Clinton Health Access Initiative

# Ethiopia Nutrition Initiative: Agricultural Strengthening



2014 Mid-Year Progress Report

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CLINTON HEALTH ACCESS INITIATIVE

1. Update on Program Progress

The Clinton Health Access Initiative (CHAI) and the Government of Ethiopia made substantial progress on the initial phases of the Nutrition Initiative in Ethiopia during the first half of 2014. A series of meetings between key government agencies and the consortium of international investors resulted in the signing of a term sheet between the Federal Ministry of Agriculture (s9(2)(ba) behalf of the Government of Ethiopia, and DSM, on behalf of the investors. The agreement lays the groundwork for the launch of two world-class food processing facilities in Ethiopia, s9(2)(b)(ii) s9(2)(ba) s9(2) s9(2)(ba) The term sheet provides the framework for the Joint Venture Agreement to be executed by the government and the investors, including terms for s9(2)(b)(ii) , governance, capital requirements, and crop procurement, as discussed in more detail below.

The Boards of DSM, the International Finance Corporation (IFC), and s9(2)(b)(ii) s9(2)(b)(ii) ( ) have officially voted and agreed to fund the first phase of factories in Rwanda and Ethiopia and to create the international holding corporation ("HoldCo") that will be the s9(2)(b)(ii) investor in the local joint ventures. The financial and legal negotiations to determine the structure and mechanics of HoldCo are in the final stages. DSM and [redacted] have a dedicated team in place to drive the process of engineering the factory design, conducting environmental impact assessments, and hiring contractors. The factory construction site has been selected in Rwanda, and the partners are finalizing site selection for the first factory in Ethiopia. Engineering and factory design are also in the final stages of completion. The factories will be identical in design, utilizing s9(2)(b)(ii) equipment as originally anticipated.

The World Food Program's (WFP) senior management has affirmed their five-year commitment to purchase s9(2)( metric tons (MT) of Super Cereal Plus per year from each of the first three factories, for a total of s9(2)(MT per year, as per the business cases. The agreement calls for WFP to purchase the product s9(2)(b)(ii) This is an attractive deal for the WFP s9(2)(b)(ii)

By purchasing in Africa, WFP will both save money and fulfill their organizational commitment to procure locally, thus boosting the livelihoods and long term development of smallholder farmers. s9(2)(b)(ii)

The Government of Ethiopia will be a s6(a) investor in the factory along with the majority investor, HoldCo. Each factory will require approximately US $ million of investment (including working capital), of which roughly s9(2)(b)(ii) . The debt is being organized by the IFC. DSM and s9(2 are working out the final arrangements of their equity share in HoldCo, and the IFC will be a minor equity stakeholder. CHAI, in collaboration with the Government of Ethiopia, is finalizing the decision of including a local private company to be part of the joint venture.

The term sheet describes the agreements reached between HoldCo, represented by DSM, and the Government of Ethiopia, represented by the s9(2)(ba) The agreed terms include:

- The Government of Ethiopia has committed to purchase s9(2)(b)(ii) MT of complementary food annually from each of the first two factories for at least five years.
- s9(2)(b)(ii) of the profits above that level will go to the Government to help subsidize purchase of the food for the poorest Ethiopian children and mothers. A portion of that profit-sharing to the Government will be allocated to improving the distribution systems necessary to distribute the food to the rural populations.

- s9(2)(b)(ii) Government to serve the rural population. s9(2)(b)(ii) s9(2)(b)(ii) The Government will distribute the product (for free to poor people and selling it to others) through their community health worker systems and will conduct public health campaigns to promote breast feeding in the first six months of life and continued breast feeding complemented by this nutritious food from six months to two years of age.

- The company has agreed to form contractual arrangements with unions of cooperatives for the procurement of local maize and soybeans at the required quantity and quality for processing fortified blended foods. s9(2)(b)(ii) s9(2)(b)(ii) In the event that the cooperatives are unable to produce at the agreed quantity and quality levels, the company will be able to either purchase s9(2)(b)(ii) s9(2)(b)(ii) or procure inputs from outside Ethiopia.

With the groundwork laid for the launch of the Joint Venture in Ethiopia, the CHAI team will focus over the coming months on putting in place the product promotion and distribution plans, monitoring and evaluation systems, and agricultural strengthening interventions to ensure the Nutrition Initiative moves forward successfully.

## 2. Update on Agricultural Strengthening Activities

During the first half of 2014, the CHAI team worked to set up the agricultural program which will provide high-quality maize and soybeans to the new factory ("NewCo"). Major milestones include:

- Target geographies and partner cooperatives in s9(2)(ba) have been selected with the guidance of the Regional Agriculture Bureau and the Cooperative Promotion Agency;
- Baseline data have been collected and analyzed;
- An assessment has been completed of potential intermediary institutions for the revolving loan fund, and a draft financial model has been designed to reduce default risks and ensure effective delivery of the loans; and
- Agricultural input needs and input sources have been identified for maize and soybean to meet NewCo crop demand.

In support of the above activities, CHAI has developed a working model to assess input requirements and financing needs relative to NewCo procurement volumes, along with an assessment of the current input procurement system which will inform program plans. With relevant government stakeholders, the CHAI team is developing user manuals on pre-harvest, harvest and post-harvest management of maize and soybean; cooperative development; contract farming; business plan development; and financial systems. The engagement of government staff in the design of the user manuals will allow for identification of the best ways to integrate value chain development into existing government programs.

Eleven unions, with a total membership of 55,000 farmers organized into 168 primary cooperatives, have been selected based on predefined selection criteria, as outlined below. Primary cooperatives have also been selected by the unions, although CHAI plans to conduct further assessments of the proposed primary cooperatives to fully assess their interest and suitability to participate in the project. In April 2014, the CHAI team conducted a baseline survey within a sample of the partner cooperatives, with interviews taking place at 361 households, 14 primary cooperatives and three unions. The main findings are attached as Annex 1. The baseline survey findings highlighted the challenges faced by many smallholder farmers in securing financing and agricultural inputs.

CHAI is working closely with the Federal and Regional Bureaus of Agriculture and the Cooperative Promotion Agency on all agricultural activities. An official Memorandum of Understanding (MOU) is under development with these government organizations to ensure complementarity and alignment with existing initiatives.

Cooperative Strengthening

Union selection process: To meet the anticipated crop quantity and quality requirements of NewCo, CHAI and partners agreed to select geographic areas that are agro-ecologically suitable for maize and soybean production, and have favorable characteristics for value chain development, such as accessibility and proximity to infrastructure. The partner unions were carefully selected from among available unions using the criteria outlined below. After vetting potential unions, CHAI and partners selected a total of 11 unions, nine core partner unions and two additional "reserve" unions, which have the capacity to sign forward contracts with NewCo.

The selection process involved multiple factors, with consideration given to the unions' previous performance and future potential as a reliable aggregator and seller of these crops. NewCo will sign forward contracts with a subset of the unions in advance of each agricultural season, according to their crop procurement needs.

Criteria for partner union selection:

i) Geographic areas suitable for maize and soybean: The targeted districts are within a geographic area identified as productive for maize and soybean by the regional government and other actors.
ii) Quantity: The unions are able to supply large quantities of raw materials sourced from member farmers.
iii) Previous business experience: The unions have had experience with forward contracts in the past two years.
iv) Low default rate: The unions have demonstrated the capacity to repay loans.
v) Infrastructure facilities: The unions are in reasonable proximity to roads, telephones, etc.
vi) Concentration of partner unions: Most of the unions are located in adjacent zones, allowing for cost-effective service delivery and program monitoring.

The selected unions and their characteristics are presented in the table below.

**Table 1: Selected partner and reserve unions**

| No | Address of Cooperative Union | | Name of Cooperative Union | Number of primary cooperatives | | Number of Farmers |
|---|---|---|---|---|---|---|
| | Zone | Town/ Wereda | | Maize | Soybeans | |
| Partner Unions | | | | | | |
| s9(2)(ba) | | | | | | |
| | s9(2)(ba) | s9(2)(ba) | s9(2)(ba) | | | |
| Total | | | | 142 | 23 | 55,386 |
| Reserve Unions | | | | | | |
| s9(2)(ba) | | | | | | |



NewCo will sign forward contracts with a subset of the cooperatives in advance of each agricultural season, once specific crop demands have been identified. Because Ethiopian farmers work one main agricultural season each year, the number of farmers engaged in the project in Ethiopia is expected to be significantly larger than in Rwanda, where farmers work two agricultural seasons per year.

Increasing capacity of primary cooperatives: The baseline survey indicated that unions have relatively strong management structures, with experience managing forward contracts and loans, and the financial systems to support the administration of a large set of primary cooperatives. Unlike the unions, however, the management systems of the primary cooperatives demonstrated a number of gaps. Leaders of primary cooperatives have limited access to training on financial management, leadership, and good governance, although they have often been trained on agronomy practices and soil

and water conservation activities. It is also common for the primary cooperatives' management committee members to prioritize their paying jobs over their cooperative responsibilities. For these reasons, the project will support primary cooperatives to assess and strengthen leaders' skills and commitment before moving forward.

CHAI plans to undertake organizational assessments of the primary cooperatives, in collaboration with union leadership and extension agents who specialize in cooperative development, and design tailor-made capacity-building trainings for the primary cooperatives. This process will also serve to inform unions and extension workers as to the performance of each of the cooperatives under their remit, through assessments using organizational diagnostic tools and other indicators of trade performance. To ensure that both unions and primary cooperatives are equipped to enter into forward contracts, CHAI will provide training to strengthen their organizational and financial capacity. CHAI also plans to train extension workers to improve their effectiveness in supporting farmers and their organisations to profit from maize and soybean production and sales.

Financing Mechanisms

s9(2)(ba)

**Creating a financial model:** According to the Regional Agricultural Bureau, in the past farmers were able to buy inputs from cooperatives on credit, but for the last four years this has not been possible due to high default rates. The baseline survey indicates that only 8% of farmers are accessing loans in order to purchase seed, fertilizer, or labor.

Cognizant of this fact, CHAI has been developing an appropriate financial model for Ethiopia, leveraging the reduced risk inherent in the forward contracting arrangements. The IFC has agreed to provide the necessary capital to launch a revolving loan fund for the Ethiopia program that will be administered through a local intermediary bank partner. The local partner needs to have the capacity to administer the loans, and the willingness to serve smallholder farmers at low interest rates with the forward contracts from NewCo as collateral.

In the first half of 2014, CHAI identified five local microfinance institutions (MFIs) with the potential to serve as the local intermediary partner for the revolving loan fund. These five MFIs all have ample experience providing agricultural financing to smallholder farmers, and were selected according to the following criteria:

1. Experience in the targeted intervention areas
2. Capacity to assess risk and achieve a low default rate
3. Experience working with smallholder farmers
4. Experience providing agricultural loans
5. Ability to provide an appropriate agricultural loan product for smallholder farmers

Table 2 – Potential intermediary MFI partners and their assets (figures in USD)

| Name | No of Active Borrowers | Loans Outstanding | Voluntary Savings | Compulsory Savings | Total Savings | Total Assets | Total Liabilities | Total Capital |
|---|---|---|---|---|---|---|---|---|
| s9(2)(ba) | | | | | | | | |

In addition, four banks have been identified that provide agricultural loans, including the s9(2)(ba) s9(2)(ba) , which provides output loans to unions for aggregation of crops at harvest season.

To ensure the success of the lending model, CHAI plans to provide training in the coming months to the management teams of the partner primary cooperatives to build their knowledge of the regulations and procedures of financial institutions, and strengthen their internal financial systems and controls.

Access to Inputs

During the first half of 2014, CHAI developed a working document and model of the program's agricultural input requirements, with flexibility to update the model depending on NewCo's crop procurement requirements. The working document discusses current input supply systems and identifies opportunities that the program may leverage, such as upcoming Government-led soil mapping exercises which will allow for a better understanding of the nutrient needs in varying geographic areas.

Access to agricultural inputs among a sample of partner cooperatives was assessed during the baseline survey. The baseline survey indicated that 93% (n = 289) and 95% (n = 296) of farmers reported using Urea and DAP, respectively, on their maize crop. The application rate of these fertilizers, averaging 94.2 kg per hectare for Urea and 90.1 kg per hectare for DAP, fell slightly below the minimum regional recommended rate of 100 kg per hectare for both Urea and DAP. Neither DAP nor Rhizobium was used for soybean production. The baseline assessment also showed that farmers have little experience using organic fertilizer, with only 2% of farmers reporting use of natural fertilizer.

The baseline survey further showed that 80% of households reported having purchased improved seeds for maize, while only 4% did so for soybean.

The baseline survey findings and the working model will be used by the CHAI team and partners to effectively plan for timely input distribution during the first season of crop purchases by NewCo. For example, the program will be developing a plan to source adequate quantities of soybean seed, which has not been an area of focus in past or current seed multiplication efforts.

Harvest / Post-Harvest Losses

Harvesting practices: Farmers in the selected areas reported using a wide range of techniques to reduce post-harvest losses at different stages. These include, but are not limited to, optimizing the timing of the harvest to reduce shattering of the grains; preparing a smooth, wide threshing ground to reduce loss before storage; and preparing drying beds. To store maize, the majority of the farmers surveyed use traditional structures made of mud and straw.

It is clear from the baseline report that harvesting of maize and soybean is currently done by hand. There is a considerable amount of damage and loss of the crops during this process. Other post-harvest operations, including threshing, are all done manually or with wooden hand tools. Such post-harvest practices exacerbate crop losses by resulting in broken maize kernels and un-separated chaff. Farmers have limited access to mechanized agricultural equipment like threshing machines, which is contributing to high post-harvest losses.

The findings from the baseline survey indicate that smallholder farmers have limited access to high quality storage facilities, or to drying and shelling machines, and therefore have few options except to continue to use less effective manual technologies and practices.

**Post-harvest quality assurance:** Only 21% of surveyed cooperatives have storage facilities reported as being in excellent condition, and only 8% of surveyed farmers reported having access to those storage facilities that are in excellent condition. In addition, out of the total 804 primary cooperative leaders trained on different topics, only six leaders (1%) reported being trained on product quality or quality assurance. This is likely because agricultural extension workers have, in the past, placed high emphasis on crop productivity, while post-harvest handling has not been an area of focus. s9(2)(ba) s9(2)(ba)

Once the selected cooperatives are engaged in forward contracts, CHAI will work with partners to assess each cooperative's practices with regards to quality control procedures, and provide concrete recommendations and tailored capacity building to the cooperatives to ensure the supply of high-quality crops as per NewCo requirements.

Preparatory work for the following trainings has been completed:

- Cooperative Leadership and Business Development for union leaders, cooperative extension workers and zone experts.
- Pre- and Post-Harvest Management of Maize and Soybean for smallholder farmers, agricultural extension workers (DA), district agronomy experts and zonal agronomy experts.

Before designing the training program, CHAI met with the s9(2)(ba) Regional Agricultural Bureau and Cooperative Promotion Agency to understand cooperatives' and smallholder farmers' current levels of performance and capacity gaps, in order to effectively target weaknesses in the trainings. Based on these discussions, the preparation of the user manuals for agricultural strengthening and cooperative development mentioned above is underway, in local languages, in collaboration with the s9(2)(ba) Regional Agricultural Bureau and the Cooperative Promotion Agency.

Review Meetings

The project's implementing partners have been working together smoothly and continuously since the launch of the project. The roles of the Federal Ministry of Agriculture, the Cooperative Promotion Agency, the respective regional bureaus, and CHAI are clearly defined and a formal Memorandum of Understanding is under development among all signatories.

The Federal Ministry of Agriculture, the Cooperative Promotion Agency, and the regional bureaus have designated focal persons who are readily available for consultation. The CHAI team has conducted informal meetings with the focal persons to design the capacity building trainings discussed above.

The Government of Ethiopia is currently conducting soil mapping to determine customized fertilizer recommendations; the agricultural team will continue to liaise with Government partners to collect relevant information on soil types and corresponding packages of recommended nutrients/fertilizers within our target areas.

## 3. Summary of Any Emerging Threats

While the initiative has made strong progress to date in Ethiopia, a number of potential threats could create challenges during program implementation. The CHAI team recognizes this and is seeking to mitigate the risk of negative impacts on the program through contingency planning. Unforeseen risks are also likely to arise over the course of the project, and will be managed as they come up.

The interdependence of the Nutrition Initiative's components continues to pose a potential risk. The agricultural strengthening work is contingent on NewCo's crop procurement contracts, which serve as collateral for the revolving loan fund and allow farmers to purchase inputs with favorable financial terms. To date, CHAI has continued to move the NewCo timelines forward as aggressively as possible while keeping all stakeholders engaged and actively supportive of the Initiative. However, it is possible that delays in establishment of the joint venture and construction timelines will impact the agricultural work.

Ethiopia has a history of experiencing droughts, floods and other severe weather events, any of which could significantly slow the program's progress towards improving smallholder farmers' productivity. CHAI has been exploring potential crop insurance schemes, which would be built into the financing model for smallholder farmers, in order to limit the downside risk of a severe event. By promoting the incorporation of organic fertilizers, along with appropriate use of chemical fertilizers, CHAI will also be working with Government agencies to reduce farmers' vulnerability to climatic events over time.

Finally, the goals of the agricultural strengthening work are contingent on the active participation of partner cooperatives and the strong performance of the extension service agents in driving uptake of improved agronomy practices. If improved inputs and practices are not taken up by farmers, yield improvements may not materialize as quickly as anticipated, and the program's income improvement goals could not be met. Per the discussion above, CHAI will seek to mitigate these risks through informed selection of partner unions and cooperatives, and targeted trainings to fill gaps in the current capacity of both farmers and the extension workers who will be supporting them.

Annex I – Report on the 2014 Baseline Survey Findings

## 1. Introduction

This report comprises a description of the quantitative baseline survey that was carried out as part of the Nutrition Initiative in Ethiopia, and an analysis of the resulting data.

The baseline survey was carried out in April 2014 with two objectives:

1. Provide a detailed understanding of characteristics of the population to be served by the project; and
2. Provide baseline data to enable rigorous evaluation of the impact of the project.

The baseline survey was carried out at two levels:

1. Cooperative leadership (primary and union level)
2. Farming households (members of selected cooperatives)

The questionnaire administered at the household level covered the following subjects:

- Demographics of the respondents
- Productivity of maize and soybean
- Input use, spending and timeliness of delivery
- Uptake of improved agronomic practices
- Use of insurance
- Challenges

The questionnaire administered at the cooperative level collected data on the following key variables:

- Demographics of respondents
- General information about the cooperative
- Trainings completed
- Creditworthiness of the cooperative
- Infrastructure status and recent improvements
- Maize and soybean volumes purchased and sold
- Experience with offtake agreements
- Challenges

## 2. Baseline survey design and implementation

The CHAI team carried out the baseline survey, with support and coordination to ensure consistency between the survey administration in Ethiopia and Rwanda. The CHAI team worked together to design the questionnaire; provide training to enumerators; supervise the survey field work and data entry; undertake sampling and data quality checking; and compile the final report.

### 2.1. Survey area

The survey was conducted in three administrative zones of s9(2)(ba) , , and s9(2)(ba) s9(2)(ba) which are known to have suitable characteristics for maize and soybean production.

### 2.2. Determination of sample size

The sampling procedures were performed at three levels: cooperative unions, primary cooperatives, and farming households. First, three unions were selected randomly, comprising 33% of the total anticipated unions in the project. Following the selection of unions, fifteen primary cooperatives (five from each union) were selected purposively depending on their accessibility and distance from the center. Finally 24 respondent farmers were interviewed from each cooperative, making the total number of respondents 360. Farmers were selected randomly from cooperative membership lists. Furthermore, fourteen cooperative leaders (out of the total fifteen cooperatives selected) were interviewed to collect data on the cooperatives' systems.

## 3. Descriptive results from the baseline survey

### 3.1. Maize and soybean production and marketing

An important focus of the baseline survey was the activities of those households already engaged in maize and soybean production. As shown in Table 1, approximately 86% of households (312 households) reported having been engaged in maize production during the last season prior to the survey, while 48 farmers (15% of the 312 surveyed) were engaged in soybean production. Table 1 presents reported productivity among the maize- and soybean-producing households.

In this study, all of the respondents are small-scale farmers. However, the size of land owned differs from farmer to farmer. Per table 1 below, the average amount of land farmers planted with maize is 0.94 hectares. Only 15 farmers reported cultivating more than two hectares of land with maize.

The total yield per household is related to land area planted. However, productivity per hectare varies based on uptake of improved agronomic practices and technologies. Average productivity of maize is 2.88 metric tons (MT) per hectare (ha), excluding values below 0.5 MT/ha or above 6 MT/ha. This finding is in agreement with Central Statistics Authority data (CSA 2013) which shows 2.9 MT/ha maize yields in s9(2)(ba) . The average productivity of soybean is 1.27 MT/ha.

The yield level reported by farmers is low when compared to yields that can be obtained on demonstration fields. Improving the efficiency of farmers' agronomy practices should therefore result in a significant improvement in yields.

