing and lending risk

CHAI teams will work with participating smallholder farmers and cooperatives to identify the magnitude of financing required to improve business performance and to map the capacity of available financial institutions and local, rural credit and savings organizations. CHAI will support the government and financial institutions to identify default and delayed payment risks after extension of credit, in order to identify design features that could improve the sustainability of loan programs. The team will also assess the need for non-lending financial tools that may increase efficiency or mitigate lending risks, such as weather insurance or savings accounts.

Activity 2.2: Capitalize and implement a revolving loan fund to provide low-interest financing to cooperatives and farmers

Based on the needs identified in Activity 2.1, a dedicated and sustainable revolving loan fund for the agricultural sector will be designed, implemented, and capitalized. The loan fund will deliver sequential payments and receive repayments through the same sustainable pool of funding. The appropriate design, administration, and conditions for extension of loans from this pool will be determined in collaboration with implementing partners. CHAI is exploring partnerships with the [§9(2)(ba)] [§9(2)(ba)], the [§9(2)(ba)], and others to capitalize the fund at low interest rates.

Activity 2.3 Develop and implement mechanisms to deliver low-cost financing to partner cooperatives

CHAI will help the Ministries of Agriculture to develop mechanisms for providing access to the revolving loan fund to the cooperatives that will be supplying the food processing facilities. Where local banks and microfinance institutions are willing and able to serve as partners, CHAI will help build the capacity of existing institutions to administer credit services based off the revolving fund. Where such institutions are not available, CHAI will support the development of new institutions to serve as administrators of loan agreements. This will include building credit access into the contractual agreements with partner cooperatives, as part of the "facilitated contract farming" arrangements discussed above. By providing a guaranteed market, providing loans for input purchases in advance of the growing season, and providing advance payments for crops where appropriate and useful, CHAI expects to be able to significantly decrease the financial constraints facing smallholder farmers and smooth their incomes over the course of the year.

Activity 2.4: Provide tools to reduce the risk of smallholder farmer default

CHAI will support the development of mechanisms to assist farmers in securing loans and reducing their risk of default. CHAI will work with partners to find new ways to collateralize farmers' working capital, create loan guarantees, or develop specialized procurement contracts. These methods may include warehouse receipts, pooled lending, forward contracting, or cooperative pass-through financing designed with the goal of increasing the revolving loan fund's sustainability by reducing repayment risk and thus substantially reducing lending interest rates.

5.3 Agricultural Inputs

CHAI will work with the government, cooperatives, farmers and private industry to ensure the adequate supply and appropriate use of productivity-enhancing agricultural inputs, including fertilizers, improved yield seed, low-cost equipment, and potentially pesticides, with the objective of increasing smallholder farmers' yields. CHAI will take into account target volumes for each crop in engaging with farmers on the appropriate packages of inputs. For instance, CHAI may encourage intercropping or crop rotation systems to ensure adequate volumes of all crop inputs for production (maize, wheat, and/or soy, depending on the context.)

Activity 3.1: Support government and private suppliers to improve supply chain practices and ensure a reliable supply of agricultural inputs

CHAI will identify and drive operational efficiencies in delivering improved agricultural inputs to end users, working with partners to reduce the prices of inputs through bulk purchasing, better tendering, improved supply chain management, and/or decreased operational costs. CHAI will support suppliers in

implementing improvements to inventory management and input transport systems to reduce delivery delays and smooth supply availability. CHAI will help the Ministries of Agriculture and the food production companies to quantify supply gaps to determine and address root causes. CHAI will then work with the appropriate public and private suppliers to address the identified gaps and improve upstream supply chain practices, including addressing supply constraints at the production end over the medium term. CHAI will also work to consolidate and forecast demand in order to improve supply planning, incentivizing increased production and/or lower costs for input procurement.

Activity 3.2: Develop trainings, promotional materials, and management tools to drive uptake of the inputs required for the crops necessary for the food processing facilities

CHAI will provide targeted programmatic support through enhanced trainings, IBC materials, management tools, and technical assistance to drive appropriate utilization of agricultural inputs: using the right inputs, in adequate quantities, at the appropriate time of year. CHAI will customize input provision to meet soil, field size, crop type, and other agronomic conditions, working with government and private suppliers to provide more prescriptive and locally tailored sets of inputs to farmers, potentially by upstream bundling of inputs into 'packages'. CHAI will also work upstream with suppliers to develop marketing and supply chain strategies to ensure the packaging and distribution of input products help to promote more appropriate use.

Activity 3.3: Enhance the effectiveness of agricultural extension services

CHAI will collaborate with governments and partners to develop new trainings, informational tools, and other resources for improving the quality of existing extension services for input provision. New and enhanced training programs will focus on addressing knowledge gaps on the optimal use of inputs, tailored to local soil and agronomic conditions, to increase agricultural yields.

5.4 Reduce Harvest and Post-Harvest Loss

Post-harvest losses in Ethiopia, §6(a) and §6(a) comprise 20% to 40% of potential yields, and crop contamination is a common challenge. Losses are generated by mold, rot, bacteria, pests, animals, or other contaminants that result from poor storage facilities on the farm, at an aggregation site, during transportation, or at the factory. During initial engagement with cooperatives, CHAI will assess current harvesting and storage practices, capture rough loss rates, and identify the drivers of crop losses and contamination during the harvesting, transportation, and storage processes, in order to inform the development of appropriate solutions. With the appropriate use of improved technologies and techniques and an efficiently structured supply chain, CHAI will significantly reduce these losses and improve the quality of the crops.