Table 1 – Maize and soybean production and sale

| I. Maize | Number | Percent |
|---|---|---|
| Household produced any maize in past 12 months | 312 | 86% |
| Average size of maize plot (Ha) | 0.94 | |
| Average quantity of maize harvested per hectare (MT) | 2.88 | |
| Household sold any maize in past 12 months, among maize producers | 216 | 69% |
| Sold to Cooperative | 67 | 31% |
| Sold to other market | 149 | 69% |
| Average quantity of maize sold among maize sellers (MT) | 1.69 | 58% |
| Average sale price per MT maize (USD) | $204 | |
| Average maize revenue among maize sellers (USD) | $345 | |
| Average total value of maize production, per farmer (USD) | $523 | |

| II. Soybean | Number | Percent |
|---|---|---|
| Household produced any soybean in past 12 months | 48 | 13% |
| Average size of soybean plot (Ha) | 0.84 | |
| Average quantity of soybean harvested per hectare (MT) | 1.27 | |
| Household sold any soybean in past 12 months | 34 | 71% |
| Sold to Cooperative | 17 | 50% |
| Sold to other market | 17 | 50% |
| Average quantity of soybean sold among soybean sellers (MT) | 1.11 | 88% |
| Average sale price per MT soybean (USD) | $349 | |
| Average soybean revenue among soybean sellers (USD) | $465 | |
| Average total value of soybean production, per farmer (USD) | $519 | |

The survey's findings indicate that from the total maize production by the sample households, just under 70% is sold at market while farmers retain approximately 30% for household consumption. Roughly 88% of the soybean harvested is reported to be sold at market.

As can be observed from Table 1, about 70% of maize sales take place in the local markets, while about 30% of maize sales are to the cooperative. Soybean sales are evenly split between sales to the local market and sales to the cooperative. These results show that a large proportion of farmers' product reaches the market outside of the cooperatives, and that significant numbers of farmers are likely not getting adequate marketing services from the cooperatives.

### 3.2. Input use by the respondents

The participating farmers were asked whether they are using modern agricultural inputs. The baseline findings indicate that farmers are using two types of fertilizer, nitrogen (Urea) and phosphorus (DAP) for maize. Out of the total 312 respondents who planted maize, 93% (n=289) and 95% (n=296) reported using Urea and DAP respectively. However, none of the soybean producer farmers have reported using DAP and/or Rhizobium.

According to the proposed maize technology package for s9(2)(ba) (unpublished 2013/2014 Government document) s9(2)(ba) s9(2)(ba) However, the current Urea and DAP application rate in the surveyed areas is lower than the regional recommendation rate, s9(2)(ba) for Urea and DAP respectively. Furthermore, Urea application can vary depending on yield expectations and moisture availability. For areas with high production potential, the highest grain yield can be achieved with Urea application of 250 to 300 kg per hectare.

The respondents' use of improved seed is shown in Table 2. Approximately 80% of maize producers reported that they purchased improved seeds, while only 4% of soybean producers reported doing so.

The timeliness of the agricultural input supply was also assessed due to the seasonal nature of agricultural activities. A quarter of the respondents reported a delay in fertilizer and seed supply. Furthermore, quite a significant number of respondents raised seed quality problems as a challenge in their response to open-ended questions on major concerns.

Table 2 – Maize and Soybean Input use

| | Number | Percent |
|---|---|---|
| I. Maize input use | | |
| Maize farmers who used Urea fertilizer in last season | 289 | 93% |
| Maize farmers who used DAP fertilizer in last season | 296 | 95% |
| Average application rate of Urea, Kg/Ha | 94.2 | |
| Average application rate of DAP, Kg/Ha | 90.1 | |
| Maize farmers who used improved seed in last season | 248 | 80% |
| Maize farmers who used organic fertilizer in last season | 6 | 2% |
| Maize farmers who used pesticide in last season | 92 | 30% |
| Maize farmers who used herbicide in last season | 64 | 21% |
| II. Soybean input use | | |
| Soybean farmers who used DAP fertilizer in last season | 0 | |
| Soybean farmers who used Rhizobium in last season | 0 | |
| Soybean farmers who used organic fertilizer in last season | 0 | |
| Soybean farmers who used improved seed in last season | 2 | 4% |
| III. Timeliness of fertilizer and seed input supply | | |
| Number of farmers who reported receiving fertilizer on time | 279 | 77% |
| Number of farmers who reported receiving seed on time | 279 | 77% |
| IV. Tractor and other mechanization use | | |
| Maize farmers who used tractors or other mechanization in last season | 6 | 2% |

Generally, use of agrochemicals is not widespread, with 30% and 21% of farmers reporting that they used some pesticide and herbicide, respectively, during the past production season. However, the Integrated Pest Management (IPM) practices of respondents are not known at this level and therefore it is difficult to see gaps in their insecticide use.

A small percentage of the respondents reported spending money on mechanized inputs, with only 2% reporting renting tractors.

When all input types are considered together, including fertilizer, seed, insecticide and herbicide, there is significant room for improvement in terms of input application rate, use of small mechanized technologies, and timely delivery of inputs.

### 3.3. Access to post-harvest infrastructure (storage, dry shed, pavement)

Though data on the magnitude of post-harvest loss were not collected during the baseline data collection, some sources indicate that about 30% of production is lost after harvest due to inappropriate collection, transport, storage, pest control etc. (Ethiopia Agricultural Sector Policy and Investment Framework, 2010-2020).

According to observation and discussion during baseline survey data collection, farmers do most harvesting and post-harvesting activities manually. Most of the farmers use wooden hand tools to beat the grain off of the cob (shelling), which damages the kernels and leaves farmers with considerable un-separated chaff. The traditional shelling of maize by hand results in losses, and farmers struggle to rely on manual work alone, due to limited labor availability. The time-consuming nature of the manual process leaves the crop exposed to contamination and pests. As expected, none of the farmers reported accessing machines for shelling, which would enable labor saving and timely execution of farm operations.

Only 3% of the respondents reported use of improved drying facilities to reduce losses caused by insects and fungus. None of the cooperatives reported providing drying facilities to members.

Table 3 – Access to post-harvest technologies

| | Number | Percent |
|---|---|---|
| Proportion of farmers accessing high-quality dry shed | | 3% |
| Proportion of cooperatives with high-quality storage | 3 out of 14 cooperatives | 21% |
| Proportion of farmers accessing high-quality storage services from cooperatives | 718 members out of total 8497 | 8% |
| Proportion of farmers accessing threshing machine | 0 | 0% |
| Proportion of farmers advised on post-harvest management | 306 | 85% |
| Proportion of farmers applying pre-storage treatments | 90 | 30% |

At the household level, farmers frequently use traditional storage made up of mud and straw to store their product for consumption and for sale at market when need arises. As shown in Table 4, 93% of the primary cooperatives own stores: 43% have stores reported as "poor" quality; 29% have stores in "good" quality; and the remaining 21% report "excellent" quality stores. Only 8% of the member farmers have access to the excellent quality cooperative stores (718 farmers sold to the cooperatives with the excellent stores out of the total 8,497 members in the surveyed cooperatives).

Table 4 – Storage quality of cooperatives and access by smallholder farmers

| | Number | Percent |
|---|---|---|
| Number of cooperatives with storage | 13 | 93% |
| ... Excellent condition | 3 | 21% |
| ... Good condition | 4 | 29% |
| ... Poor condition | 6 | 43% |
| Number of farmers using high quality/excellent quality storage | 718 | 8% |

Additionally, most farmers (>70%) do not use pre-storage treatments to reduce potential losses/damages. According to the Regional Bureau, those who do use fumigants do not apply the chemicals properly. s9(2)(ba)

Eight-five percent of farmers reported that they were advised on post-harvest handling by extension workers. However, the advisory service on post-harvest loss is weak compared to the services provided on production. The Development Agents (DAs) have limited knowledge and training on post-harvest crop management.

The majority of the respondents raised threshing problems as the main challenge in post-harvest management. This finding implies that they could be eager to employ post-harvest loss reduction technologies and practices provided they get technical training and acquire the technologies at affordable prices, with access to credit.

### 3.4. Access to financing/loans

Respondents were also asked for information about their access to financing. Only 8% of farmers reported taking out any loan during the past 12 months. Most of these farmers took out loans for fertilizer and seed, with a few taking out loans for labor payments.

Table 5 – Access to financial services (household level data)

| | Number | Percent |
|---|---|---|
| Farmers who took any loan during past 12 months | 28 | 8% |
| Farmers who took a loan for fertilizer/ pesticide purchase | 21 | 6% |
| Farmers who took a loan to finance seed purchase | 23 | 6% |
| Farmers who took a loan for labor payments | 6 | 2% |

s9(2)(b)(ii)

The data taken from primary cooperatives have shown similar trend. Out of the 14 cooperatives, only five cooperatives have distributed loans to their members, averaging US $ per loan. Even when distributed, the loan size is insufficient to cover the input costs required to produce on a 0.94 hectare plot of land.

Table 6 – Access to financial services (cooperative level data)

| | Number | Percent |
|---|---|---|
| Proportion of cooperatives distributing loan to members | 5 | 36% |
| Total loan funds received by 14 cooperatives last year (USD) | s9(2)(ba), s9(2)(b)(ii) | |
| Total loans distributed to farmers in the past year (USD) | | s9(2)(ba) |
| Proportion of members who borrowed from cooperative | | 24% |
| Average size of loan provided (among borrowers – USD) | | |

The baseline data collected at both household and cooperative levels have shown that smallholder farmers have limited access to affordable loans, which could result in low adoption rates of improved technologies that enhance productivity and product quality.

### 3.5. Contact with extension agents and training topics covered

In the surveyed areas, 83% of respondents reported being advised by extension workers. The advice provided by extension workers reportedly covered weeding (this topic was covered with 89% of surveyed farmers), line spacing (89%), crop rotation (90%), herbicide/fertilizer use (81%), proper seasonal timing (84%), post-harvest handling (85%) and pesticide/disease management (80%).

Table 7 – Proportion of farmers advised on improved agronomic services

| | Number | Percent |
|---|---|---|
| Farmers visited by extension workers | 299 | 83% |
| Advised on weeding | 322 | 89% |
| Advised on line spacing | 323 | 89% |
| Advised on crop rotation | 324 | 90% |
| Advised on herbicide/fertilizer use | 291 | 81% |
| Advised on proper seasonal timing | 305 | 84% |
| Advised on post-harvest handling | 306 | 85% |
| Advised on pesticides/disease management | 289 | 80% |

However, given the gap between yields on demonstration sites and farmer-managed plots, it can be concluded that the impact of these trainings has been limited, and that smallholder farmers are not consistently applying improved agronomic practices, i.e. improved inputs and ideal timing for sowing seeds, weeding, crop rotation, etc. There is room for the project to encourage farmers to improve technical efficiency, so as to increase productivity and quality, through a proper extension system.

The data from cooperatives indicate that cooperative leaders are trained on a number of topics, including crop productivity, and soil and water conservation. However, the proportion of cooperative leaders who have received training on crucial topics like financial management, quality assurance and leadership is low, as shown in Table 8 below.

Table 8 – Training topics covered at cooperative level

| | Male | Female | Total | Percent |
|---|---|---|---|---|
| Crop/ maize procurement, marketing | 181 | 5 | 186 | 23% |
| Soil and water conservation | 366 | 11 | 377 | 47% |
| Financial management | 7 | 0 | 7 | 1% |
| Quality maize production | 129 | 4 | 133 | 17% |
| Quality assurance | 5 | 1 | 6 | 1% |
| Input distribution | 3 | 0 | 3 | 0% |
| Saving and credit | 26 | 0 | 26 | 3% |
| Leadership, by law and regulation | 22 | 0 | 22 | 3% |
| Fertilizer selling mechanism | 44 | 0 | 44 | 5% |
| Total | 783 | 21 | 804 | |

Most interestingly, the above data provide information about gender: only 3% of the training participants were women. Therefore, the project should ensure that the technologies that will be introduced are equally accessible for both women and men.

### 3.6. Insurance

Generally, there is very low awareness of agricultural insurance on the part of farmers as well as their unions. The baseline findings have indicated that none of the farmers purchased insurance to cover agricultural efforts over the past two years. However, one union has purchased insurance for its trading activities.

### 3.7. Challenges that farmers face

Respondents were asked about the most important barriers to improving the quantity and quality of maize and soybean production. The limited access to finance; poor weather condition (climate change); poor seed quality and timeliness of its supply; and termites were cited by many respondents as the most important factors limiting their productivity. The lack of agricultural technologies like threshing machines was the most common challenge cited on quality of production. Some respondents also reported receiving limited extension services from Development Agents.

Clinton Health Access Initiative

# Rwanda Nutrition Initiative: Agricultural Strengthening



2014 Mid-Year Progress Report

**Submitted to the New Zealand Ministry of Foreign Affairs and Trade**

August 2014

CLINTON HEALTH ACCESS INITIATIVE

1. Update on Program Progress

During the first half of 2014, the Clinton Health Access Initiative (CHAI) team and the Government of Rwanda made substantial progress on implementation of the Nutrition Initiative. Having finalized a sustainable business model for the production and distribution of nutrient-rich complementary foods, CHAI has completed negotiations with the Government of Rwanda and a consortium of international investors to launch a world-class food processing facility in the Eastern Province. The Ministry of Health has endorsed the formulation of the complementary food product, lending its support to plans for widespread promotion and distribution through the national Community Health Worker program. CHAI has also secured ethical approvals to move forward with a rigorous evaluation of the program's impact, which will begin with enrollment of a pre-program cohort of children who will provide a baseline against which to measure progress after product launch.

The Boards of DSM, the International Finance Corporation (IFC), and s9(2)(b)(ii) ( ) have officially voted and agreed to fund the first phase of factories in Rwanda and Ethiopia and to create an international holding corporation ("HoldCo") that will be the s9(2)(b)(ii) investor in the local joint ventures. The financial and legal negotiations to determine the structure and mechanics of HoldCo are in the final stages. DSM and s9(2) have a dedicated team in place to drive the process of engineering the factory design, conducting environmental impact assessments, and hiring contractors. The factory construction site has been selected in Rwanda, and the partners are finalizing site selection for the first factory in Ethiopia. Engineering and factory design are also in the final stages of completion. The factories will be identical in design, utilizing Bühler equipment as originally anticipated.

The senior management of the World Food Program (WFP) has affirmed their five-year commitment to purchase s9(2)(ba)(i) tons (MT) of Super Cereal Plus per year from each of the first three factories, for a total of s9(2)(ba)(i) MT per year, as per the business cases. s9(2)(b)(ii) s9(2)(b)(ii) . By purchasing in Africa, WFP will both save money and fulfill their organizational commitment to procure locally, thus boosting the livelihoods of smallholder farmers.

The Government of Rwanda has signed a term sheet with DSM, representing HoldCo, agreeing to the parameters of the joint venture to manufacture nutritious foods ("NewCo"). The Government of Rwanda will be a s9(2)(ba) investor in the factory along with s9(2)(ba) HoldCo. The Rwanda factory is scheduled to break ground this summer and targeted to be at full production by July 2015. s9(2)(ba)

The term sheet describes the agreements reached between HoldCo, represented by DSM, and the Government of Rwanda. Terms agreed to include:

- The government has committed to purchase fortified complementary food for infants from the factory for at least five years, targeted for distribution to the most vulnerable parts of the populations. In Rwanda, the Government has committed to purchase US $ M annually, which s9(2)(ba)

represents volumes sufficient to feed all infants whose families fall within the s9(2)(ba) of the *Ubudehe* social support system, representing the lowest-income households.

- The company will earn a target rate of return on equity of s9(2)(b)(ii) of the profits above that level will go to the government to help subsidize purchase of the food for the poorest Rwandan children and mothers. A portion of that profit-sharing to the governments will be allocated to improving the distribution systems necessary to distribute the food to the rural populations. s9(2)(b)(ii)

- The company has agreed to sell the products to the Government to serve the rural population. s9(2)(b)(ii) s9(2)(b)(ii) The Government will distribute the product (for free to poor people and selling it to others) through their community health worker systems and will conduct public health campaigns to promote breast feeding in the first six months of life and breast feeding complemented by this nutritious food from six months to two years of age.

- The company has agreed to form contractual arrangements with cooperatives for the procurement of local maize and soybeans at the required quantity and quality for production. s9(2)(b)(ii) s9(2)(b)(ii) In the event that the cooperatives are unable to produce at the agreed quantity and quality levels, the company will be able to either purchase from the s9(2)(b)(ii) or procure inputs from outside Rwanda.

s9(2)(b)(ii)

In collaboration with the Ministry of Health, CHAI has secured ethical approvals to launch program monitoring and evaluation activities in the second half of 2014. Given that high uptake is anticipated in Rwanda after product launch in 2015, it is important to capture a pre-program cohort of 6-24 month old children, measuring stunting rates at baseline. These data can then be compared with stunting rates among children with higher and lower uptake of the product once the program is underway. In order to secure ethical approvals, the CHAI team finalized the study design, developed data collection tools, and brought on board a team of data collectors. CHAI has also organized a team of researchers from local institutions to provide advice and support for the project. Data collection will begin with the enrollment of children in the third quarter of 2014.

## 2. Update on Agricultural Strengthening Activities

**Overview:** During the first half of 2014, the CHAI team worked closely with the Ministry of Agriculture (MINAGRI) and the Rwanda Agricultural Board (RAB) to lay the groundwork for the Nutrition Initiative's agricultural strengthening activities. Major milestones include selection of partner cooperatives; completion of a baseline survey within partner cooperatives; maize and soybean procurement planning with the joint venture partners and other key stakeholders; and the development of an effective financing model for the revolving loan fund for farmers. Each of these is discussed in more detail below.

### Cooperative Strengthening

**Cooperative Selection Criteria:** CHAI worked with MINAGRI and the WFP, two of the largest institutional buyers in Rwanda, to develop the following selection criteria for cooperatives:

1. Registration: The cooperative should be registered with the Rwanda Cooperative Agency (RCA) and Local Authorities. Having a legal entity enables CHAI and partners to:
   - Select credible cooperatives, avoiding working with fraudulent or non-existent cooperatives;
   - Hold the cooperatives accountable because registered cooperatives work hard to avoid losing their registration status; and
   - Deal with experienced and skilled cooperatives, because registered cooperatives often have been trained previously and/or have engaged in similar business contracts.
2. Land: The cooperative should have adequate land (at least 30 hectares) for maize and soybean production, the land should be productive, and the cooperative should agree to produce maize and soybeans for the company under a rotation system. Larger, more productive land allows for fewer contracts and thus simplifies management, input distribution, monitoring, and extension support.
3. Experienced Sellers: The cooperative should have at least one year of experience in supplying to large private buyers under contract to ensure that partner cooperatives:
   - Understand binding contracts, with a record of preventing defaulting or side-selling;
   - Understand the importance of deadlines; and
   - Have existing capacity to meet crop quantity and quality requirements.
4. Membership: The cooperative should have at least 50 members to ensure that the benefits of our interventions go to many smallholder farmers, thus raising incomes, reducing poverty, and diversifying risks.
5. Organizational Capacity: The cooperative should have basic skills in record keeping, financial management, and administration. Its leadership should have basic literacy skills to make sure that there is proper:
   - Tracking of supply from farmer to factory for transparency and traceability;
   - Filing systems for input distribution and loan recovery; and
   - Communication with and mobilization of members by the leadership.
6. Post-Harvest: The cooperative should have basic post-harvest handling infrastructure and associated skills.
7. Location: The cooperative should be based in the Eastern Province to reduce transport costs, thereby increasing farmers' profit margins while keeping the price affordable for NewCo.
8. Financials: The cooperative should have a bank account with proper signatories, as per the cooperative law, and should agree to have their accounts audited.

9. Free from Water Stress: The cooperative should be farming on irrigated land, radical terraces and/or good soil to mitigate the risks of low rainfall which sometimes happens in Eastern Province. The aforementioned types of land reliably provide higher yields during rain shortages than other land types.
10. Extension Support: The cooperative should have an existing partnership with an extension service provider and agro-dealer suppliers of improved seed and fertilizer. This criterion ensures the farmers already have basic farming skills and input systems.

Selection Process: Once these criteria were developed, CHAI began a comprehensive selection process by working with RAB, the RCA, and local government officials, among others, to create a list of all the cooperatives currently involved in maize and soybean production in the Eastern Province. CHAI worked with the above partners to conduct a preliminary assessment of this list of cooperatives based on the selected criteria. CHAI then visited the shortlisted cooperatives to collect more detailed field data on each of the criteria. These field activities generated the list of finalists which was agreed upon by MINAGRI, RAB, the RCA and local government. Forward contracts will be signed seasonally with a subset of the selected cooperatives, based on cooperative capacity and NewCo maize and soybean demand.

Table 1, below, summarizes key information about the selected cooperatives.

Table 1: Selected partner cooperatives

| Cooperative Name | District | Total Members | Total Land Size (Ha) |
|---|---|---|---|
| s9(2)(b)(ii) | Nyagatare | 560 | 400 |
| | Nyagatare | 127 | 250 |
| | Nyagatare | 1,493 | 2,854 |
| | Gatsibo | 100 | 500 |
| | Gatsibo | 370 | 80 |
| | Gatsibo | 1,881 | 600 |
| | Gatsibo | 102 | 600 |
| | Rwamagana | 3,414 | 600 |
| | Rwamagana | 4,035 | 1,200 |
| | Kirehe | 700 | 600 |
| | Kirehe | 730 | 730 |
| | Kabarore | 43 | 402 |
| | Rwamagana | 100 | 100 |
| | Kabarore | 1,387 | 2006 |
| | Nyagatare | 37 | 171 |
| | Mimuli | 59 | 38 |
| | Nyagatare | 74 | 256 |
| Total | | 15,212 | 11,387 |

The cooperatives have a total reported membership of 15,212 farmers, with a total of 11,387 hectares (ha) of land. As shown above, the cooperatives vary significantly in the size of their membership and available land. The baseline survey findings indicate that most farmers have access to less than one hectare of land for planting (0.7 ha).

Under Rwandan law, one third of cooperative leadership must be female. However, women typically comprise the majority of cooperative members, both because they dominate the agriculture sector and because women constitute more than half of the Rwandan population. Among the partner cooperatives polled in the baseline survey, 45% of the total members are female. Approximately one third of the cooperative members are recorded as having paid their membership dues. Women are better represented than men among dues-paying members: 54% of the baseline cooperatives' dues-paying members are women.

Cooperative Engagement: With the cooperatives identified, CHAI will be working with NewCo and Government partners to negotiate the terms of the forward contracts for procurement of maize and soybeans. These forward contracts have been drafted, and cover the following areas:

- Maize and soybean quantities, under a seasonal rotation schedule
- Maize and soybean quality, including adherence to Codex standards
- Moisture content
- Maize and soybean pricing
- Training and extension support
- Affordable financing and skills development in financial literacy
- Access to improved seed and fertilizer
- Cooperative leadership strengthening

A procurement plan has been developed by NewCo, with volumes specified for procurement from the upcoming Season A. Prices were discussed between [s9(2)(ba)] and MINAGRI, and subsequently the Minister of Agriculture met with the cooperatives to negotiate maize and soybean pricing. [s9(2)(ba)]

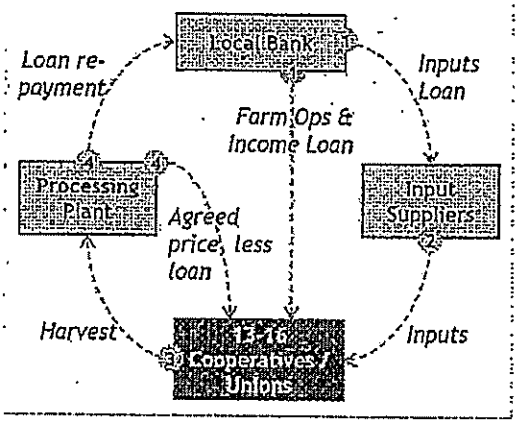
[s9(2)(ba)]

Agricultural extension and input supply activities will begin in line with the upcoming agricultural season.

Financing Mechanisms

The CHAI team spent significant time in the field with smallholder farmers during the first half of 2014, and confirmed that the highly constrained access to financing in Rwanda makes it difficult for farmers to invest in crop productivity and increase their incomes. Farmers collect payment for their crops at each harvest, with minimal cash flow beyond harvest season. With poor yields and unreliable market prices, incomes often do not last between harvests, driving farmers to (a) sell their crops as soon as possible at base prices, and (b) underinvest in the subsequent crop. This is a vicious cycle: farmers are unable to invest in their inputs, and therefore unable to achieve greater incomes needed to increase subsequent yields. Local financing sources offer some credit options for farmers, but do not mitigate the market risk and charge high interest rates of 18-24%. Despite these high rates, 30% of the farmers in the baseline said they had taken a loan to pay for inputs in the past season, demonstrating a strong demand for financial services. The farmers who participated in the baseline survey did not report the amount of their loans, but

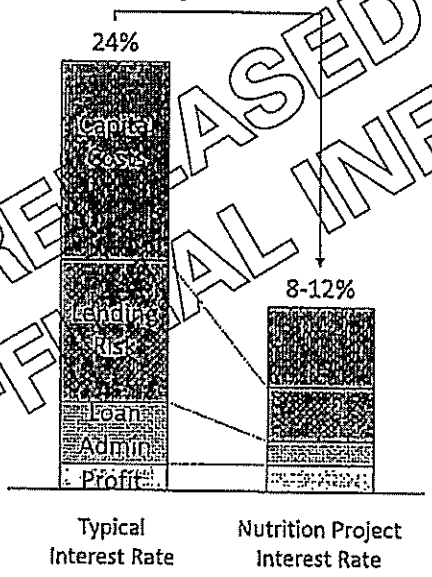
Figure 1: Sample Seasonal Loan Structure



anecdotally, the CHAI team heard reports that farmers were not taking loans for the full recommended package of inputs and labor, which contributed to reduced yields.

**Delivery Model:** CHAI worked closely with partners throughout the first half of 2014 to develop a financing model that can efficiently and effectively meet the identified need in Rwanda. This model is illustrated in Figure 1, above. It is composed of a lending mechanism to allow farmers to safely and affordably invest in their crops, maximizing yields and incomes. Each harvest cycle, the food processing factory will guarantee demand by establishing forward contracts with farmer cooperatives, as discussed above. These contracts are underpinned by the factories' guaranteed off-take contracts s9(2)(b)(ii) s9(2)(b)(ii) The forward contracts for farmers will provide security for a seasonal lending mechanism of s9(2)(b)(ii) providing the cooperative farmers incremental disbursements to: (1) purchase recommended quantities of high-quality inputs (fertilizers and improved seeds); (2) hire labor and/or mechanized farm equipment; and (3) smooth income between harvests. Once harvests are delivered, the manufacturer will pay the bank directly; payment will then be disbursed to cooperatives, less the loan balance, minimizing the risk of default on loan repayment. The purchasing agreements and loan structure – complemented by robust extension support, financial management training, and cooperative infrastructure upgrades – will enable farmers to achieve substantial yield increases and increased income, which is predictable through a guaranteed buyer.

Figure 2: Financing Model




**Sustainable, Affordable Financing:** Affordable financing is essential to encourage farmers' investment, increase yields and farmer profits, and ensure internationally competitive prices for the locally sourced maize and soybeans. To promote an environment where low-interest rates are *attractive and sustainable* for the local intermediary bank which will be responsible for the lending, the project is being structured to reduce the intermediary lender's (1) cost of capital, (2) lending risks, and (3) administration costs. Resulting savings will be passed to farmers through reduced interest rates, while sustainable margins are maintained for lenders.

Table 2, below, outlines the ways this model will reduce lender costs and risk.

Table 2: Lender Cost and Risk Model

| Costs and Risks | Mitigating Features |
|---|---|
| Cost of Capital | → *Borrowing in USD.* Typical local lending is based on local borrowing rates; this mechanism will source international funding in USD at significantly reduced rates |
| Lending Risk | |
| -Low yields and side-selling | → *Training and Extension Services.* Cooperatives and farmers will receive training and extension services to improve farming and post-harvest techniques<br>→ *Crop Insurance.* Weather-index insurance is being considered to mitigate the impact of droughts or floods<br>→ *Government Participation.* As co-signers, the Governments of Rwanda and Ethiopia will increase adherence to forward contracts |
| -Demand and price shifts | → *Forward Contracts.* Forward purchasing agreements from the manufacturing company, and supported by WFP guarantees, ensure adequate demand volumes and prices |
| -Use of funds | → *In-Kind Disbursements.* Funding for inputs will be sent directly from the lender to input suppliers<br>→ *In-Kind Repayments.* Repayment will be made directly by the manufacturing company to the lender on receipt of maize and soya harvests<br>→ *Incremental Disbursements.* Disbursements to be made throughout the season per specific needs.<br>→ *Financial Training.* Cooperatives will receive financial training and support to ensure processes and safeguards are in place to manage loans<br>→ *Smoothed Income.* Greater and smoothed income payments between harvests will provide farmers with a cushion to manage emergency needs |
| -Other | → *Risk Sharing.* Risk sharing mechanisms may be available through international partners |
| Loan Administration | → *Simplified lending.* Lending costs will be significantly reduced as disbursements and contracts will be made through cooperatives, as opposed to individual farmers<br>→ *Simplified collection.* Collection simplified as repayment made directly by the manufacturer |



**Lenders:** The International Finance Corporation (IFC) has agreed to partner with CHAI to capitalize the revolving loan fund for farmers. The IFC will provide low interest loans to a local intermediary bank, which will then lend the money onwards to the cooperatives. The IFC has committed to lend US s9(2)(b)(ii) per factory at a s9(2) interest rate, and to move forward on an expedited timeline. CHAI and the IFC have been working together in Rwanda to identify the most qualified local bank to administer the loans. All the major banks and microfinance institutions in Rwanda have been reviewed. After initial research, four potential partners were shortlisted and invited to give presentations on their capacity and willingness to serve as the intermediary partner under the proposed financing model. Two of the most interested and qualified banks were then engaged in final negotiations. Ultimately the s9(2)(b)(ii) s9(2)(b)(ii) (s9( was selected, having offered the lowest interest rate for the cooperatives at s9(2)(b)(ii) (significantly below current interest rates) and having agreed to accept the forward contracts as collateral.

s9(2)(b)(ii)

**Implementation Timeline:** The IFC and are currently undergoing due diligence on the cooperatives selected for the upcoming season. Once that is complete, they will disburse the first round of funds to the input suppliers, including mechanization service providers, improved seed companies, and fertilizer dealers. Once planting is complete, a second round of funds will be disbursed directly to the cooperatives for ongoing labor and/or mechanization costs, depending on the cooperatives' preferences. A third payment will be made around harvest season for harvesting and post-harvest

services. The funds will be reimbursed when the cooperatives deliver their produce at harvest season in early 2015. This will complete the first cycle of ongoing seasonal funding using this low cost revolving fund. , the cooperatives, CHAI, IFC, NewCo, the government and other stakeholders will review the performance of the revolving loan fund on a semi-annual basis, and use that information to agree on improvements for the following season.

s9(2)(b)(ii)

Access to Inputs

**Use of Inputs:** MINAGRI introduced the Crop Intensification Program (CIP) in Rwanda approximately five years ago, with the goal of improving uptake of improved seeds and fertilizers, and thus increasing smallholder farmer productivity. Through CIP, the Government identifies crops that are critical to food security, like maize and soybean, and provides subsidies for improved seed and fertilizer. The Government has been fully covering the cost of seed (100% subsidized) and covering half the cost of inorganic fertilizers (50% subsidized) for maize. One hundred percent of farmers in the baseline study reported using improved seed, while 93% reported using fertilizer.[1] This is significantly higher than most other countries in sub-Saharan Africa. Farmers who used improved seed reported using 55 kg per hectare on average; this is twice the 25 kg per hectare recommended by the Government.

While the program has been very successful in increasing uptake of improved inputs, the resulting yield gains have been slow to materialize. CHAI's baseline survey found that farmers' average maize yield was 2.4 metric tons (MT) per hectare in Season A 2014, significantly lower than our anticipated baseline of 3.8 MT per hectare. The low maize yield, despite high uptake of improved seed and fertilizer, is likely a result of inappropriate or incorrect input application. This may have resulted from inadequate extension services, an area which will be addressed through the CHAI program.

**Challenges and Planned Interventions:** Smallholder farmers continue to face a number of challenges which constrain their productivity, as evidenced by continued yield gaps. Largely the findings from the baseline survey validate CHAI and the Government of Rwanda's planned approach to providing agricultural strengthening support. These challenges and mitigation strategies are outlined below.

- Inadequate Fertilizer Quantities: Farmers who used fertilizer reported using 92 kg/ha of DAP and 50 kg/ha of urea. These figures are in line with the recommended amounts of 100 kg/ha of DAP and 50 kg/ha of urea. Training from extension workers should improve farmers' understanding of correct application practices. Farmers reported using 0.9 MT/ha of organic fertilizer, which is below the recommended 10 MT/ha, but still quite a significant amount. The extension workers will also train farmers on production of their own organic fertilizer to increase these amounts without reducing farmers' profits.
- Late Delivery: Among farmers using improved seed, 22% reported that the seeds were delivered late. Of the farmers using fertilizer, 20% reported it was delivered late. Late delivery of these critical inputs diminishes their effectiveness and therefore their value to farmers. CHAI is working with MINAGRI, the IFC, [redacted] seed companies and fertilizer dealers to ensure the quality, quantity and timeliness of the supply of seed and fertilizer to farmers during the upcoming season.
- Mechanization: CHAI carried out a cost-benefit analysis of mechanization options in Rwanda and identified a number of options which could be beneficial to farmers, particularly after price negotiation to lower costs. CHAI has worked with the cooperatives and MINAGRI to negotiate

[1] The baseline figures all refer to the maize growing cycle.

lower rates for mechanization services, making the costs more similar to labor costs. Mechanization is expected to improve yields due to: a) timely preparation and planting, b) improved soil nutrients, and c) increased ability of the soil to absorb and store water. CHAI and the cooperatives' leadership are currently determining which cooperatives/farmers will be taking advantage of this opportunity during the coming season. Less than 1% of farmers in the baseline survey reported using tractors last season.

- Ineffective Planting Techniques and Fertilizer Application: The farmers seem to be using a sufficient amount of improved seed and fertilizer, but not realizing the full yield benefits, as noted above. The extension workers are therefore going to work with the farmers to improve their planting techniques and tools. The extension workers will also focus on the appropriate application of fertilizers to reduce the amount needed and improve fertilizers' effectiveness.

Extension Services: Many of the challenges above will be addressed in part through extension services. During the first half of 2014, CHAI met with a number of local service providers to understand each group's interest in and capacity to provide support to the farmers through this program. The Rwanda Development Organization (RDO) was recommended to CHAI by MINAGRI as the largest, most experienced and most effective extension service provider in the Eastern Province. RDO has been working with MINAGRI to provide support to farmers under the CIP since 2008. MINAGRI has continued working with RDO because of consistent strong performance against their contracts. CHAI is in the process of signing a partnership contract with RDO to deliver the high quality extension services that are critical to the program's effectiveness in improving yields. The extension workers are expected to be deployed during the third quarter of 2014, with one extension worker serving every 500 farmers. CHAI is in discussions with the New Zealand Ministry of Foreign Affairs and Trade (MFAT) about sourcing technical assistance for the training of the extension workers, focused on strengthening the RDO team's skills in maize and soybean productivity, as well as farmer education, during the coming season.

Harvest / Post-Harvest Losses

Confirmed Need: Farmers interviewed in the baseline survey reported moderate access to post-harvest infrastructure, particularly storage: while only 59% of farmers reported access to pavement for threshing, 94% reported having access to storage facilities. The condition of post-harvest infrastructure of all types was reportedly quite low. Almost half of the farmers with access to infrastructure reported the quality as "poor," a third "good," and the final fifth to sixth of the farmers reported "excellent" quality. From these data and the CHAI team's observations, there is significant need for upgrading existing infrastructure for post-harvest crop management, including dry sheds, pavement, and storage facilities.

Table 3: Reported quality of post-harvest infrastructure

| Infrastructure | % Access | Poor | Good | Excellent |
|---|---|---|---|---|
| Drying Shed | 79% | 47% | 32% | 21% |
| Storage facility | 94% | 45% | 39% | 16% |
| Pavement | 59% | 47% | 33% | 20% |

Aflatoxins: During the baseline survey, CHAI collected 18 samples of maize, two samples from each of nine of the cooperatives that participated in the baseline survey. Only three samples registered any aflatoxins, with those total aflatoxin levels equaling 1.4, 1.49, and 3.59 parts per billion (ppb). All of these aflatoxin measurements fell below the minimum requirement for NewCo, of 10 ppb total

aflatoxins. While this is a positive finding for the crop procurement plans in Rwanda, post-harvest infrastructure remains a priority area to improve crop quality and reduce losses.

**Timeline:** Post-harvest infrastructure plans are being set up for the fourth quarter of 2014. The CHAI team is working with partner cooperatives to quantify the infrastructure gaps, analyze the costs and benefits of upgrade options, and create the financial mechanisms for investment in post-harvest infrastructure, in order to move into implementation in the second half of 2014.

Program Reviews

**Procurement Planning Meeting:** CHAI worked with MINAGRI and RAB to organize and co-chair a procurement planning meeting in May 2014. The purpose of the meeting was to bring together key stakeholders from NewCo and government agencies and establish clear timelines and responsibilities to ensure crop procurement moves smoothly during the coming agricultural season. The stakeholders included NewCo's investors, MINAGRI, RCA, RDO, fertilizer companies, and seed companies, among others. Over the course of two days, stakeholders built out a detailed work plan to procure inputs, support partner cooperatives during land preparation and planting, provide extension services, and then ultimately source crops at the appropriate quality and in the necessary quantities for the first year of NewCo's production. Each item on the work plan has clear lead and supporting individuals from partner organizations to ensure accountability. The group established an ongoing Procurement Planning Committee which is communicating on a regular basis to ensure the plans move forward in a timely manner.

## 3. Summary of Any Emerging Threats

While the initiative has made strong progress to date, a number of potential threats could create challenges over the coming year of program implementation. CHAI is cognizant of these risks and seeking to actively mitigate them through advance planning.

In some years, Rwanda is impacted by droughts and other severe environmental events, and it is possible that a weather or pest-related event could impact yields and significantly slow the program's progress towards improving smallholder farmers' productivity. CHAI has been exploring potential crop insurance schemes in order to limit the downside risk of a severe event, both for farmers themselves and for the revolving loan fund. The project's partner cooperatives will also have access to a reserve of pest control mechanisms, managed by MINAGRI, which will be deployed in the event that a severe pest event threatens crops.

The interdependence of the Nutrition Initiative's components continues to pose a potential risk. The agricultural strengthening work is contingent on NewCo's crop procurement contracts, which serve as collateral for the revolving loan fund and allow farmers to purchase inputs with favorable financial terms. To date, CHAI has continued to move NewCo timelines forward as aggressively as possible while keeping all stakeholders engaged and actively supportive of the initiative. However, it is possible that delays in establishment of the joint venture and construction timelines will impact on our agricultural work. CHAI is mitigating this risk through proactive project management and coordination of the full scope of activities that fall under the Nutrition Initiative. This enables CHAI to step in and set up bridging mechanisms where needed to ensure deadlines are met, s9(2)(b)(ii) s9(2)(b)(ii)

Finally, the goals of the agricultural strengthening work are contingent on the active participation of partner cooperatives and the strong performance of our extension service agents in driving uptake of improved agronomy practices. If improved inputs and practices are not taken up by farmers, yield improvements may not materialize as quickly as anticipated, and the program's income improvement goals could not be met. Driving these improvements will be particularly challenging for soybeans, since farmers have little previous experience with this crop. Per the sections above, CHAI has actively sought to mitigate this risk by identifying organized cooperatives, motivating the cooperatives to improve productivity through forward contracts and attractive loan agreements, and bringing on a proven service provider for extension support. CHAI will actively monitor the implementation of extension support and input provision during the coming season to identify successes and challenges, and implement any lessons learned during the following season in 2015.

## Annex 1: Report on 2014 Baseline Survey Findings

This annex discusses the agricultural baseline survey conducted in Rwanda in March and April of 2014, summarizing the process as well as the analyses of the data.

*Methodology*

Scope: During this baseline assessment, surveys were conducted with farmers and cooperatives that have been identified for potential participation in CHAI's agricultural strengthening work. A total of 298 farmers and 12 cooperatives were included in this assessment. All farmers who were interviewed were members of the cooperatives. These surveys were conducted over the course of seven days, 24-28 March and 1-2 April in Nyagatare and Gatsibo Districts in Eastern Province.

Sampling Methodology: The sample of farmers to be interviewed was determined by the membership numbers of each cooperative (see Table 1, below). Because the size of cooperatives varied considerably, probability proportional to size (PPS) sampling was used to ensure a random, representative sample. Prior to surveying farmers, cooperatives provided member registers, which were used to select farmers for participation. A systematic random sample was taken to select the farmers who were surveyed. Occasionally selected farmers were not available, and the farmer listed before or after him/her in the register was selected to be surveyed.

Table 1: Cooperatives surveyed during agricultural baseline assessment

| Cooperative Name | Sector | Cell | Member Farmers |
|---|---|---|---|
| s9(2)(b)(ii) | Kabarore | Nyabikiri | 100 |
| | Remera | Rurenge | 370 |
| | Rwembogo | Nyamatete | 102 |
| | Gatsibo | Mugera | 1,665 |
| | Rwembogo | Rwikiriro | 43 |
| | Nyagihanga | Bugamba | 100 |
| | Kabarore | Kabarore | 1,387 |
| | Nyagatare | Rukomo | 1,493 |
| | Nyagatare | Mirama | 171 |
| | Karama | Bushana Center | 47 |
| | Mimuli | Nteko | 59 |
| | Nyagatare | Rwimiyage | 74 |

**Data Collection:** Cooperative surveys were conducted on-site with cooperative leadership with access provided to registers, ledgers, and other pertinent information. Farmer surveys were conducted privately either at the farmer's home or another central location. Cooperative leaders were not involved in these surveys as it was agreed that farmers might be unduly influenced by cooperative management in the information provided about crop sales and other potentially sensitive topics.

**Aflatoxin Testing Procedure:** Aflatoxin testing was conducted at the cooperative level on 18-19 March with the assistance of the Rwanda Bureau of Standards (RBS). Random samples were collected by trained RBS workers and transported back to Kigali for testing at their Mycotoxin Testing Laboratory. These visits to cooperatives were unannounced and samples were taken from 100-kilogram bags of maize according to accepted practices.

Crop Yields & Sales – Maize

The below tables show a number of relevant analyses related to maize yields and sales. The baseline survey did not cover soya production, because it is not commonly grown by the selected partner cooperatives, and because the survey focused heavily on the 2014 Season A, during which maize is predominantly grown in the Eastern Province.

**Yields:** Maize yields, averaging 2.4 MT per hectare among farmers growing maize, were significantly lower than CHAI originally anticipated based on national yield information provided by MINAGRI. This could be a result of lower yields this season than in the past, a difference in data collection methodology or the groups surveyed; or could relate to methods for calculating post-harvest losses, which are not incorporated into CHAI's figure.[2] CHAI has opted to incorporate the baseline figure from the survey into the program's results framework, because it should provide a more accurate means of comparison with data CHAI collects from this population in future years of the project.

**Plot Size:** The average reported maize plot size of 0.7 ha was somewhat lower than the anticipated size of one hectare. Rwanda is one of the most densely populated countries in the world, so farmers have limited access to land. However, they do benefit from two agricultural seasons annually due to two rainy seasons, so the surveyed farmers usually dedicate their entire plot to maize production once a year.