Activity 4.1: Implement appropriate solutions to reduce losses and improve crop quality

CHAI will work with the Ministries of Agriculture and local partners to implement the most viable solutions in the following three categories, working in partnership with cooperatives, government agencies, the food processing investors, and the relevant technical experts to reduce crop losses and improve crop quality:

- **Mechanization and Improved Technologies:** Technological solutions are available to reduce harvest and post-harvest losses by mechanizing steps currently done by hand on most small farms, such as reaping, threshing, and winnowing. Machines vary considerably in size and

complexity, ranging from small units developed for use on small farms to massive industrial combines. CHAI will implement appropriate technological solutions, taking into account typical farm sizes and other relevant environmental factors within partner cooperatives.

- **Transportation Logistics:** Significant losses take place during the process of transporting the crops from the farm to an aggregation site or from an aggregation site to the market or factory. With current transportation systems, crops often spend excessive time in transit, leaving them susceptible to many different infestations that compromise quality and result in losses. Working with the food processing facilities, CHAI will develop and execute the optimal logistics process to minimize the time and costs from farm to high quality storage facility.
- **High-Quality Storage System:** High-quality storage systems across the value chain from farm to factory are a critical component to minimizing losses. CHAI will determine whether a centralized or decentralized storage system is more economical for optimal quality. Teams will do a landscape assessment to determine whether government, partners or other players in the market have or are designing high-quality facilities to which they could outsource, or whether the food processor will need to own and manage these facilities themselves. Working with cooperative leadership, farmers, and the food processing facilities, CHAI will implement the most quality- and cost-effective solution for each partner cooperative.

Activity 4.2: Source credit mechanisms to implement and sustain identified solutions

Connected with the financial tools activities above, CHAI will link the cooperatives to the funding and/or sources of credit to invest in the improved harvesting and post-harvest storage techniques. CHAI will liaise with the appropriate partner organizations to ensure that solutions are implemented in adherence with the necessary quality specifications and with the technical assistance necessary. CHAI will manage all the different partners and systems working together to ensure that the new system achieves the efficiency objectives of this work in losses and quality.

Activity 4.3: Proactive monitoring, trouble-shooting and quality assurance

CHAI will support the government and companies to develop the best possible quality assurance system. Levels of aflatoxins and other contaminants will need to be kept exceptionally low because the target markets for the food are young children and pregnant and lactating women. CHAI will feed back quality testing results to the farmers to allow for modification and improvement of their systems. CHAI will consider building a differential pricing structure into contractual arrangements with cooperatives, depending on the quality of the crops sold. CHAI will help monitor all value chain partners' losses to ensure that losses are decreasing with the introduction of new methods, systems or technologies and will help the partner trouble-shoot if they are not seeing these improvements.

6. Monitoring and Evaluation

CHAI will work with cooperative leadership and the food processing facilities to track key indicators across the duration of the project. Baseline data collection will take place during the last harvest season prior to the launch of the nutrition initiative, when contractual arrangements for agricultural inputs and procurement will take effect. Data will then be collected on an ongoing basis during each sequential planting and harvesting period. Process data will be collected in collaboration with cooperatives and with the partners responsible for administering credit schemes, distributing agricultural inputs, and providing improved harvesting and storage technologies. Outcome data will be collected in close collaboration with the food processing facilities, which will need to track similar figures for their own record-keeping purposes. Data will be tracked only within partner cooperatives.

Indicators will be discussed and agreed with government partners in each country; the list below should be considered indicative.

Potential Process Indicators:

- Number and percent of farmers in partner cooperatives participating in credit schemes
- Number and percent of farmers in partner cooperatives procuring agricultural inputs (tracked for fertilizers, seeds, and complete packages)
- Number and percent of farmers in partner cooperatives participating in improved harvesting or post-harvest storage mechanisms (depending on the solution(s) selected by each cooperative)

Potential Outcome Indicators:

- Crop quality (e.g. aflatoxin levels, moisture content, infestations)
- Crop yields per hectare (averages within and across all partner cooperatives, by crop)
- Increase in farmer incomes (calculated within and across all partner cooperatives)

Targets will likewise be set in consultation with partners, after reviewing baseline data. Ongoing monitoring will allow for intervention and support where indicators fall below targets, and will provide rapid feedback to farmers and cooperative leadership on performance. End-program evaluation will allow for documentation of successes and lessons learned, which can be shared with partners and other programs undertaking similar efforts.

7. Budget

7.1 NZ AID Budget

NZ AID budget per objective	2013	2014	2015	2016	2017	2018	Total
s9(2)(b)(ii)							

NZ AID budget by Location	2013	2014	2015	2016	2017	2018	Total
s9(2)(b)(ii)							

NZ AID budget per objective and location	2013	2014	2015	2016	2017	2018	Total
s9(2)(b)(ii)							

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

7.2 Total CHAI Nutrition Budget – Africa

Total Budget	2013	2014	2015	2016	2017	2018	Total
s9(2)(b)(ii)							

Total Budget by Location	2013	2014	2015	2016	2017	2018	Total
s9(2)(b)(ii)							

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

7.2 Total CHAI Nutrition Budget – Ethiopia

Ethiopia Nutrition budget summary

	2013	2014	2015	2016	2017	Total
--	------	------	------	------	------	-------

s9(2)(b)(ii)

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

7.3 Total CHAI Nutrition Budget – s6(a)

Nutrition budget summary							
	2013	2014	2015	2016	2017	2018	Total

s9(2)(b)(ii)

RELEASED UNDER THE
OFFICIAL INFORMATION ACT

s6(a) 7.4 Total CHAI Nutrition Budget - s6(a)

Nutrition budget summary	2013	2014	2015	2016	2017	2018	Total
--------------------------	------	------	------	------	------	------	-------

s9(2)(b)(ii)

RELEASSED UNDER THE
OFFICIAL INFORMATION ACT