Table 2: Maize yields amongst surveyed farmers

| Maize yields | |
|---|---|
| Number of farmers who planted maize | 281 |
| Number of farmers who harvested maize | 270 |
| Average size of maize plot (ha) | 0.7 |
| Average MT yields per ha (including 0.5 - 8 MT) | 2.4 |

**Sales:** Ninety-three percent of the farmers who planted maize sold some portion of their maize, with average sales of 1.45 MT, or about 76% of their total yields. The average price farmers sold at was $275 per MT, and the average revenue among farmers who sold maize was $335. Taking into consideration

[2] In some cases, yield reports will add an estimation of post-harvest losses to observed yields in order to estimate yields prior to those losses. Since the modeling methods for such estimations are inconsistent, CHAI has opted to report observed yields directly, understanding that these yields have already been lowered by some amount of post-harvest loss. Reducing post-harvest losses should contribute directly to increasing observed yields over time.

total production, including crop sold and consumed, the total value of farmers' maize crop averaged $407.

Table 3: Maize sales amongst surveyed farmers

| Maize sales | |
|---|---|
| Number of farmers who sold maize, among farmers who planted maize | 261 (93%) |
| Average quantity of maize sold, among maize sellers | 1.45 MT |
| Percent maize crop marketed, among maize sellers | 76% |
| Average sale price per MT maize (USD) | $ 275 |
| Average maize revenues, among maize sellers (USD) | $ 335 |
| Average total value of maize production, per farmer (USD) | $ 407 |

Input Use & Spending

**Input Quantities:** Farmers reported high uptake of improved seeds and fertilizers, as indicated in the table below. The "improved seed" category includes both hybrid seed and improved open pollinated varietal (OPV) seeds. One hundred percent of farmers reported using improved seed while 93% reported using urea and DAP. The average amounts of fertilizer used per hectare, among farmers reporting fertilizer use, were very close to or above the recommended amounts.

Table 4: Reported use of improved seed and fertilizer amongst surveyed farmers

| Input | Number and Percent of Farmers Reporting Use | | Average Quantity Used per Ha | Recommended Quantity per Ha |
|---|---|---|---|---|
| Improved Seed | 284 | 100% | 55.1 kg | 25 kg |
| Urea | 261 | 93% | 49.8 kg | 50 kg |
| DAP | 262 | 93% | 92.1 kg | 100 kg |
| Org. Fert. | 242 | 86% | 913 kg | 10,000 kg |
| Resticide | 40 | 14% | 1.5 kg | As needed |

**Appropriate Use:** If most farmers are already using the right amounts of inputs, then it should not be a challenge for farmers to continue investing in these amounts. However, the extension workers will need to work closely with farmers to ensure that inputs are being used effectively to maximize impact on yield gains.

Labor and Mechanization Use

While the vast majority of farmers (86%) paid for at least some percentage of their labor, and over half used threshing machines (57%), very few farmers reported using irrigation, tractors or other mechanization (2%, 1%, and 2% respectively). This means that there is significant opportunity to work with farmers to explore the benefits of potential mechanization options. With partners providing affordable financing for these long-term investments and the potential for institutional funding sources to provide subsidies to incentive uptake, there is significant opportunity to improve yields through modern and appropriate agricultural technologies. However, because much of the labor used by farmers currently is in kind, the farmers will have to determine whether the benefits are worth the potential additional cash they will need to spend.

Table 5: Labor and mechanization use amongst surveyed farmers

| Labor/Mechanization Tool | Number and Percent of Farmers Reporting Use | | Average Price/Unit | Average Cost/ Season |
|---|---|---|---|---|
| Paid Labor | 235 | 84% | $1.09/Person-Day | $50.79 |
| Threshing Machine | 161 | 57% | $8.23/MT | $15.98 |
| Irrigation System | 6 | 2% | N/A | $29.70 |
| Tractors | 2 | 1% | N/A | $73.01 |
| Other Mechanization | 6 | 2% | N/A | $19.17 |

Extension Services

Farmers reported that extension workers visited them an average of four times per year, or twice per season. The table below shows the most common topics covered by the extension agents. The quality and extent of training provided on each topic was not explored in depth.

Table 6: Topics covered by extension agents

| Farmers visited by extension worker | Frequency of visits | What topics were discussed in the meeting with the extension agent? | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Weeding | Line spacing | Crop rotation | Herbicide/ fertilizer | Proper timing of season | Harvest handling | Pesticide/ disease management |
| 267 farmers (90%) | Once per quarter | 215 farmers (71%) | 239 farmers (80%) | 206 farmers (69%) | 238 farmers (80%) | 225 farmers (76%) | 192 farmers (64%) | 204 farmers (68%) |

Post-Harvest Infrastructure Access

Currently, access to post-harvest infrastructure in the cooperatives that participated in the baseline survey is relatively high compared to many farmers in Sub-Saharan Africa. However, the quality of the infrastructure is quite low, with about half the farmers with access indicating that the infrastructure was "poor" in quality. There is significant opportunity for CHAI to intervene to upgrade post-harvest infrastructure, which have been proven to be linked directly to decreasing post-harvest losses, especially with adequate training, maintenance and extension services. The table below summarizes the access and quality of post-harvest infrastructure currently available.

Table 7: Quality of post-harvest infrastructure amongst surveyed farmers

| Infrastructure | % Access | Poor | Good | Excellent |
|---|---|---|---|---|
| Drying shed | 79% | 47% | 32% | 21% |
| Storage facility | 94% | 45% | 39% | 16% |
| Pavement | 59% | 47% | 33% | 20% |

Access to Financing

The majority of farmers who purchase fertilizer, pesticides and labor in Rwanda do so from their own savings. Only 88 of the 298 farmers surveyed (30%) accessed loans to pay for inputs last season. Most loans were for fertilizer and labor payments: 26% of farmers took a loan to cover fertilizer purchases, while 10% of farmers used a loan to make labor payments. Loans for seed purchase were rare because

of the heavy MINAGRI seed subsidy: eighty-one percent of farmers received their seeds for free with the subsidy from MINAGRI (only seeds purchased for seed multiplication purposes are not subsidized).

Table 8: Access to financing amongst surveyed farmers

| | Number | Percent |
|---|---|---|
| Farmers who took any loan during past 12 months | 88 | 30% |
| Farmers who took a loan for fertilizer purchase | 77 | 26% |
| Farmers who took a loan to finance seed purchase | 8 | 3% |
| Farmers who took a loan for labor payments | 30 | 10% |

Use of Insurance

Use of insurance was extremely limited. Only three farmers (~1%) said they had bought crop insurance in the previous two years. None reported the price nor values of claims made or paid out. There is a significant opportunity to increase uptake of insurance with farmers.

Clinton Health Access Initiative

# Reducing Chronic Malnutrition and Increasing Agricultural Incomes in Ethiopia

2014 Progress Report

Submitted to the
New Zealand Ministry of Foreign Affairs and Trade

15 March 2015



CLINTON
HEALTH ACCESS INITIATIVE

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# Executive Summary

During 2014, CHAI undertook significant preparatory work to enable the launch of the Nutrition Initiative in Ethiopia. CHAI facilitated the finalization of the business plan for sustainable production of nutrient-dense foods, and secured the commitment of international investors to finance the initial two Ethiopia-based factories. The Government of Ethiopia remains strongly committed to the initiative, having signed a term sheet with the international investors that describes the terms of the local joint venture that will own and run the factories. CHAI has provided ongoing support for the negotiation process, laying the groundwork for the partners to move forward rapidly with construction and production once legal agreements are finalized.

Also in 2014, CHAI conducted market research to understand acceptable product types for pregnant and lactating women, testing a range of products with individuals and focus groups to hear feedback on taste and preference, and sharing the findings with key stakeholders. In addition, CHAI and program partners laid the groundwork for the product registration process, and CHAI helped to vet crops that will be used as production inputs for quality concerns such as aflatoxins.

In preparation for the agricultural strengthening component of the program, CHAI conducted a baseline study in March and April 2014 among potential partner cooperatives. CHAI identified the cooperatives using a set of criteria established in collaboration with government agencies. Following an analysis of the baseline survey findings, CHAI developed a set of training materials for cooperatives and their member farmers. Additionally, CHAI worked during 2014 to build an effective financial model to support partner cooperatives at low interest rates. Through a mapping of local financial institutions, CHAI identified potential intermediary partners to channel revolving loan funds from the International Finance Corporation (IFC). Finally, CHAI initiated discussions with input suppliers and providers of mechanization technologies to prepare to link these groups with the partner cooperatives.

In the fourth quarter of 2014, CHAI completed an assessment of supply chain channels in order to better understand the strengths and weaknesses of existing distribution channels in the public and private sectors. The assessment formed the basis of a report which will be reviewed in collaboration with government partners in early 2015 to determine an appropriate supply chain strategy going forward. CHAI also completed an assessment of packaging options available in Ethiopia.

In preparation for product marketing plans, CHAI participated in a branding exercise undertaken by the investor partners that focused on identifying acceptable product names across the East Africa region. CHAI also worked extensively during 2014 to put in place the appropriate Memoranda of Understanding (MoU) with partner agencies in the health and agriculture sectors to pave the way for full engagement on the Nutrition Initiative. CHAI also began work on the program's monitoring and evaluation strategy, including development of a draft study design for a robust impact evaluation. This groundwork has positioned the program well for success in the coming years.

# I. Update on Global Program Progress

The global stakeholder negotiations to launch local joint ventures for the production of nutrient-dense foods for infants and PLW saw significant progress during 2014. The International Consortium ("IC") of investors, consisting of DSM, the International Finance Corporation (IFC), and s9(2)(b)(ii) s9(2)(b)(ii) ( ), officially voted and agreed to fund the first phase of factories in Rwanda and Ethiopia. CHAI provided heavy support throughout the negotiations, facilitating discussions between the partners and ensuring that all agreements reflected the initiative's core goal of reducing undernutrition. The commitment to each factory represents approximately US s9(2)(b)(ii) million of investment (including working capital), of which roughly s9(2)(b)(ii) DSM, and IFC will each be equity stakeholders in the IC. IFC will provide the debt. s9(2)(b)(ii)

The commitment to finance the first three factories resulted from extensive development of a business model for the joint ventures, supported by CHAI, indicating that the factories can be run profitably and sustainably with conservative assumptions for sales and input costs. CHAI facilitated negotiations with s9(2)(b)(ii) and sourced data from multiple in-country and global sources to verify input costs. The IC partners invested heavily in market research in the region over the course of the year to ensure that the sales assumptions in the business model were realistic. s9(2)(b)(ii) to keep production costs low and facilitate affordable product access.

In Q1 2015, the IC will legally form an international holding corporation, Africa Improved Foods Ltd. ("AIF"), which will be the s9(2)(b)(ii) investor in each local joint venture. The Governments of Ethiopia and Rwanda and the IC have signed term sheets detailing the terms of the local joint venture deals. In Rwanda, this term sheet has been developed into a full legal agreement with support from a pro bono legal team provided to CHAI. The Government of Rwanda has signed the legal agreement, and AIF has agreed to sign upon conclusion of the other pending IC agreements. Importantly, the agreements include an innovative profit-sharing model, developed by CHAI, s9(2)(b)(ii) s9(2)(b)(ii) to offset the cost of subsidized product access for poor households.

The IC partners have a construction team in place that has finalized the engineering and design plans for s9(2)(b)(ii) the factories. The team has pre-selected construction agencies and agreed on equipment plans with The factories will be identical in design, allowing the same plans to be used in each location. The factory site has been selected in Rwanda, and an environmental impact assessment has been completed with no reservations identified. CHAI has helped to identify two sites that are being considered for the first factory in Ethiopia, both in industrial and commercial areas where environmental impact will be limited.

CHAI finalized the purchase agreement with the World Food Program (WFP) during 2014, guaranteeing off-take of s9(2)(b)(ii) metric tons (MT) of SuperCereal Plus per factory per year. The pricing for the WFP purchases will be s9(2)(b)(ii) s9(2)(b)(ii) This agreement

allows for the joint ventures to realize a profit while generating savings for WFP relative to their current costs. Alongside its benefits for the Nutrition Initiative in Ethiopia and Rwanda, this arrangement will allow WFP to expand access to SuperCereal Plus within its target populations in refugee camps and emergency settings, as well as significantly expand WFP's current programming to combat chronic malnutrition across several partner countries.

While the global stakeholder negotiations have now concluded, the process of setting up the legal agreements between the IC partners, and finalizing negotiations with the Government of Rwanda, took significantly longer than originally anticipated. These delays have pushed back the project's construction and production timelines, with product launch now anticipated in 2016. With the international holding company formed and the agreement finalized in Rwanda, the next steps towards finalizing the agreements in Ethiopia and proceeding with construction should move quickly.

# II. Progress on Grant Objectives in Ethiopia

**2.1 Objective 1: Develop a suite of food products, suited to local tastes, to provide complete nutrient solutions to pregnant and lactating women and young children**

Developing nutritious food products that are affordable and suitable to the tastes and eating behavior of children and pregnant and lactating women (PLW) is one of the key steps in realizing CHAI's program goal of improving nutrition outcomes among the poorest in Ethiopia. In 2014, CHAI supported the iterative process of food product development. This work will continue in 2015 with refinement of the composition, organoleptic (i.e. sensory) properties, and packaging of the products.

Milestones:

- CHAI completed and circulated an analysis of PLW food product preferences
- CHAI completed an assessment of input crop quality
- CHAI initiated the food product registration process

**PLW product assessment**

In late 2013, CHAI carried out an assessment focused on identifying an appropriate food product type for PLW. These data were then analyzed in early 2014, and CHAI compiled an assessment report that was shared with key stakeholders, including the IC partners.

The aim of the assessment was to understand the preferred taste, flavor, consistency, texture, and appearance of food products for PLW. Primary data collection included representative sets of PLW and other key influential groups across rural and urban districts, such as Health Extension Workers and male household members. The assessment was conducted in two phases. In initial in-depth interviews with women, CHAI focused on the dietary preferences of PLW and the best possible product types to meet these preferences. In the second phase, CHAI conducted focus group discussions to further evaluate the feasibility and acceptability of three food product types: porridge, a drink mix, and an energy bar.

The analysis showed that porridge was the most widely accepted product out of the three options presented, with drink mix and energy bars being the second and third choices respectively. Further probing revealed that the preference for porridge was driven strongly by PLWs' interest in providing for their children: women indicated that they would like the porridge because it would be easily shared with other household members. When participants were advised that a separate porridge product would be available for their children, the women's preferred product for their own consumption was a drink mix. Discussions with PLW revealed that procuring any of these products from health facilities might reduce the risk of sharing as it creates a perception that the product was prescribed by health professionals. In response to these findings, CHAI is exploring the option of providing micronutrient supplements for PLW that would be medicinal and therefore less likely to be shared.

**Food product development**

CHAI provided support to the IC partners on a range of activities related to food product development. This included supporting an assessment of input quality, by collecting maize and soybean samples from local markets, testing the grains for aflatoxin levels at a laboratory facility in Addis Ababa, and compiling and sharing the results with the IC partners. The test results indicated that the maize and soybean samples were free from aflatoxins.

**Food product registration**

During 2014, CHAI started working on the food product registration process. CHAI held a series of discussions with the Ethiopian Public Health Institute (EPHI), the agency responsible for approving food product registration in Ethiopia, with the aim of understanding the procedures and possible challenges to the registration process, and gathered information about the process from partners such as the WFP.

**2.2 Objective 2: Create joint ventures or other cooperative business arrangements to produce the suite of nutritious products at impeccable quality standards**

In 2014, CHAI, the Government of Ethiopia, and the IC partners made progress on laying the groundwork for legal formation of a joint venture (JV) for production of fortified blended food (FBF) products for children and PLW.

Milestones:

- Business model developed and approved by IC partners
- The Government of Ethiopia and the IC signed the term sheet providing the JV framework
- Legal documents for formation of the JV have been drafted in collaboration with the Ethiopian Privatization and Public Enterprises Supervising Authority
- Open call for local JV partners issued and vetting process completed
- The Ethiopian Prime Minister and CHAI leadership held discussions regarding mobilizing political support for JV formation and subsequent program implementation

**Business model development**

During 2014, CHAI worked to collect, compile, and analyze input cost information from Ethiopian and global data sources in order to customize the business plan, originally developed for the Rwanda factory, to the Ethiopian context. The IC partners have invested heavily in market research to vet the assumptions in the business plan and ensure that sales expectations are conservative. The resulting model describes a profitable, sustainable venture even with conservative assumptions for input costs and sales.

**Broker negotiations to establish appropriate JV**

A key accomplishment in 2014 was the signing of a term sheet between the Government of Ethiopia and the investors, which established the parameters for the formation of the local JV (see Annex A). The document set forth a list of the material terms and conditions for the JV agreement to be executed by and between the two parties, including:

s9(2)(b)(ii)

- The Government of Ethiopia has committed to purchase MT of complementary food annually from each of the first two factories for at least five years.
- s9(2)(b)(ii)

  will go to the government to help subsidize purchase of the food for the poorest Rwandan children and mothers.[1] s9(2)(b)(ii)

  A portion of that profit-sharing to the governments will be allocated to improving the distribution systems necessary to distribute the food to rural populations.
- s9(2)(b)(ii) to serve the rural population. The government will distribute the product (for free to poor people and selling it to others) through their community health systems and will conduct public health campaigns to promote breastfeeding in the first six months of life and breastfeeding accompanied by this nutritious food from six months to two years of age.
- The company has agreed to form contractual arrangements with unions of cooperatives for the procurement of local maize and soybeans. s9(2)(b)(ii)

  In the event that the cooperatives are unable to produce at the agreed quantity and quality levels, the company will be able to purchase s9(2)(b)(ii) or import if necessary.

CHAI held several meetings with investors and government offices to facilitate this process, including Ministry of Health (MOH), Ministry of Agriculture (MOA), Ministry of Industry (MOI), Ministry of Finance and Economic Development (MoFED) and the Privatization and Public Enterprises Supervising Authority (PPESA).

**JV formation**

Once the IC and the government reached the initial agreement, CHAI has continued to facilitate the negotiation between the two parties towards JV formation. In June 2014, the Government of Ethiopia designated PPESA to lead the process on its behalf. Following this, CHAI was able to provide support to the MOI technical team in defining the government's equity stake and the equity stake of local partners; identifying and assessing potential local partners; preparation and submission of legal documents for company formation; submission of the business plan to PPESA; and facilitation of the first round of negotiations on JV formation between PPESA and the IC partners. CHAI leadership held two meetings with the Ethiopian Prime Minister to mobilize political support for JV formation and subsequent program implementation. The negotiation will continue in 2015 and is expected to conclude at the end of Q1 or early Q2, subject to the progress of the international negotiations to finalize formation of AIF.

In addition, CHAI has been working closely with PPESA, relevant regional bureaus, and the IC to facilitate land acquisition and infrastructure development for factory construction. CHAI staff visited potential

[1] Note that the terms of the profit-sharing have been updated with the partners since the term sheets were signed.

sites, evaluated the sites based on requirements set by the IC, and arranged field visits for designated staff from the IC. CHAI also held a promising high-level meeting in with government officials from the s9(2)(ba) to initiate the process for establishing the second plant in Ethiopia. Subsequently, the staff visited potential sites in s9(2)(ba) and assessed the sites' feasibility against the infrastructure requirements for the new company ("NewCo").

CHAI arranged a high-level meeting between the IC and MOFED to facilitate discussions on significant issues such s9(2)(ba) . Discussions also took place between the IC and various government offices and key partners (such as the s9(2)(ba) and EthioJobs) on issues including procurement of inputs, human resource availability for factory construction and operations, and the national HR recruitment policy.

CHAI also held several discussions with WFP regarding potential partnership and their experience in terms of procurement and distribution of food products.

**2.3 Objective 3: Develop tools and systems to increase the productivity and crop quality of the smallholder farmers who will provide input crops to the food production facility**

In 2014, CHAI undertook various activities that laid the foundation for subsequent interventions to strengthen cooperatives and facilitate access to finance and other inputs for smallholder farmers.

Milestones:

- CHAI collected baseline data among potential partner cooperatives
- CHAI developed user manuals for cooperative strengthening
- CHAI developed a farmer financing model for Ethiopia
- CHAI conducted an analysis of input access and post-harvest handling capacity
- An MoU was developed and signed between CHAI, the Federal Ministry of Agriculture, and the Federal Cooperative Agency

### 2.3.1 Cooperative Strengthening

**Union selection process**

s9(2)(ba)

Approximately 32,500 to 44,500 smallholder farmers will be engaged in , providing maize and soybeans for the first factory at initial production capacity of s9(2)(b)(ii) MT per year. In Ethiopia, smallholder farmers are organized into primary cooperatives, which in turn form apex organizations called unions. In s9(2)(ba) , there are 19 unions that are agro-ecologically fit for maize production. CHAI has initiated engagement with 11 unions that are located at a favourable distance (250 to 516 kilometers) from the proposed factory sites in Addis Ababa. Seven of these 11 unions have experience with forward contracts through the WFP's Purchase for Progress (P4P) program and the Union Federation. The remaining four unions are not currently engaged in the P4P program, but have strong potential for contracting maize production. The Regional Cooperative Promotion Agency has encouraged the program to bring in unions that do not currently have access to markets, in order to spread the program's benefits. However, including unions that are located far from Addis Ababa would

increase the cost of raw materials to the company, which could in turn impact the affordability of the FBF. The current list of partner unions represents a mix of experience levels, but with the common attribute of all being located at a moderate distance from the capital.

The partner unions have been carefully selected using criteria developed with the Cooperative Promotion Agency (see Annex B). NewCo will sign forward contracts with a subset of unions in advance of each agricultural season, according to their crop procurement needs.

Due to limited market and extension services, soybean production is not highly adopted among the selected partner unions. However, soybean can play a critical role in cropping systems for maize by rejuvenating soils through crop rotation. The project will promote soybean technologies, which include intercropping of maize and soybean, in the selected areas to increase the income of smallholder farmers and meet NewCo demand.

**Capacity building of primary cooperatives**

The CHAI baseline survey, conducted in March and April 2014[2], indicated that the selected unions have relatively strong management structures, with the majority having experience managing forward contracts and loans, and maintaining the financial systems needed to support the administration of a large set of primary cooperatives. Out of the selected 11 unions, seven have experience of forward contract management with the WFP P4P program. CHAI will further assess the unions' capacity in post-harvest quality management, ability to supply the necessary volumes, and ability to aggregate crops in a timely manner during 2015. CHAI will also source technical support where needed to strengthen the unions' financial and management systems.

The management systems of the primary cooperatives demonstrated a number of gaps. Leaders of primary cooperatives have limited access to training on financial management, leadership and good governance, although they have often been trained on agronomy practices and soil and water conservation activities. The project will support primary cooperatives to assess and strengthen leaders' skills and commitment before moving forward, designing participatory action plans so that cooperatives can track their own progress over time. This will further help to assist the cooperatives in linking to service providers and obtaining technical assistance in direct relation to their own self-assessments.

Furthermore, in collaboration with the Regional Cooperative Promotion Agency, CHAI has developed user manuals on Financial Management, Cooperative Management, Good Governance, Agricultural Marketing and Product Quality Management to improve the capacity of cooperative extension workers, cooperative leaders, and union managers.

[2] A full report on the baseline data was included as an annex to CHAI's 2014 mid-year report. Copies are available on request.

### 2.3.2 Financing Mechanisms

**Financial constraints**

Currently, the s9(2)(ba) provides credit to the cooperative unions for agricultural inputs, i.e. fertilizer and seed, backed by the credit guarantee of the Regional Bureaus of Agriculture. The primary cooperatives in turn receive credit from the cooperative unions and sell the inputs to farmers on a cash basis. The government is encouraging farmers to save money and cover their own inputs instead of purchasing on credit. The CHAI baseline survey indicated that only 8% of the farmers took loans for input purchases in the 2013-14 season.

The blanket input recommendations for maize are approximately 100 kilograms per hectare (kg/ha) of DAP, 100 kg/ha of urea, and 25 kg/ha of improved seeds. According to the baseline survey, the average application rates in the 2013-14 season were above 90 kg/ha for DAP and urea, and 80% of farmers reported purchasing improved maize seeds. Despite low loan use, high input use recorded in the baseline survey indicates that maize farmers recognize the value of input investments, and are willing to apply their own funds to purchase inputs when needed. Nonetheless, financing would give farmers significantly more flexibility to invest in inputs, labor, and improved technologies. There is also room to increase productivity by basing input recommendations on specific soil types.

**CHAI financial model**

CHAI has developed a farmer financing model designed to reduce the cost of capital, administrative burden, and lending risks for local banking partner(s), thereby reducing the interest rate charged to partner cooperatives. Forward contracts with NewCo, with repayment directly to the bank, reduce the loan risk, while the program's ongoing extension support for cooperatives both reduces the risk of a bad harvest, and eases the administrative burden of managing loans. The IFC has agreed to provide the necessary capital at a interest rate to a local intermediary partner to launch a revolving loan fund.

s9(2)(b)(ii)

**Selection of an intermediary institution**

CHAI has worked to identify potential local intermediary partners with the capacity and interest to participate in the program under the proposed lending model. To identify potential partners, CHAI conducted preliminary meetings with nine private and two public banks. These banks were selected on the basis of experience in the banking business (at least four years' experience); experience in the targeted intervention areas; and experience providing agricultural loans.

Currently, a small portion of bank portfolios is dedicated to agriculture, i.e. from 0.4 – 3% in private banks and from 8 – 24% in public banks. Private banks have hesitated to build agricultural loan portfolios because of the sector-specific risks, lack of insured collateral, and uncertain repayment capacity. Nonetheless, four private banks – the s9(2)(ba) , the s9(2)(ba) , s9(2)(ba) s9(2)(ba) and s9(2)(ba) – have shown strong interest in seasonal and capital loans despite these difficulties. These banks find access to foreign currency payments and loan guarantees attractive. The banks see this project's structure as a means to more safely reach a large number of clients, build local banking business, and gain a relationship with NewCo.

These four banks have experience working on similar initiatives with an international lender for the honey, malt barley, and maize sectors. The banks are able to offer interest rates ranging from s9(2)(b)(ii) s9(2)(b)(ii) depending on the loan type. However, they have provision for subsidized loans, e.g. in the P4P program of the WFP, as low as s9(2)(b)(ii) for agricultural output marketing. Among private banks, the s9(2)(ba) and s9(2)(ba) are the strongest contenders for partnership in Oromia and s9(2)(ba) regions, respectively. Both have shown a high degree of flexibility and appetite for risk, having issued collateral-free loans while other banks require a 100% guarantee. Most of the shareholders of the s9(2)(ba) are cooperatives, and some unions are represented among s9(2)(ba) shareholders. These two banks also have the greatest experience with farmer financing, and are viewed positively by other implementing partners for their flexibility.

Among the public banks with which CHAI met, the s9(2)(ba) and the s9(2)(ba) s9(2)(ba) showed a strong interest in working with the project. The s9(2)(ba) offers interest rates ranging from s9(2)(b)(ii) and is dedicated to export, tourism, and businesses. Similar to private banks, government banks value access to foreign currency, which is feasible under the Nutrition Initiative. The s9(2)(ba) could be a particularly strong financial partner for both s9(2)(ba) and s9(2)(ba) regions, due to its appetite for risk and availability of a financial package for the maize sector.

CHAI will pursue negotiations with these potential private and public banking partners in 2015 to finalize the selection of a suitable intermediary partner for farmer financing.

### 2.3.3 Access to Inputs

**Input use constraints**

Despite the ecological diversity in Ethiopia, input packages and agronomic practices are not currently tailored by soil type and agro-ecological conditions. The Ministry of Agriculture has blanket input recommendations for maize, as described above, and there is no cost-effective way for cooperatives to obtain specific input package recommendations based on local climatic and soil conditions, including micronutrient profiles. The Ministry of Agriculture is currently in the process of conducting soil mapping and developing tailored input packages, as discussed in more detail below.

According to the CHAI baseline study, the average input application rates were above 90 kg/ha for DAP and Urea, and 80% of farmers used improved seeds. However, blanket application has not brought the expected yield improvements. While uptake is close to the broad recommendations, it falls short in those regions and soil-types that require higher inputs. Current application levels, alongside poor seed quality, delayed planting, and inappropriate agricultural practices, contribute to low yields of only 2.9 MT/ha for maize, instead of a potential 5-6 MT/ha. According to a recent International Fertilizer Development Center assessment, the country must double its fertilizer use to meet the national Growth and Transformation Plan (GTP) goals for crop production.

Soybean farmers make almost no investment into DAP, improved seeds, or rhizobium. Current soybean yields average 1.3 MT/ha among partner unions, far below potential yields.

Post-harvest operations, including threshing, are also done manually or with wooden hand tools. Without access to mechanized agricultural equipment like threshing machines or improved drying and storage facilities, farmers will continue to face high post-harvest losses. As it stands, only 8% of farmer report access to high-quality storage facilities.

**Soil mapping and fertilizer recommendations**

The ATA and the Ministry of Agriculture are in the process of conducting soil studies to determine site-specific recommendations for inputs and agronomic practices. To date, soil fertility surveys have been completed in 277 districts, out of a total of about 670 rural districts in the country. The team plans to reach 501 districts by the end of July 2015, which presents a good opportunity for CHAI to promote improved agricultural practices based on these new, site-specific recommendations. The soil analysis and corresponding fertilizer recommendations have been completed for 170 districts, including 54 districts in s9(2)(ba) . The Regional Bureau of Agriculture has developed six blended fertilizer formulas, each containing a nutrient mix adapted to specific crop needs and soil test results. CHAI plans to work with the Regional Bureau of Agriculture to ensure that partner cooperatives have access to these tailored input packages, and that farmers are informed as to the benefits and appropriate application of these new fertilizer blends. The latter will be undertaken in collaboration with the Agriculture Extension System.

**Seed, rhizobium and other inputs**

Alongside fertilizers, improved seed is another input that contributes to increased agricultural productivity. According to the baseline survey, 80% of farmers reported having purchased improved seeds for maize in the 2013-14 season, though only 4% did so for soybean.

The Ethiopian Seed Enterprise and Regional Seed Enterprises are the major public sector seed producers and suppliers, typically distributing through the Bureau of Agriculture and Regional Cooperative Promotion Agencies. CHAI met with both seed agencies to understand each group's interest in and capacity to deliver improved seed to the program. Both enterprises have a well-established contract agreement for maize seed multiplication with smallholders and commercial farmers. Due to low market demand for soybean, however, they have limited soybean seed as it requires prior contract agreement for its production. CHAI will work to ensure the appropriate contracts are organized to ensure adequate soybean seed for partner cooperatives.

There are two organic fertilizer producers in Ethiopia that can provide rhizobium bacteria: the public-sector Ethiopian Soil Testing Center and the private Menagesha Biotech Industry PLC. Both organizations have the necessary production capacity to work with the program. The price in the public sector is partially subsidized by the government, and is therefore lower than the price in the private sector (US s9(2)(ba)

### 2.3.4 Harvest / Post-Harvest Losses

With limited access to mechanized agricultural equipment like threshing machines and improved drying and storage facilities, farmers are facing estimated post-harvest losses of 30%, according to Ethiopia's Agriculture Sector Policy and Investment Framework (2010-2020).

**Harvesting practices**

Farmers in the selected areas reported using a wide range of techniques to reduce post-harvest losses at different stages. These techniques include, but are not limited to, optimizing the time of harvesting to reduce shattering of the grains; preparing a smooth, wide threshing ground to reduce losses before storage; and preparing drying beds. To store maize, the majority of farmers surveyed use traditional mud and straw structures.

As indicated in the baseline survey, maize and soybean harvesting is currently done by hand. There is a considerable amount of damage and loss of the crops during this process. Other post-harvest operations, including threshing, are all done manually or with wooden hand tools. Such post-harvest practices exacerbate crop losses by resulting in broken maize kernels and un-separated chaff. Farmers have limited access to mechanized agricultural equipment like threshing machines, which is contributing to high post-harvest losses.

The findings from the baseline survey indicate that smallholder farmers have limited access to high-quality storage facilities or to drying and shelling machines, and therefore have few options except to continue to use less effective manual technologies and practices. CHAI has developed a user manual addressing post-harvest quality management, and will prepare for both farmer trainings and access to financing to support farmers to improve their post-harvest practices.

**Post-harvest quality assurance**

Only 21% of surveyed cooperatives have storage facilities reported as being in excellent condition, and only 8% of surveyed farmers reported accessing storage facilities that were in excellent condition. From these data and the CHAI team's observations, there is significant need for upgrading existing infrastructure for post-harvest crop management, including threshers, dry sheds, pavement, and other proper storage facilities. These investments will significantly reduce losses and ensure farmers can meet the manufacturing plant's quality requirements. An assessment from local thresher machine producers indicates that the total expected investment cost for threshing machines is under US $50,000.

In addition, out of the 804 primary cooperative leaders trained on different topics, only six leaders (1%) reported being trained on quality assurance. This is likely because in the past, agricultural extension workers placed a heavy emphasis on crop productivity, while post-harvest handling was neglected in terms of resource allocation and organizational focus. These data are a good indication that cooperative leaders do not have sufficient knowledge and ability to control the quality of the product both at purchase and after purchase.

Once the selected cooperatives are engaged in forward contracts, CHAI will work with implementing partners to assess each cooperative's practices with regards to quality control procedures, and provide concrete recommendations and tailored capacity building to the cooperatives to ensure the supply of high-quality crops as per NewCo requirements. In the meantime, CHAI has initiated collaboration with the Maize Alliance members (described in further detail in the next section) to fill the gaps by aligning strategy and resources.

### 2.3.5 Regional and national reviews

CHAI continues to engage with and work through the following stakeholders:

**Ministry of Agriculture and Federal Cooperative Agency**

A Memorandum of Understanding has been signed between CHAI, the Ministry of Agriculture and the Federal Cooperative Agency to strengthen and coordinate resources in the maize and soybean sectors as well as cooperative development. The roles of the Federal Ministry of Agriculture, the Cooperative Promotion Agency and CHAI are clearly defined and further action plans will be developed as needed.

The relationship with the Regional Agriculture Bureau and Cooperative Promotion Agency has been strong and supportive, especially on adapting the capacity-building approach for smallholder farmers and cooperatives. The Federal Ministry of Agriculture, the Cooperative Promotion Agency, and the regional bureaus have designated focal persons to be available for consultation. The CHAI team has conducted informal meetings with these focal persons to design the capacity building trainings discussed above.

**Agricultural Transformation Agency (ATA)**

Discussions with the Agricultural Transformation Agency (ATA) have continued, with a focus on the maize sector, and CHAI will join the Maize Alliance partnership forum as a member. With the support of ATA, the Maize Alliance was established to bolster and improve the maize sector. The Alliance members include ATA, the WFP, the Federal Cooperative Agency, ACDI-VOCA, Sasakawa Global 2000, TechnoServe, the Regional Cooperative Promotion Agencies of s9(2)(ba) , and the Bureau of Marketing and Cooperatives of s9(2)(ba) CHAI will benefit from the experience of the Maize Alliance partners in maize aggregation, post-harvest quality management, and pricing issues as program plans develop.

### 2.4 Objective 4: Establish or strengthen supply chain systems to ensure product delivery across target areas in Ethiopia, including delivery to remote and hard-to-reach areas

In 2014, CHAI identified and assessed potential supply chain channels for safe and efficient distribution of nutrient-dense foods, with a focus on reaching rural and remote areas.

Milestones:

- CHAI conducted a rapid assessment of existing distribution systems

- CHAI developed and shared a working document on distribution systems
- CHAI initiated engagement regarding logistics and distribution with the WFP country office
- CHAI assessed the local availability of packaging systems

**Rapid assessment of distribution systems**

Successful implementation of the Nutrition Initiative will depend on the availability of reliable and efficient distribution systems for sustained and widespread delivery of FBF products to those in need. In preparation for this, CHAI conducted a rapid assessment of the existing distribution systems in Ethiopia with the goal of identifying suitable systems for FBF. CHAI carried out the assessment in the last quarter of 2014. The assessment involved reviewing the key distribution networks in the country, characterizing the types of products that they transport, distribution facilities used, storage and transport capacities, and options for last mile distribution. Other issues relevant to distribution of food products, such as product loss, temperature regulation, and inventory management were also assessed.

The assessment focused on the five major distribution routes reaching across the country. The CHAI team held key informant interviews with the staff of transportation and distribution companies, as well as health workers. CHAI visited regional distribution outlets and central and regional warehouses of the distribution agencies to collect data. Altogether, 29 key informants were interviewed including managers of distribution companies, health extension workers, and members of health development army units. CHAI has also been seeking opportunities to learn from the operations of similar programs in the country. CHAI held a number of discussions with relevant staff from the WFP country office throughout 2014 to explore options for collaboration and share experience on logistics management and distribution of food products.

Several public and private transportation and distribution agencies have been identified as potential partners. These include the s9(2)(ba) (s9(2)(ba)) s9(2)(ba) s9(2)(ba) (s9(2)(ba)), s9(2)(ba) (s9(2)(ba)), , and WFP. Of these, the strongest potential distribution channels are s9(2)(ba) and WFP. s9(2)(ba) s9(2)(b)(ii)

The WFP has extensive experience in distributing bulk products, including food commodities. The organization also has large and standardized regional strategic stores. WFP's distribution system is thus another potential channel for food product distribution, especially for Productive Safety Net Program (PSNP) populations and those who would be receiving the product for free, including refugees.

The other agencies assessed had limitations in reach that make them unlikely to be primary distribution partners, but certain elements of their systems could be leveraged in support of the program's goals. Ultimately a hybrid system may be developed to ensure that the distribution system meets the program's needs for uninterrupted access to FBF at impeccable quality levels.

**Working document preparation**

As a next step, details of the distribution strategic plan will be determined in consultation with government. CHAI has developed a draft action plan outlining the implementation process to facilitate discussion. After working with the government to determine the appropriate distribution channel(s), CHAI will support system strengthening to build the physical and managerial capacity for FBF product management. The system will then be tested for its reliability, record-keeping, and quality control before moving to full product roll-out.

**Packaging assessment**

Packaging is another key aspect of FBF production and distribution that requires thorough preparation. CHAI conducted an assessment of local packaging systems with the aim of understanding local capacity for the production of quality, hygienic, and low-cost packaging for fortified food products. CHAI interviewed the managers of 25 local packaging companies in June and July 2014. Findings indicate the general lack of local capacity to fully meet the requirements set by the IC for packaging. Although four companies meeting the WFP quality criteria for producing quality food product packages have been identified, they face significant challenges, including lack of raw materials and limited daily production capacity. CHAI prepared a detailed report outlining these findings and their implications for the food factories, which has been shared with the IC partners.

## 2.5 Objective 5: Implement public health programs to drive product uptake, ensure widespread product access, and educate households on appropriate product utilization

The impact of the Nutrition Initiative will ultimately depend on successful public health activities that ensure widespread access to, and proper utilization of, FBF products by those in need. CHAI has been working with all relevant stakeholders in order to effectively engage in various national processes that are relevant to public health nutrition in the country.

Milestones:

- MOU on implementation of nutrition public health program signed with s9(2)(ba)
- CHAI represented in key nutrition Technical Working Groups
- CHAI provided technical support to the national nutrition program
- Completion of branding exercise to inform brand name selection

**MOU for public health program**

The CHAI team held a series of consultations with the s9(2)(ba) with the aim of designing a strong public health program to support the nutrition program. CHAI developed a draft MOU outlining the principles discussed, and then shared the draft with the s9(2)(ba) feedback. CHAI and the s9(2)(ba) signed the MOU after the s9(2)(ba) comments had been incorporated. This key step will provide a framework for securing government support and collaboration for implementation of the program.

**Technical Working Group participation**

CHAI supported the inter-ministerial Nutrition Technical Working Committee, the MOH-chaired Technical Working Group, and the National Nutrition Coordinating Body during 2014. With lobbying and support from CHAI, a number of ministries have assigned focal persons to the Steering Committee of the Nutrition Technical Working Committee, raising political support for nutrition programming. Throughout 2014, CHAI was also represented in a high-level Food Fortification Task Force. CHAI staff have been participating and contributing to the monthly Nutrition Development Partners Forum meetings and the PSNP Social Development Task Force, engagement which will pave the way for smooth implementation of the public health program.

**Technical Support**

CHAI supported the s9(2)(ba) designing and applying an appropriate subsidization mechanism for fortified food products, including exploring the possibility of integrating with existing government and partner subsidization efforts. CHAI provided support to the national nutrition program through the nutrition TWG. Specifically, CHAI provided direct support to the MOH in organizing a successful Breastfeeding Week, held in August 2014.

**Branding exercise**

CHAI has also been involved in selecting appropriate brand names for the food products. The IC commissioned the s9(2)(ba) , a global branding agency, to conduct an initial branding exercise. CHAI provided feedback on the proposed brand names and discussed the results with the IC marketing team. This process will inform decision-making on brand name selection and brand architecture during 2015.

# III. Monitoring and Evaluation

Monitoring, evaluation and research are central to successful implementation of CHAI's nutrition program. Several key M&E activities were carried out in 2014 to provide the necessary M&E support for the program.

Milestones:

- CHAI developed a draft impact evaluation study protocol
- Agricultural baseline data collection supported
- CHAI explored the alignment of the program M&E plans with existing evaluations

**Impact evaluation study design**

CHAI conducted background work to design a robust study of the Nutrition Initiative's impact in Ethiopia. The CHAI team held a number of meetings with the Ethiopian Public Health Institute (EPHI) and s9(2)(ba) to establish a partnership for a rigorous impact evaluation. Based on these discussions and a review of the literature, CHAI developed a proposed approach for the impact evaluation and drafted a study protocol. Additionally, CHAI carried out several key activities to facilitate and accelerate the process for study implementation. These include revisions of the study budget, questionnaire design, and articulation of human resources and procurement plans. The study design will be ready for finalization once distribution plans have been fully fleshed out.

**Baseline survey**

CHAI carried out a range of M&E activities to support the program work streams during 2014. M&E support was provided to the agriculture team during design and execution of the agriculture baseline survey. The support included tool development, data collection, analysis, and report writing. CHAI also updated the program's results framework in line with the findings of the baseline survey and the latest production timelines. See Annex D for the updated results framework.

**Alignment of M&E with existing systems**

CHAI has been working with various stakeholders to explore the possibility of aligning the nutrition program M&E with existing systems to minimize cost and avoid duplication of efforts. To this end, several discussions were held with the PSNP team to examine the possibility of aligning the nutrition program M&E with the PSNP evaluation framework. Discussions and document review revealed that many of the indicators needed for monitoring and evaluation of the nutrition program are part of the updated PSNP log frame, making integration feasible. These discussions will continue in early 2015 when the PSNP evaluation tools will be developed.

# IV. Financial Report

## STATEMENT OF EXPENDITURES

*Submitted by Clinton Health Access Initiative (CHAI) to the Ministry of Foreign Affairs and Trade, New Zealand*

**Reducing Malnutrition and Increasing Agricultural Incomes, Africa - Ethiopia**

For the Period 1 February 2014 - 31 December 2014

MFAT activity code: A11846-A01

*Reporting Currency: USD*

| OUTPUT | | Budget 2014 | Actual Expenditure 2014 | % Budget Spent to Date |
|---|---|---|---|---|
| Design Phase | | | | |
| Develop Proposal, Costed Workplan, Results Matrix - Ethiopia | $ | s9(2)(ba) | | 100% |
| Global Team Support | | | | 100% |
| Indirect Costs | | | | 100% |
| *Subtotal - Design Phase* | $ | | | *100.0%* |
| Implementation in Ethiopia | | | | |
| Obj. 0.1: Local non-output specific costs | $ | | | 49% |
| Obj. 0.2: Global non-output specific costs | | | | 100% |
| Obj. 1: Agricultural farmers cooperatives strengthened | | | | 18% |
| Obj. 2: Financing mechanisms for farmers developed | | | | 25% |
| Obj. 3: Access to agricultural inputs are improved | | | | 0% |
| Obj. 4: Harvest and post-harvest losses are reduced | | | | 0% |
| Obj. 5: Regional level reviews undertaken | | | | 18% |
| *Subtotal - Implementation in Ethiopia* | $ | | | *33.4%* |
| TOTAL COST | $ | | | 38.7% |



**Variance Explanation:** The design phase funding for Ethiopia was fully spent between February and April 2014, with spending aligned with the expected budget across cost categories. Spending during the implementation phase, running from May to December 2014, was significantly lower than budget (33%). This underspend was due to the delayed start of project activities, pending the finalization of the joint venture agreements between the IC and the Government of Ethiopia. The process of legal formation of the international holding company, which will represent the investors in the local joint venture deal, has proved much lengthier than anticipated. As the joint venture's forward contracts with farmers underpin the agricultural strengthening work which CHAI will undertake, this has slowed down project implementation and therefore spending against the anticipated budget.

Within the implementation phase budget, approximately half of the anticipated budget for local non-output specific costs was spent in 2014, representing staffing, vehicles, and office costs applied to preparatory work across program objectives. The budget for global non-output specific costs was fully spent, since this objective category includes heavy global team support – both staff time and travel – for project planning in Ethiopia. Objective-specific spending was concentrated in cooperative strengthening, which includes baseline survey costs, and the development of the farmer financing

model, which has entailed engagement with national and regional financial institutions. Light costs were incurred in working with government stakeholders to prepare for the project.

## Annex A – Ethiopia Joint Venture Term Sheet

Withheld in full under s9(2)(ba)

## Annex B – Cooperative Selection Criteria

Criteria for partner union selection:

- **Geographic areas suitable for maize:** The targeted districts are within a geographic area identified as suitable for maize production by the regional government and other actors
- **Potential crop supply:** The unions are able to supply large quantities of raw materials sourced from member farmers
- **Previous business experience and loan repayment by unions:** The unions have experience of forward contracts over the past two years and have maintained high fulfillment rates
- **Low default rate:** Unions have demonstrated the capacity to repay loans
- **Proximity to infrastructure facilities:** Infrastructure facilities include roads, telephones, etc.
- **Concentration of partner unions:** Most of the unions are located in adjacent zones allowing for cost-effective service delivery and program monitoring
- **Distances from the anticipated market (NewCo):** The selected unions are accessible to the proposed NewCo factory site(s)

# Annex C – Updated Results Framework

CHAI has updated the results framework for the program to align targets with the latest production timelines, and to harmonize the framework with the logframe agreed with the U.K. Department for International Development (DFID). Changes to individual indicators are footnoted in the tables below.

*Production Metrics and Targets*

| | Targets | | | |
|---|---|---|---|---|
| | 2014 | 2015 | 2016 | 2017 |
| (1) Construction started | | | | |
| Ethiopia | - | Q3 | - | - |
| (2) Foundation laid | | | | |
| Ethiopia | - | Q4 | - | - |
| (3) All regulatory approvals achieved | | | | |
| Ethiopia | - | - | Q2 | - |
| (4) Manufacturing begins and batch testing meets quality standards | | | | |
| Ethiopia | - | - | Q3 | - |
| (5) Product launched | | | | |
| Ethiopia | - | - | Q3 | - |

*Marketing, Sales and Distribution Metrics and Targets*

| | Targets | | | |
|---|---|---|---|---|
| | 2014 | 2015 | 2016 | 2017 |
| (1) Transportation and storage requirements mapped and procured | | | | |
| Ethiopia | - | Q3 | - | - |
| (2) Subsidy system established to serve beneficiaries who cannot afford the product | | | | |
| Ethiopia | - | Q4 | - | - |
| (3) Percentage of target villages with active, fixed distribution points for the product | | | | |
| Ethiopia | - | - | 25% | 50% |
| (4) Percentage of stock-outs at fixed distribution points | | | | |
| Ethiopia | - | - | <10% | <5% |
| (5) Number of health workers trained | | | | |
| Ethiopia | - | | 500 | 1,000 |
| (6) Percentage of target sites reached with complementary feeding and breastfeeding campaigns | | | | |
| Ethiopia | - | - | 25% | 50% |
| s9(2)(ba) | | | | |
| Ethiopia | - | - | - | - |
| (8) Sales volumes [MT (000)] to: WFP; in country – rural; in country – urban; non-WFP export | | | | |
| Ethiopia | - | - | 16.4; 2.4; 0.1; 0.1 | 35; 10.9; 0.3; 0.2 |
| (9) Average price per MT (USD) per market: WFP; in country – rural; in country – urban; non-WFP export | | | | |
| Ethiopia | - | - | $1,328; $1,245; $3,000; $2,700 | $1,082; $1,031; $3,000; $2,700 |

s9(2)(ba)

distribution planning sessions in 2015. An appropriate replacement will be determined through

| | Targets | | | |
|---|---|---|---|---|
| | 2014 | 2015 | 2016 | 2017 |
| 10) Total sales revenues (USD) per market: WFP, in country – rural; in country – urban; non-WFP export | | | | |
| Ethiopia | - | - | s9(2)(b)(ii) | |

*Nutrition Improvement Metrics and Targets*

| | Targets | | | |
|---|---|---|---|---|
| | 2014 | 2015 | 2016 | 2017 |
| 1) Decrease in proportion of stunted children, 6-23 months, among poorest/most vulnerable groups | | | | |
| Ethiopia | - | - | - | 20% reduction |
| 2) Decrease in proportion of wasted children, 6-23 months, among poorest/most vulnerable groups | | | | |
| Ethiopia | - | - | - | 40% reduction |
| 3) Decrease in proportion of underweight children, 6-23 months, among poorest/most vulnerable groups | | | | |
| Ethiopia | - | - | - | 30% reduction |
| 4) Proportion of infants and young children, 12-15 months, fed breast milk in the previous 24 hours[5] | | | | |
| Ethiopia | - | - | ≥95% | ≥95% |

*Agriculture Improvement Metrics and Targets*

| | Targets | | | |
|---|---|---|---|---|
| | 2014 | 2015 | 2016 | 2017 |
| 1) Increase in the average maize/soybean yield (MT per hectare) in partner cooperatives | | | | |
| Ethiopia | 2.9 MT/ha maize<br>1.4 MT/ha soybean<br>(Baseline) | *No change* | *No change* | 3.1 MT/ha maize<br>1.6 MT/ha soybean |
| 2) Total smallholder farmers reached with improved agricultural technologies (broken down by gender)[6] | | | | |
| Ethiopia | | - | 30,000 | 65,000 |
| 3) Percentage of input crops procured domestically[7] | | | | |
| Ethiopia | | - | 50% | 60% |
| 4) Percentage of crops produced by partner cooperatives meeting quality standards for acceptance at factory[8] | | | | |
| Ethiopia | - | - | - | 80% |
| 5) Increase (%) in average annual income per farmer involved in in the program | | | | |
| Ethiopia | - | - | - | 10% |

Note: These indicators are intended to reflect CHAI's goals under both the s9(2)(ba) and the MFAT grants. The s9(2)(ba) grant currently runs through 2016, while the MFAT grant runs through 2017.

[4] This language is being updated to align with DFID framework. The impact measurements will be tracked within the poorest / most vulnerable groups that will receive fully subsidized product from the government.

[5] This indicator has been changed from 0-6 months to 12-15 months, in order to measure the prevalence of continued breastfeeding rather than exclusive breastfeeding. This is intended to track whether there is any change in continued breastfeeding rates when an improved complementary food is introduced and promoted.

[6] This indicator is being added to ensure alignment between the s9(2)(ba) and MFAT results frameworks.

[7] A number of indicators, including this one, have been updated to track percentages, in order to reduce the number of updates that are needed as production and distribution schedules are refined.

[8] This is a new indicator to replace the indicators on post-harvest losses and aflatoxin levels. The quality standards relate to moisture content and aflatoxin levels, so this should capture the impact of post-harvest services in a more directly measurable way than the original indicators.

Clinton Health Access Initiative

# Reducing Chronic Malnutrition and Increasing Agricultural Incomes in Rwanda

2014 Progress Report

Submitted to the
New Zealand Ministry of Foreign Affairs and Trade

15 March 2015



CLINTON
HEALTH ACCESS INITIATIVE

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# Executive Summary

In 2014 CHAI made significant progress on the Nutrition Initiative in Rwanda. The global stakeholder negotiations to set up joint ventures for the production of nutrient-dense foods progressed considerably, and the Government of Rwanda signed the legal agreement to form the joint venture at the end of the year. While the negotiation process has taken longer than expected and construction timelines are delayed, progress has been made in parallel towards construction designs and implementation and distribution design and strengthening, so next steps should progress rapidly during 2015. Product launch is now anticipated in Rwanda in early 2016.

CHAI undertook targeted product development activities during 2014, first through an assessment of pregnant and lactating women's (PLW) food preferences, and secondly by supporting the Ministry of Health (MoH) to lay out complementary feeding guidelines that support the use of the fortified blended food (FBF) formulation. The PLW assessment reviewed three potential product types. The findings indicated that women preferred a porridge-type product, but this was in part due to the ease of sharing porridge with other household members, particularly children. Since sharing would significantly increase costs and dilute benefit to PLW, CHAI is now considering a micronutrient supplement for women that would be medicinal and therefore, surveyed women indicated, would be less likely to be shared. Additionally, CHAI undertook market research to better understand the preferred product attributes for a complementary food among women with children six months to two years of age.

CHAI began agricultural activities during Rwanda's main 2014-15 season ("Season A"), supporting more than 12,000 farmers with extension services, financing, and inputs. In partnership with the Ministry of Agriculture and the Rwanda Agricultural Board, CHAI identified a set of cooperatives in the Eastern Region with high productivity potential to contract with the Rwanda factory for more than 10,000 metric tons of maize. CHAI worked with the International Finance Corporation (IFC) to identify an intermediary financing partner, the s9(2)(b)(ii) , to provide loans to partner cooperatives and facilitate input access. CHAI also contracted the Rwanda Development Organization (RDO), an experienced local partner, to provide extension support to farmers in the partner cooperatives, and worked with external partners, including the New Zealand Ministry of Foreign Affairs and Trade (MFAT), to organize technical support for RDO.

At the request of the government, in the last quarter of 2014, CHAI undertook a distribution assessment identifying potential distribution scenarios and providing cost estimates of the likely investment and running costs to support FBF distribution under each scenario. This assessment will be used to select an optimal scenario and plan distribution channels in early 2015.

CHAI initiated program evaluation activities in 2014, collecting baseline data on agricultural indicators and enrolling children into a cohort study for baseline data collection prior to product launch. In collaboration with the MoH, a team of CHAI data collectors enrolled more than 600 children, performing initial household surveys and collecting anthropometric indicators. This cohort will be followed for 15-18 months, and will serve as a comparison group for a second cohort of children enrolled after product launch and measured for their level of FBF intake.

# I. Update on Global Program Progress

The global stakeholder negotiations to launch local joint ventures for the production of nutrient-dense foods for infants and PLW saw significant progress during 2014. The International Consortium ("IC") of investors, consisting of DSM, the International Finance Corporation (IFC), and s9(2)(b)(ii) s9(2)(b)(ii) ( ), officially voted and agreed to fund the first phase of factories in Rwanda and Ethiopia. CHAI provided heavy support throughout the negotiations, facilitating discussions between the partners and ensuring that all agreements reflected the initiative's core goal of reducing undernutrition. The commitment to each factory represents approximately US million of investment (including working capital), of which roughly s9(2)(b)(ii) . DSM, and IFC will each be equity stakeholders in the IC. IFC will provide the debt. s9(2)(b)(ii) s9(2)(b)(ii)

The commitment to finance the first three factories resulted from extensive development of a business model for the joint ventures, supported by CHAI, indicating that the factories can be run profitably and sustainably with conservative assumptions for sales and input costs. CHAI facilitated negotiations with s9(2)(b)(ii) , and sourced data from multiple in-country and global sources to verify input costs. The IC partners invested heavily in market research in the region over the course of the year to ensure that the sales assumptions in the business model were realistic. CHAI ensured that s9(2)(ba) were included in the joint venture deals to keep production costs low and facilitate affordable product access.

In Q1 2015, the IC will legally form an international holding corporation, Africa Improved Foods Ltd. ("AIF"), which will be the majority investor in each local joint venture. The Governments of Ethiopia and Rwanda and the IC have signed term sheets detailing the terms of the local joint venture deals. In Rwanda, this term sheet has been developed into a full legal agreement with support from a pro bono legal team provided to CHAI. The Government of Rwanda has signed the legal agreement, and AIF has agreed to sign upon conclusion of the other pending IC agreements. Importantly, the agreements include an innovative profit-sharing model, developed by CHAI, which s9(2)(ba) s9(2)(ba) to offset the cost of subsidized product access for poor households.

The IC partners have a construction team in place that has finalized the engineering and design plans for the factories. The team has pre-selected construction agencies and agreed on equipment plans with s9(2)(b)(ii) The factories will be identical in design, allowing the same plans to be used in each location. The factory site has been selected in Rwanda, and an environmental impact assessment has been completed with no reservations identified. CHAI has helped to identify two sites that are being considered for the first factory in Ethiopia, both in industrial and commercial areas where environmental impact will be limited.

CHAI finalized the purchase agreement with the World Food Program (WFP) during 2014, guaranteeing off-take of s9(2)(b)(ii) metric tons (MT) of SuperCereal Plus per factory per year. The pricing for the WFP purchases will be s9(2)(b)(ii)

s9(2)(b)(ii)

This agreement allows for the joint ventures to realize a profit while generating savings for WFP relative to their current costs. Alongside its benefits for the Nutrition Initiative in Ethiopia and Rwanda, this arrangement will allow WFP to expand access to SuperCereal Plus within its target populations in refugee camps and emergency settings, as well as significantly expand WFP's current programming to combat chronic malnutrition across several partner countries.

While the global stakeholder negotiations have now concluded, the process of setting up the legal agreements between the IC partners, and finalizing negotiations with the Government of Rwanda, took significantly longer than originally anticipated. These delays have pushed back the project's construction and production timelines, with product launch now anticipated in 2016. With the international holding company formed and the agreement finalized in Rwanda, the next steps towards finalizing the agreements in Ethiopia and proceeding with construction should move quickly.

# II. Progress on Grant Objectives in Rwanda

**2.1 Objective 1: Develop a suite of food products, suited to local tastes, to provide complete nutrient solutions to pregnant and lactating women (PLW) and young children**

Developing successful, palatable, and nutritious products requires understanding the context-specific preferences of PLW and young children. These preferences must be accounted for in product design and aligned to local guidelines and regulatory frameworks. To this end, CHAI carried out a number of activities over the course of 2014 towards developing a suite of FBF products in Rwanda. Milestones included:

- CHAI completed an assessment of PLW's food preferences
- The Government of Rwanda adopted complementary feeding guidelines aligned with the FBF product formulation
- CHAI registered the product category for the FBF and arranged an expedited process for specific product registrations

**Assessment of pregnant and lactating women**

In order to develop appropriate and attractive products for PLW, the project team undertook fieldwork to solicit feedback from mothers in Rwanda and other key decision-makers in the household across a mix of urban and rural settings. Low-income women in rural areas represent the primary target market for the product. This product development work will be iterative, and will begin with selection of the appropriate product types before continuing to develop and refine product flavors, composition, and packaging over the coming months.

The project team solicited feedback through three phases of semi-structured discussions and direct household observations with relevant target groups in a representative set of field sites. The sampling structure was designed to capture diversity across agricultural zones, which are roughly equivalent to geographic regions (Northern, Eastern, Southern, and Western); income levels (divided into low-, middle- and high-income groups by Ubudehe[1] level); and both rural and urban areas. Three basic product types were tested: porridge, a drink mix, and an energy bar.

During the first phase of work, in-depth interviews were conducted with PLW in rural and urban areas. The purpose of these interviews was to understand women's "need state" during pregnancy and lactation, and ask open-ended questions about preferred foods and the proposed product types. The team also spoke with other "influencers" of behavior at each site, including health care workers, husbands, community leaders, and mothers-in-law.

During the second phase of work, teams brought together consumer groups consisting of 6-10 women for focus group discussions. These consumer groups were divided into pregnant women and lactating

[1] The Ubudehe system is a means of classifying Rwandan households according to their level of access to resources, and providing social support for households in need. There are currently six tiers or income levels within the Ubudehe system.

women, and further divided by varying income levels (low, middle, high) and rural versus urban areas.

The third phase of work involved direct observations conducted at the household level for PLW in rural and urban areas. PLW were interviewed and observed in their home as they prepared food throughout the day. This phase was intended to complement the in-depth interviews and focus group discussions by triangulating the findings, to ensure that what was being reported by the women about their eating habits and daily life was accurate. During this last round, an additional product type, namely porridge with micronutrient sprinkles, was introduced into the assessment, and so all data on the porridge with sprinkles are drawn from discussions during home observations.

The porridge proved to be the most familiar product of the samples tested. During the household observations, women were evenly divided between preferring the porridge with sprinkles and the regular porridge. Women consistently reported that the porridge would be the most likely of the products to be shared, and the fact that the women could increase the quantity of the porridge by adding water or flour was appealing. The porridge with sprinkles was generally liked and believed to be nutritious, however a few women complained that the initial smell of the sprinkles was undesirable. Some women favored the energy bar due to ease of preparation, but others thought that it would not provide enough energy to get through the day, and felt that the texture was too hard to consume. The drink mix was the least preferred product because women cited a lack of clean water availability and the distinct smell of milk, which was believed to be undesirable for some. The drink mix is also undesirable due to the fact that it could be used as a substitute for breast milk among children below six months of age, which would represent an inappropriate and potentially harmful use of the product.

PLW consistently indicated that a medicinal product would be less likely to be shared than a food product. s9(2)(ba)

s9(2)(ba)



**Government of Rwanda complementary feeding guidelines**

In January 2014, the Government of Rwanda released a set of complementary feeding guidelines for infants and young children.[2] CHAI provided technical assistance for the development of the guidelines, identifying appropriate academic sources for the document and organizing reviews by the relevant technical committees in-country. The resulting guidelines align with the product formulation proposed by CHAI and partners, and will ensure that the development of the FBF will be done according to local standards and practices. The following recommendations are included in the guidelines:

- Breast milk is the ideal food for infants from 0-6 months of age, and continues to be a rich source of nutrients through two years of age. Therefore the MoH continues to advocate and

[2] The full guidelines are available on request.

promote exclusive breastfeeding in the first six months and continued breastfeeding throughout the first two years..

- Meeting nutrient needs between the ages of 6-23 months requires breastfeeding combined with frequent feeding of energy- and nutrient-dense foods. Complementary foods must provide sufficient levels of energy, proteins, fats, and micronutrients.[3] The WHO defines complementary foods to include those that are manufactured or locally prepared, suitable as a complement to breast milk or a breast-milk substitute when either becomes insufficient to satisfy the nutritional requirements of the infant.[4]
- A plant-source based diet with few animal-source and/or fortified foods, which is the prevalent diet of Rwandan families, is unlikely to meet the requirements of these young children, and the ability to increase consumption of these foods is limited by availability and affordability for many Rwandan families. Household food insecurity, resulting from seasonal food insecurity in the lean months leading up to harvest time, lack of food preservation methods available at the household level, and/or from poverty, further threatens the potential to adequately nourish an infant during this critical period of growth and cognitive development.
- For Rwandan infants between the ages of 6-23 months, the MoH recommends continued breastfeeding complemented by frequent feeding of an RBF product that fully meets the nutritional needs of a 6-23 month old child, as defined in the annexes to the guidelines. The recommended solution is suitable for daily consumption by infants and for short-term catastrophic situations requiring increased consumption to prevent and/or treat moderate acute malnutrition.

**Registration process initiated**

Building on the establishment of the complementary feeding guidelines, CHAI completed the registration process for the RBF product category. This was a lengthy process, and with this step completed, the specific product registrations will move forward much more quickly. s9(2)(ba)

s9(2)(ba)



[3] Pan American Health Organization (PAHO) /World Health Organization (WHO). 2004. *Guiding principles for complementary feeding of the breastfed child.*

[4] World Health Organization (WHO). 2013. *Essential Nutrition Actions: Improving maternal, newborn, infant and young child health and nutrition.*

2.2 **Objective 2: Create joint ventures or other cooperative business arrangements to produce the suite of nutritious products at impeccable quality standards**

The negotiations between the Government of Rwanda and the international consortium (IC) of investors made substantial progress during 2014, culminating in the signature of the joint venture agreement by the government at the end of the year.

Milestones:

- CHAI-supported business model was developed and approved by investors
- The Government of Rwanda and the IC negotiated and signed a term sheet defining the parameters of the joint venture, with CHAI support
- Factory site was selected for construction and environmental impact assessment completed
- The Government of Rwanda signed the legal joint venture agreement

**Business model approved**

The CHAI team collected and analyzed inputs to the joint venture business model during 2014, utilizing Rwandan and global data sources to develop conservative estimates of input costs and production assumptions. The IC partners also put significant resources towards market research to vet the sales assumptions in the business model. The resulting model describes a profitable, sustainable venture even with these conservative assumptions for input costs and sales. These efforts resulted in formal approval of the business model by the Boards of each of the IC partners and the IFC Credit Committee, providing the green light for investment in the first phase of factories to move forward.

**Term sheet signed**

With CHAI support, the Government of Rwanda and the IC partners signed a term sheet (see Annex A) describing the joint venture agreement in March 2014, demonstrating the commitment to move forward with the project. CHAI played a key role in helping the partners reach consensus on the terms of the agreement, keeping the parties focused on the program's intended impact on undernutrition. s9(2)(b)(ii)



Key points agreed upon in the term sheets include:

- The government has committed to purchase fortified complementary food for infants from the factory for at least five years, targeted for distribution to the most vulnerable parts of the populations. The government has committed to purchase US million annually, which is intended to represent volumes sufficient to feed all infants whose families fall within the first two tiers of the *Ubudehe* social support system, representing the lowest-income households. s9(2)(ba)

- s9(2)(ba)

  s9(2)(ba) to help subsidize purchase of the food for the poorest Rwandan children and mothers.[5] s9(2)(b)(ii)
  s9(2)(b)(ii) · A portion of that profit-sharing to the governments will be allocated to improving the distribution systems necessary to distribute the food to rural populations.

- s9(2)(b)(ii)

  to serve the rural population. The government will distribute the product (for free to poor people and selling it to others) through their community health systems and will conduct public health campaigns to promote breastfeeding in the first six months of life and breastfeeding accompanied by this nutritious food from six months to two years of age.

- The company has agreed to form contractual arrangements with cooperatives for the procurement of local maize and soybeans. s9(2)(ba)
  s9(2)(ba)
  s9(2)(ba) In the event that the cooperatives are unable to produce at the agreed quantity and quality levels, the company will be able to purchase s9(2)(b)(ii)
  s9(2)(b)(ii) or import if necessary.

- s9(2)(ba)



**Land selected for construction**

After initially reviewing land sites in the Eastern Region where the maize and soybean inputs will be grown, the IC partners and the government agreed on a construction site in an industrial zone just outside of the capital, Kigali. With a strong road network providing linkages with the Eastern Region, the crops can easily be brought in from the fields, and locating the factory in Kigali should facilitate recruitment of the human resources needed to manage production. s9(2)(ba)
s9(2)(ba)

The site has the necessary space and infrastructure connections to support the factory at both initial and expanded production capacities. An environmental impact assessment has been completed at the proposed site and no significant concerns were flagged. Once established, NewCo will put in

[5] Note that the terms of the profit-sharing have been updated with the partners since the term sheets were signed.

place environmental management protocols to minimize any adverse impacts, with oversight from the government and the IC partners.

**Legal joint venture agreement signed**

The CHAI team worked throughout 2014 to facilitate negotiations between the IC partners and the Government of Rwanda, in order to move from the term sheet signatures to the legal agreement to launch the Rwanda-based joint venture. The Rwanda Development Board and the Ministry of Agriculture (MINAGRI) jointly managed the negotiations on behalf of the government, while the IC partners were represented by teams from DSM and [redacted] CHAI provided support at multiple points throughout the process to enable consensus between the parties and develop mutually agreeable solutions. While the process of reaching an agreement proved time-consuming, the government signed the joint venture agreement in December 2014. The agreement will be signed off on by the IC partners once the international holding company, Africa Improved Foods Ltd., is officially incorporated in early 2015.

**2.3 Objective 3: Develop tools and systems to increase the productivity and crop quality of the smallholder farmers who will provide input crops to the food production facility**

During 2014, CHAI initiated agricultural activities with a set of smallholder farmers in partner cooperatives in the Eastern Region of Rwanda. Procurement quantities for the main 2014-15 season ("Season A") were determined by NewCo, and agricultural plans were mapped out in detail at a multi-stakeholder Procurement Planning Meeting held in May 2014.

Milestones:

- Partner cooperatives selected and baseline agricultural data collected
- Extension support initiated through contract with the Rwanda Development Organization
- Technical assistance plans for cooperative strengthening laid out with partners
- Farmer financing model finalized and due diligence completed with local bank
- Input procurement for partner cooperatives facilitated with MINAGRI support

### 2.3.1 Cooperative Strengthening

**Cooperative selection**

CHAI worked with MINAGRI and the WFP, two of the largest institutional buyers in Rwanda, to develop a set of selection criteria for partner cooperatives (see Annex B). Once these criteria were developed, CHAI began a comprehensive selection process by working with the Rwanda Agricultural Board (RAB), the Rwanda Cooperative Agency (RCA), and local government officials, among others, to create a list of all the cooperatives currently involved in maize and soybean production in the Eastern Province. CHAI visited a shortlisted set of cooperatives to collect more detailed field data on each of the criteria. The list was then refined with the guidance of MINAGRI, RAB, the RCA and local government.

A subset of these cooperatives was selected for production in the 2014-15 season, based on NewCo's crop demands. Initial procurement expectations were for 10,000 MT of maize and 2,750 MT of soybeans. Ultimately, delays procuring soybean seed – along with farmers' reticence to plant soybean during the traditional growing season for maize – led the partners to enter into contracts for maize only. s9(2)(ba)

s9(2)(ba) This arrangement s9(2)(b)(ii) represented the first case of forward contracts being used in Rwanda, and entailed close collaboration between CHAI, the government, and the partner cooperatives to put the appropriate terms in place. After negotiations, pricing was set at s9(2)(b)(ii) per kilogram of maize delivered to the factory and meeting the set quality standards.

**Baseline data collection**

The CHAI team collected baseline data in March and April of 2014 on key agricultural indicators, such as yields and incomes, as well as access to financing, inputs, and post-harvest services.[6] A total of 298 farmers and 12 cooperatives were included in the assessment. Maize samples were taken for aflatoxin testing in collaboration with the Rwanda Bureau of Standards. While the baseline survey showed relatively high input use among maize farmers, maize yields were considerably lower than expected, at 2.4 metric tons per hectare (MT/ha). This could be explained by inappropriate selection or application of inputs, which can result from inadequate extension support. Aflatoxin levels were extremely low, with only three samples registering any aflatoxins, and all of these falling within the required quality levels for NewCo procurement.

**Extension contract initiated**

During the first half of 2014, CHAI met with a number of local service providers to understand each group's interest in and capacity to provide support to the farmers through this program. The Rwanda Development Organization (RDO) was recommended to CHAI s9(2)(ba) as the largest, most experienced and most effective extension service provider in the Eastern Province. In July, CHAI signed

[6] A full report on the baseline data was included as an annex to CHAI's 2014 mid-year report. Copies are available on request.

a contract with RDO for extension support for Season A. The contract with RDO lays out the following seven key deliverables:

- Build capacity of farmer-based extension system
- Train and monitor farmers who are members of the 11 selected cooperatives in identified Good Agricultural Practices, with the goal of increasing yields to at least 3.5 MT/ha of quality marketable maize and 1.7 MT/ha of quality marketable soya for the coming season
- Strengthen the capacity of the selected cooperatives
- Monitor input distribution
- Support cooperatives and members to access affordable financing
- Build capacity of farmers on post-harvest handling technology
- Support cooperatives in delivering on forward contracts

In order to deliver on these goals, RDO hired an additional thirteen extension officers dedicated to supporting the CHAI partner cooperatives, as well as an extension supervisor. The extension officers work through the existing cooperative structure to reach the cooperative members, training the leaders of farmer groups who then pass on extension support to farmer group members. This training on improved agricultural techniques reached 12,233 farmers in 2014, per the table below. More than 5,000 of the farmers supported in 2014, or just over 40%, were women. These same farmers were reached with the financing support indicated in the following section, which facilitated access to improved seeds and fertilizers.

Along with farmer training, RDO also provided an initial round of capacity-building trainings with cooperative leaders. This aimed at increasing the leaders' organizational and managerial skills to enable them to organize and mobilize farmers; keep proper records; and manage the respective cooperatives and their property in an effective and efficient manner. Six cooperative capacity-building training sessions were conducted, involving 135 leaders (41 women and 94 men).

**Table 1: Farmers accessing improved agricultural technologies through CHAI program in 2014**

| Cooperative Name | Registered members | | Affiliates | | Total – By Gender | | Total |
|---|---|---|---|---|---|---|---|
| | Female | Male | Female | Male | Female | Male | |
| s9(2)(b)(ii) | 464 | 619 | 0 | 0 | 464 | 619 | 1,083 |
| | 162 | 568 | 0 | 0 | 162 | 568 | 720 |
| | 104 | 169 | 0 | 0 | 104 | 169 | 273 |
| | 413 | 341 | 0 | 0 | 413 | 341 | 754 |
| | 1,521 | 2,100 | 0 | 0 | 1,521 | 2,100 | 3,621 |
| | 887 | 924 | 0 | 0 | 887 | 924 | 1,811 |
| | 17 | 97 | 183 | 215 | 200 | 312 | 512 |
| | 183 | 221 | 145 | 171 | 328 | 392 | 720 |
| | 521 | 978 | 485 | 745 | 1,006 | 1,723 | 2,729 |
| **Total** | **4,272** | **6,017** | **813** | **1,131** | **5,085** | **7,148** | **12,233** |

The extension services provided by RDO are tailored to address the gaps identified during CHAI's initial consultations with the partner cooperatives, as well as those identified by the baseline survey. The baseline indicated that a lack of technical farming skills led to inadequate application of fertilizers and seeds; improper spacing; and weeding, harvest and post-harvest inefficiencies; all contributing to low productivity. So far, monitoring reports indicate that farmers' skills have increased and production is expected to be high due to the extension support. This can be illustrated by the picture the right, showing well-developed maize with two cobs on one stalk, which has previously been rare. The results of these efforts in terms of crop yields and any changes in farmers' incomes will be measured in April 2015 through surveys of farmers and cooperative leaders.

**Technical assistance plans developed with partners**

During the last quarter of 2014, the CHAI team collaborated with partners to build out technical assistance plans to support cooperative strengthening efforts over the lifespan of the program. In November, CHAI hosted partners from the New Zealand Ministry of Foreign Affairs and Trade (MFAT) and a team of consultants tasked with building out a work plan for MFAT technical support. The consultant team provided a concrete mapping of current agricultural extension activities and available farmer training materials, and performed a gap assessment. This gap assessment was then mapped to New Zealand's core strengths in order to identify the activities that could have the greatest impact on the program's agricultural strengthening efforts.

Based on these efforts, MFAT developed a work plan that focuses on the core objective of ensuring that RDO extension officers have the appropriate skills and training materials to effectively and efficiently train farmers in good agricultural practices for production and post-harvest management of maize and soybean. This objective will be achieved through: a structured training program for extension officers, focused on improving the extension officers' skills in training farmer facilitators and farmer group leaders, including adult education techniques; the development of an extension management manual for extension officers; and the development of farmer-friendly extension materials that farmer facilitators and farmer group leaders can use to convey information to farmers on recommended agricultural practices. This focus on farmer training will strengthen a key component of the overall program, namely the effectiveness of the RDO extension support, by leveraging an area of New Zealand expertise.

In addition to the MFAT support, the CHAI team has been in discussions with the IFC regarding technical assistance for the partner cooperatives. To ensure complementarity of these efforts, CHAI facilitated a meeting between the visiting MFAT team and the IFC's Rwanda office in November 2014. In line with their organizational strengths, the IFC will be providing technical assistance for cooperative

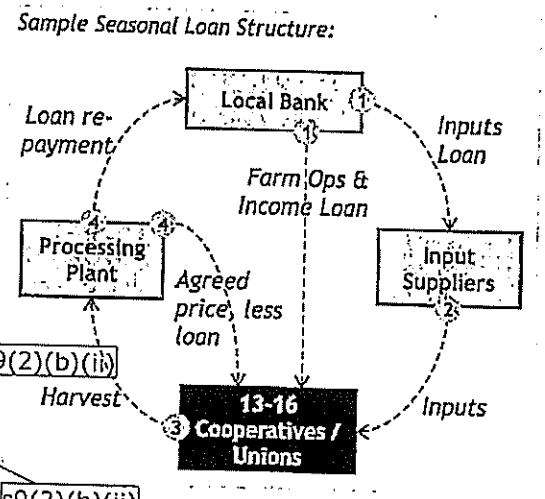
management and governance, as well as irrigation technologies. The IFC will initiate the former work stream through assessments of cooperative management capacity in collaboration with s9(2)(ba) , an independent rating agency that assesses the business potential of farmer organizations, in the first quarter of 2015. These assessments will be used to target technical assistance for partner cooperatives over the coming years. The irrigation technology support will be initiated through pilots, which will then be evaluated for yield improvements and expanded as needed. The IFC is considering a particular focus on "supplementary irrigation," which is used only when rains fail, to avoid worst-case scenario drought impacts.

### 2.3.2 Financing Mechanisms

**Farmer financing model finalized**

During the first half of 2014, CHAI developed a financing model that can efficiently and effectively meet the needs of partner cooperatives in Rwanda. As illustrated in the figure below, the model provides for farmers' input needs and operational costs, while minimizing risk on the part of the lenders. This allows cooperatives to access loans at interest rates below 10%, a significant improvement over the status quo rates of 20-25%. The rates are sustainable for the local intermediary bank because the project is being structured to reduce the intermediary lender's cost of capital and administration costs, alongside reducing risk through forward contracts and repayment directly from NewCo to the local bank.

**Figure 1: Sample Seasonal Loan Structure**




CHAI and the IFC worked together during the first half of 2014 to identify a local intermediary partner with the qualifications and interest to provide financing to the partner cooperatives under the proposed loan structure. All the major banks and microfinance institutions in Rwanda were reviewed, and four potential partners were shortlisted and invited to give presentations. Two of the most interested and qualified banks were then engaged in final negotiations.

s9(2)(b)(ii) was selected, having offered the lowest annual interest rate for the cooperatives at and having agreed to accept the forward contracts as collateral.

s9(2)(b)(ii) s9(2)(b)(ii)

Following the selection of as the intermediary bank, a negotiation and due diligence process began between the IFC and . CHAI assisted in driving forward this process, including defining contract s9(2)(b)(ii) terms, assisting with due diligence requests from the IFC, providing IFC contextual information on Rwandan agriculture, and facilitating coordinating calls between banks. In parallel, CHAI worked with to make loans available for cooperatives in Season A.

s9(2)(b)(ii)

**Due diligence completed with cooperatives**

s9(2)(b)(ii) s9(2)(b)(ii)

Having selected as the local intermediary institution, CHAI supported cooperatives with the due diligence processes required by and the IFC to initiate loans to the partner cooperatives in the third quarter of 2014. CHAI worked with cooperative leaders to produce the financial and organizational information to secure loans, and facilitated negotiations when the bank had questions or concerns about lending to any particular group. This support allowed the due diligence processes to progress rapidly and ensured that loans were available for the first land preparation and planting payments in September 2014, as discussed in more detail below. CHAI also supported IFC throughout the process of securing full internal IFC approvals to initiate loans, providing inputs during each round of reviews of the project. CHAI continued to facilitate lending through the end of 2014, monitoring loan balances and bank charges, while also validating cooperative requests for additional loan disbursements, which included loans for weeding and crop guarding in October, and harvest preparation loans in December.

s9(2)(b)(ii)

s9(2)(b)(ii)

### 2.3.3 Access to Inputs

**Procurement planning meeting**

In May 2014, CHAI worked with MINAGRI and RAB to organize and co-chair a procurement planning meeting and map detailed plans for Season A. The purpose of the meeting was to bring together key stakeholders from NewCo and government agencies and establish clear timelines and responsibilities to ensure crop procurement would move forward smoothly. The stakeholders included NewCo's investors, MINAGRI, RCA, RDO, fertilizer companies, and seed companies. Over the course of two days, stakeholders built out a detailed work plan to procure inputs, support partner cooperatives during land preparation and planting, provide extension services, and then ultimately source crops at the appropriate quality and in the necessary quantities for the first year of NewCo's production.

This meeting represented the broadest coordinated process to be organized in advance of a growing season to fully align agricultural input sourcing, farmer financing, and crop procurement volumes. This coordination proved critical to the execution of project activities throughout the season. CHAI followed up with each partner to support MINAGRI with the execution of the resulting plan, ensuring that all of the inputs were ordered and delivered on time. The group established an ongoing Procurement Planning Committee, which will convene in advance of each season to conduct a similar planning process. MINAGRI has indicated that this process has provided a valuable model for connecting agricultural development with local food processors, and may be taken up with other partners.

**Quantification of input requirements**

CHAI developed and maintained a working model of input costs and quantities, in order to inform the total amounts required for farmer financing. With crop volumes confirmed by NewCo following the July 2014 procurement planning meeting, the model was refined to provide the quantification of inputs for the requisite quantities of maize (and initially soybeans) for Season A. The fertilizer and seed quantities

were then shared with input suppliers in order to plan for and then complete the necessary procurements. The farmer financing model was built out with conservative yield assumptions in order to ensure that the loans would be repaid while allowing for profitable crop sales by the cooperatives.

**Input procurement with MINAGRI backing**

With NewCo not yet incorporated at the time when inputs were needed for the 2014-15 season, CHAI facilitated an arrangement whereby s9(2)(ba) . This support s9(2)(ba) was essential in providing the necessary confidence to input suppliers to move forward with deliveries to the partner cooperatives. s9(2)(ba) s9(2)(ba)

s9(2)(ba) seeds were delivered to partner cooperatives and planted in time for the rains, which began in September 2014. To ensure farmers applied the right doses of the inputs, RDO officers worked with farmer field promoters, facilitators, and cooperative group leaders to supervise the application within small groups of 20-30 cooperative members.

CHAI also facilitated mechanized land preparation for two cooperatives, including primary and secondary tillage. Working closely with MINAGRI and a local mechanization provider, s9(2)(ba) , tractors were deployed to the cooperatives at a discounted rate. The benefits of mechanization include faster completion of work and more thorough breaking of soil to allow for better moisture retention and therefore drought resistance.

### 2.3.4 Harvest / Post-Harvest Losses

**Assessment and planning completed for post-harvest practices**

During the baseline survey conducted in March and April of 2014, CHAI assessed the current status of post-harvest infrastructure, in order to tailor plans for its support and strengthening. As shown in the table below, farmers reported a high level of access to dry sheds and storage facilities. However, the quality of these facilities was a concern, with nearly half of farmers reporting these dry sheds and storage facilities as being in "poor" condition. Only 59% of farmers reported access to pavement for threshing, with quality again proving a concern. Poor-quality infrastructure is likely contributing to post-harvest losses and reducing the quality of the crops marketed by cooperatives.

**Table 2: Reported quality of post-harvest infrastructure in 2014 baseline survey**

| Infrastructure | % Access | Poor | Good | Excellent |
|---|---|---|---|---|
| Drying shed | 79% | 47% | 32% | 21% |
| Storage facility | 94% | 45% | 39% | 16% |
| Pavement | 59% | 47% | 33% | 20% |

s9(2)(b)(ii)

In order to address the challenges raised in the baseline survey, the CHAI team worked with RDO and cooperative leaders during the second half of 2014 to improve the quality of post-harvest practices. In order to sell the crops to NewCo, maize will need to have a moisture content below s9(2)(b)(ii) and s9(2)(b)(ii)

s9(2)(b)(ii) In order to ensure that as much of the crop meets these standards as possible, RDO staff will oversee the drying, threshing, and collection processes after the harvest in early 2015, and a dedicated CHAI post-harvest coordinator will work with RDO and the cooperatives to encourage appropriate post-harvest practices.

For future seasons, CHAI is assessing infrastructure and mechanization options to further reduce post-harvest losses and improve quality. With technical support from MFAT, the RDO team will also be better equipped to provide support in future seasons.

### 2.4 Objective 4: Establish or strengthen supply chain systems to ensure product delivery across Rwanda, including delivery to remote and hard-to-reach areas

In order to meet the program's nutrition goals, a robust distribution system will need to be established. Complementary food needs to be available consistently in sufficient quantities in the rural and remote areas where stunting rates are highest, in all seasons; the system needs to maintain the highest quality levels, with food storage in a cool, dry, secure environment, and mechanisms to identify contaminated or expired stock; and stock-out risk needs to be eliminated to ensure an uninterrupted supply. In Rwanda, CHAI supported the government with analysis to determine that the public sector distribution system for medical supplies, managed by the Medical Procurement and Distribution Division (MPDD) of the Rwanda Biomedical Center, will best achieve these goals for distribution to the lowest-income groups. Distribution through the MPDD will allow nationwide access, with linkages to the Community Health Workers (CHW) who will provide education around appropriate product use. In the last quarter of 2014, CHAI completed a set of assessments to support distribution system design, in collaboration with partner agencies in the government and an external consulting team.

Milestones:

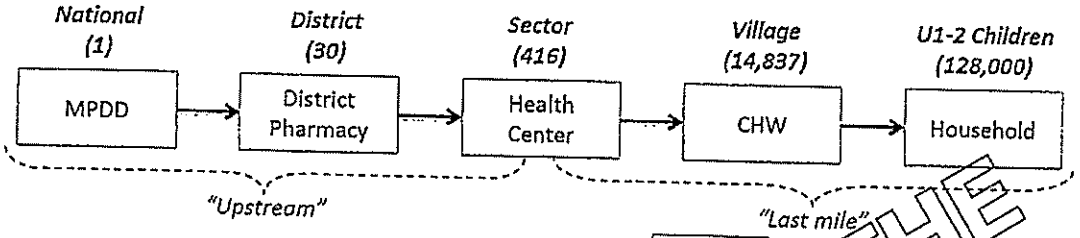
- CHAI and consultants completed a costing exercise examining MPDD distribution scenarios
- CHAI and consultants completed a qualitative assessment of distribution channels
- CHAI compiled and disseminated the results of the assessments with a draft action plan

**Completed costing exercise**

At the request of the Government of Rwanda, CHAI undertook a costing exercise to identify distribution scenarios within the MPDD system and provide a quantification of both investment and running costs under each scenario. The flow of supplies in the current MPDD system is illustrated in Figure 2 below. Under the current system, s9(2)(b)(ii)
s9(2)(b)(ii)

households on a quarterly basis. The government is in the process of setting up health posts at the village level, which may be incorporated into this distribution system once they are fully established.

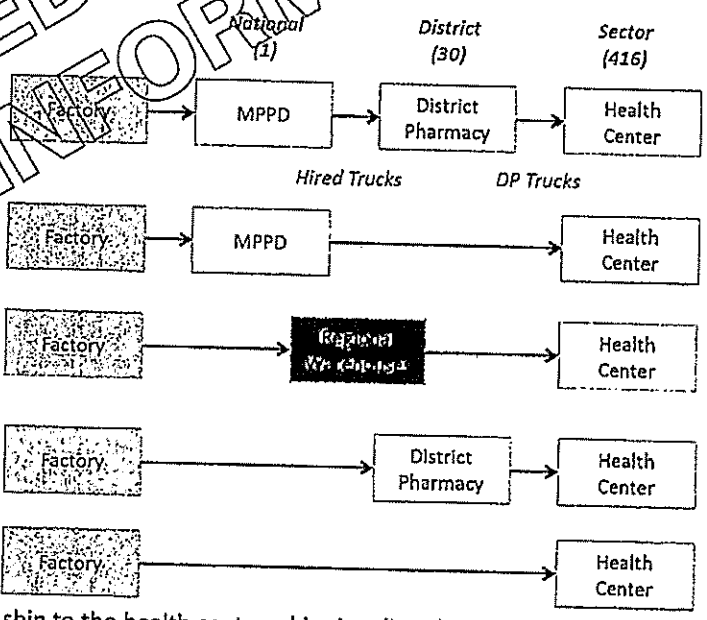
**Figure 2: Status quo distribution through MPDD**




The MPDD supply chain currently manages approximately s9(2)(ba) of supplies each month. With approximately s9(2)(ba) needed to serve the lowest income groups (Ubudehe levels 1 and 2) on a monthly basis, forecasted FBF volumes will roughly double the total current volumes managed by MPDD. This will necessarily entail a significant upgrade in both physical and organizational capacity to ensure the necessary access, quality, and service goals are met.

With support from an external consulting team, s9(2)(b)(ii) s9(2)( s9(2)(b)(ii) ), CHAI undertook an assessment of the costs of each distribution scenario in two steps. First, upstream supply chain scenarios were examined to look at product distribution from the factory to the health center. Next, the last mile distribution options were examined.

**Figure 3: Upstream distribution scenarios**




Along with the status quo scenario, CHAI looked at four options for upstream distribution, as shown in Figure 3: shipping directly from MPDD to the health center; setting up regional warehouses that would receive product from the factory, and ship to the health center; shipping directly from the factory to the district pharmacies; and shipping from the factory to the health center. The model also examined purchase versus rental options for transportation and storage, and a range of replenishment frequency options.

This analysis showed that s9(2)(b)(ii) s9(2)(b)(ii)

s9(2)(b)(ii)

Multiple scenarios were likewise examined for last mile distribution, as outlined in the figure below.
s9(2)(b)(ii)

**Qualitative assessment of distribution channels**

In parallel with the costing exercise described above, the SCW team undertook a qualitative assessment of the distribution system in Rwanda in October and November of 2014. SCW carried out initial information exchanges and briefings in October, and a two and half week in-country visit took place in November. The purpose of this exercise was to support the qualitative assessment of logistics capabilities in Rwanda, given the product specifications and volumes anticipated within the nutrition program. The assessment looked at both governmental and non-governmental channels. While the MPDD system will be used for distribution to s9(2)(ba) , as discussed above, the distribution channel for the next income tier – s9(2)(ba) – was still under discussion at the launch of the assessment.

Two alternative distribution channels were assessed in detail, alongside the MPDD supply chain discussed above. The first was the fast-moving consumer goods model. Under this model, wholesalers distribute from the national level, channeling products through semi-wholesalers at the district level. From the district level, goods could then be delivered to either CHW cooperatives or health centers at the sector level. Total margins across this chain total s9(2)(b)(ii) of product cost. While this model could allow for rapid replenishment, channeling product through the fast-moving consumer goods channel may make it more difficult to monitor product quality and track coverage.

The second option considered in depth was the s9(2)(ba) model, managed by s9(2)(ba) s9(2)(ba) in Rwanda. The s9(2)(ba) operates through its own central and regional warehouses, then connecting with the rural distribution chain to reach the consumer. Health products such as contraceptives and mosquito nets are currently distributed through this channel, with dedicated field staff conducting promotional activities at the village level. While a dedicated distribution chain would allow for close monitoring and oversight, margins in this channel are extremely high – s9(2)(ba) s9(2)(ba) . In order to pay for these dedicated services, and the objective of achieving a self-sustaining distribution channel not reliant on donor funds could not be realized.

Since the alternative options considered did not offer significant cost advantages or a sustainable alternative, distribution to s9(2)(ba) will likely flow through the same MPDD-managed system as the product volumes flowing to s9(2)(ba) . Including s9(2)(ba) children in the scenario modeling above yields significant economies of scale, s9(2)(b)(ii) This also allows for supply chain strengthening efforts to contribute to the national medical supply chain, rather than creating a parallel system which may not be sustainable over the longer term.

**Results and draft action plan circulated**

A slide deck covering the above results has been shared with government partners for feedback. The government has requested additional scenario modeling iterating on the options discussed above, which will be completed in early 2015. Once scenarios for upstream and last mile distribution are selected, the action plan will progress in three stages: distribution planning, during which detailed plans will be built

out for storage and transportation at each level of the supply chain; systems development, when tenders will be issued for the necessary infrastructure improvements and a management structure built out for oversight and monitoring; and finally a stress testing stage prior to product launch when the system will be checked for smooth operations.

### 2.5 Objective 5: Implement public health programs to drive product uptake, ensure widespread product access, and educate households on appropriate product utilization

While engagement in this work stream was limited during 2014, initial work is underway to better understand the program's target market and ensure that nutritional products are attractive to mothers and children. This market research will lay the groundwork for developing public health program messaging as well as packaging and product specifications during 2015.

Milestones:

- CHAI participated in a branding exercise to determine product name
- CHAI initiated market research in collaboration with NewCo marketing team

**Branding exercise**

At the invitation of the IC partners, CHAI completed a branding exercise to inform the process of brand name development. An agency commissioned by the NewCo marketing team, the s9(2)(ba) , compiled lists of potential names for PLW and complementary food products, with a mix of root languages. CHAI provided feedback on the names through an online survey portal. This process will inform brand name selection and discussions of brand architecture in 2015.

**Market research initiation**

During the last quarter of 2014, CHAI engaged with the NewCo marketing team to understand the parameters of market segmentation and align product development plans. With support from government partners, CHAI will undertake market research within the components of the market which will be subsidized, while the IC partners will focus on the commercial market. Market research will run in parallel to identify value propositions across target consumer groups, and develop the product formulations, packaging, and messaging accordingly.

Following these discussions, CHAI initiated a round of market research among the s9(2)(ba) and 4 groups in Rwanda, sampling across the country's four regions and Kigali. CHAI recruited and trained a team of four data collectors to conduct in-depth interviews with women, preparing the team to ask follow up questions and listen closely to understand women's perspectives in detail. An interview guide was developed and tested, and the necessary approvals obtained from the government. Approximately 60 women will be interviewed. The market research is focused around the following objectives:

- Understanding current perceptions of processed complementary food products
    - Flavors (locally appropriate, natural/savory options only)
    - Color and consistency

    - Packaging
    - Price points
    - Brand perceptions
    - Likes / dislikes about each product
- Understanding the acceptability of free products
- Identifying acceptable names for the product (e.g. Kinyarwanda versus English)

This market research will be completed in the first quarter of 2015. The results will be analyzed and shared with the NewCo partners as well as the government to facilitate discussion around branding architecture, packaging options, and key messaging.

# III. Monitoring and Evaluation

Monitoring and evaluation (M&E) is an integral component of the CHAI Nutrition Initiative in Rwanda. During 2014, activities were focused on launching a cohort study which will serve as an evaluation of the program's impact on key nutritional indicators.

By designing a rigorous study to evaluate the program's impact, CHAI and the Government of Rwanda are seeking to determine the effects of FBF on the nutritional status of children from six months to two years of age, with a particular focus on stunting. The study is being implemented in two phases. One cohort of children is being monitored from August 2014 until product introduction in early 2016 (*historical, pre-FBF introduction cohort*). A second cohort of children will be enrolled and monitored for 15-18 months after the product is introduced (*post-FBF introduction cohort*). Both cohorts will be tracked with anthropometric measurements, alongside household surveys which will collect information on a range of potential nutritional factors influencing the children's growth, such as household food security and income, dietary intake, and diarrheal illnesses. Based on reported FBF consumption, the post-FBF introduction cohort will be segmented into high- and low-uptake FBF groups. This design will thereby allow for a comparison between the high-uptake FBF group and the children in the historical, pre-FBF introduction cohort, as well as a comparison between the children with high and low uptake of FBF within the post-FBF introduction cohort.

Milestones:

- Study protocol development and ethical approvals
- Establishment of a research advisory group and study implementation team
- Selection of villages, survey pre-testing, and sensitization of key partners
- Enrollment of eligible children into the study
- First round of data collection complete (August to November 2014)

**Study protocol development and ethical approvals**

A study protocol detailing the design described above was developed and submitted to the three research ethics approval bodies in Rwanda: the Rwanda Medical Board, the National Institute of Statistics of Rwanda, and the Rwanda National Ethics Committee. CHAI incorporated feedback from each review body and ensured that each institution was well informed as to the goals of the study. The approvals process was completed, with the support of each institution's review board, in July 2014.

**Establishment of a research advisory group and study implementation team**

The CHAI team worked with government partners to assemble a research advisory team with representatives from the MoH, MINAGRI, the Ministry of Local Government, and the Rwanda University School of Public Health. This team is tasked with overseeing the study and providing advisory support to the implementation team. This team meets once every quarter to review the progress of the study.

CHAI also recruited and trained a study implementation team comprised of eight data collectors, one field coordinator, and one senior M&E program officer. The team received training on the survey tools, data collection methods, study protocols, data quality, and field management.

**Selection of villages, survey pre-testing, and sensitization of key partners**

With support from the National Institute of Statistics of Rwanda, 99 villages within 30 districts were randomly selected for the historical, pre-FBF introduction cohort. DHS data on baseline characteristics such as population distribution by Ubudehe level, annual birth rates, population per village, and stunting prevalence were used to design a nationally representative sample.

CHAI developed a household questionnaire to capture key demographic, nutritional, and health information as indicated above. The questionnaire was developed with technical assistance from partners, including the WFP, and vetted with the research team. CHAI then pre-tested the household questionnaire in two villages with a total of 10 households. The feedback from the pre-test was used to refine the questionnaire and data collection instruments.

Prior to beginning enrollment, CHAI held sensitization meetings with key stakeholders at the national, district, sector and village levels. The main purpose of these meetings was to brief stakeholders on the purpose of the study, ensure informed consent procedures were well understood, and establish good relationships for future collaboration. During these sessions, CHAI also worked with CHWs to introduce data collectors to households with children eligible for participation in the study.

**Enrollment of eligible children into the study**

Beginning in August and continuing into November 2014, eligible children from six to twelve months of age were enrolled into the pre-FBF cohort. During the enrollment period, households with a total of 626 children were approached for participation, and 23 children were found to be ineligible due to age. A total of 603 children were eligible and all agreed to enroll in the study. This cohort will continue to be monitored with anthropometric measurements and household surveys on a quarterly basis until the children reach two years of age. The data are reviewed in real time by the field coordinator to assess data quality and improve data collection processes with the enumerators as needed.

At the end of the enrollment period, the CHAI team analyzed the first round of data collection. Initial data on the cohort of 603 children align closely with the most recent Rwanda DHS survey, indicating that the sample is nationally representative and that the anthropometric indicators are being measured correctly. The second round of data collection is currently underway.

While the cohort study constituted the bulk of M&E activities during 2014, the team also provided cross-cutting technical support for programmatic activities described above, such as the surveys of PLW and the agricultural baseline survey. The team has also worked to develop and refine the program's results framework, setting up appropriate indicators and targets (see Annex D).

# IV. Financial Report

## STATEMENT OF EXPENDITURES

*Submitted by Clinton Health Access Initiative (CHAI) to the Ministry of Foreign Affairs and Trade, New Zealand*

**Reducing Malnutrition and Increasing Agricultural Incomes, Africa - Rwanda**

For the Period 1 February 2014 - 31 December 2014

MFAT activity code: A11846-A01

*Reporting Currency: USD*

| OUTPUT | Budget 2014 | Actual Expenditure 2014 | % Budget Spent to Date |
|---|---|---|---|
| Design Phase | | | |
| Develop Proposal, Costed Workplan, Results Matrix - Rwanda | $ 101,699 | 79,221 | 78% |
| Global Team Support | 29,996 | 26,169 | 87% |
| Indirect Costs | 13,170 | 10,538 | 80% |
| *Subtotal - Design Phase* | *$ 144,865* | *$ 115,928* | *80.0%* |
| Implementation in Rwanda: | | | |
| Obj. 0.1: Local non-output specific costs | $ 320,592 | $ 209,728 | 65% |
| Obj. 0.2: Global non-output specific costs | 81,302 | 75,305 | 92% |
| Obj. 1: Agricultural farmers cooperatives strengthened | 10,809 | 10,298 | 95% |
| Obj. 2: Financing mechanisms for farmers developed | 3,300 | 3,089 | 94% |
| Obj. 3: Access to agricultural inputs are improved | 138,333 | 120,139 | 87% |
| Obj. 4: Harvest and post-harvest losses are reduced | - | - | - |
| Obj. 5: Regional level reviews undertaken | - | - | - |
| *Subtotal - Implementation in Rwanda* | *$ 554,927* | *$ 418,558* | *75.4%* |
| **TOTAL COST** | **$ 699,792** | **$ 534,486** | **76.4%** |

**Variance Explanation:** During the design phase of the Rwanda program (February – April 2014), actual expenditures totaled $115,928, or 80% of the planned budget. During implementation, spending levels compared similarly to budget, with about $535,000 or 75% of the planned $700,000 implementation budget spent. In total, CHAI spent just over 76% of the planned MFAT budget in 2014. The moderate underspend in Rwanda was due to slight delays in hiring, which lowered staffing costs relative to budget. With funding confirmed in the first quarter of the year, CHAI moved forward with hiring and filled open positions on the agriculture team. CHAI also pursued opportunities for savings on travel costs. For instance, visiting team members shared rental apartments in Kigali rather than incurring nightly hotel costs. With MFAT's approval, CHAI also purchased a dedicated program vehicle during 2014, which will save on vehicle rental costs in future years of the program. Spending on each program objective was just below budget, with costs such as the execution of the baseline study and the contract with the s9(2)(b)(ii) coming in as expected.

## Annex A – Rwanda Joint Venture Term Sheet

Withheld in full under s9(2)(ba)

s9(2)(ba)

# Annex B – Cooperative Selection Criteria

1. Registration: The cooperative should be registered with the Rwanda Cooperative Agency (RCA) and local authorities. Having a legal entity enables CHAI and partners to:
   - Select credible cooperatives, avoiding working with fraudulent or non-existent cooperatives;
   - Hold the cooperatives accountable because registered cooperatives work hard to avoid losing their registration status; and
   - Deal with experienced and skilled cooperatives, because registered cooperatives often have been trained previously and/or have engaged in similar business contracts.
2. Land: The cooperative should have adequate land (at least 30 hectares) for maize and soybean production, the land should be productive, and the cooperative should agree to produce maize and soybeans for the company under a rotation system. Larger, more productive land allows for fewer contracts and thus simplifies management, input distribution, monitoring, and extension support.
3. Experienced Sellers: The cooperative should have at least one year of experience in supplying to large private buyers under contract to ensure that partner cooperatives:
   - Understand binding contracts, with a record of preventing defaulting or side-selling;
   - Understand the importance of deadlines; and
   - Have existing capacity to meet crop quantity and quality requirements.
4. Membership: The cooperative should have at least 50 members to ensure that the benefits of our interventions go to many smallholder farmers, thus raising incomes, reducing poverty, and diversifying risks.
5. Organizational Capacity: The cooperative should have basic skills in record keeping, financial management, and administration. Its leadership should have basic literacy skills to make sure that there is proper:
   - Tracking of supply from farmer to factory for transparency and traceability;
   - Filing systems for input distribution and loan recovery; and
   - Communication with and mobilization of members by the leadership.
6. Post-Harvest: The cooperative should have basic post-harvest handling infrastructure and associated skills.
7. Location: The cooperative should be based in the Eastern Province, which the government has identified as well-suited to maize production, in order to consolidate technical support.
8. Financials: The cooperative should have a bank account with proper signatories, as per the cooperative law, and should agree to have their accounts audited.
9. Free from Water Stress: The cooperative should be farming on irrigated land, radical terraces and/or good soil to mitigate the risks of low rainfall which sometimes happens in Eastern Province. The aforementioned types of land reliably provide higher yields during rain shortages than other land types.
10. Extension Support: The cooperative should have an existing partnership with an extension service provider and agro-dealer suppliers of improved seed and fertilizer. This criterion ensures the farmers already have basic farming skills and input systems.

# Annex C – NewCo Quality Specifications for Maize and Soybeans

| Maize Quality Requirements | |
|---|---|
| **Defective Kernels** | |
| Broken grains, % m/m | 2.00 |
| Rotten and diseased grains, % m/m | 2.00 |
| Immature and shriveled grains, % m/m | 1.00 |
| Maximum defective kernels, % m/m | 5.00 |
| **Other Impurities** | |
| Foreign matter, % m/m | 0.50 |
| Inorganic matter, % m/m | 0.25 |
| Filth, % m/m | 0.10 |
| Maximum other impurities, % m/m | 0.85 |
| Aflatoxins in accordance with ISO 16050 | 10 ppb incl. max 5 ppb B1 |
| Moisture content, % m/m | 16.00 |

| Soya Quality Requirements | |
|---|---|
| **Defective Seeds** | |
| Insect damaged, % m/m | 2.00 |
| Rotten and diseased, Immature and shriveled grains, % m/m | 3.00 |
| Maximum defective kernels, % m/m | 5.00 |
| **Other Impurities** | |
| Foreign matter, % m/m | 1.00 |
| impurities, % m/m | 2.00 |
| Maximum other impurities, % m/m | 3.00 |
| Aflatoxins in accordance with ISO 16050 | 10 ppb incl. max 5 ppb B1 |
| Peroxide value | Max 2meq |

# Annex D – Updated Results Framework

CHAI has updated the results framework for the program to align targets with the latest production timelines, and to harmonize the framework with the logframe agreed with the U.K. Department for International Development (DFID). Changes to individual indicators are footnoted in the tables below.

*Production Metrics and Targets*

| | Targets | | | |
|---|---|---|---|---|
| | 2014 | 2015 | 2016 | 2017 |
| (1) Construction started | | | | |
| Rwanda | - | Q2 | - | |
| (2) Foundation laid | | | | |
| Rwanda | - | Q3 | - | - |
| (3) All regulatory approvals achieved | | | | |
| Rwanda | - | - | Q1 | |
| (4) Manufacturing begins and batch testing meets quality standards | | | | |
| Rwanda | - | - | Q1 | - |
| (5) Product launched | | | | |
| Rwanda | - | - | Q2 | - |

*Marketing, Sales and Distribution Metrics and Targets*

| | Targets | | | |
|---|---|---|---|---|
| | 2014 | 2015 | 2016 | 2017 |
| (1) Transportation and storage requirements mapped and procured | | | | |
| Rwanda | - | Q2 | - | - |
| (2) Subsidy system established to serve beneficiaries who cannot afford the product | | | | |
| Rwanda | - | Q3 | - | - |
| (3) Percentage of target villages with active, fixed distribution points for the product | | | | |
| Rwanda | - | - | 25% | 50% |
| (4) Percentage of stock outs at fixed distribution points | | | | |
| Rwanda | - | - | <10% | <5% |
| (5) Number of health workers trained | | | | |
| Rwanda | - | 500 | 1,000 | 1,000 |
| (6) Percentage of target sites reached with complementary feeding and breastfeeding campaigns | | | | |
| Rwanda | - | - | 25% | 50% |
| s9(2)(ba) | | | | |
| Rwanda | - | - | s9(2)(b)(ii) | |
| (8) Sales volumes [MT (000)] to: WFP; in country – rural; in country – u | | | | |
| Rwanda | - | - | | |
| (9) Average price per MT (USD) per market: WFP; in country – rural; in | | | | |
| Rwanda | - | - | | |
| (10) Total sales revenues (USD) per market: WFP; in country – rural; in | | | | |
| Rwanda | - | - | | |

*Nutrition Improvement Metrics and Targets*

| | Targets | | | |
|---|---|---|---|---|
| | 2014 | 2015 | 2016 | 2017 |
| (1) Decrease in proportion of stunted children, 6-23 months, among poorest/most vulnerable groups[7] | | | | |
| Rwanda | - | - | - | 20% reduction |
| (2) Decrease in proportion of wasted children, 6-23 months, among poorest/most vulnerable groups | | | | |
| Rwanda | - | - | - | 40% reduction |
| (3) Decrease in proportion of underweight children, 6-23 months, among poorest/most vulnerable groups | | | | |
| Rwanda | - | - | - | 30% reduction |
| (4) Proportion of infants and young children, 12-15 months, fed breast milk in the previous 24 hours[8] | | | | |
| Rwanda | - | - | ≥95% | ≥95% |

*Agriculture Improvement Metrics and Targets*

| | Targets | | | |
|---|---|---|---|---|
| | 2014 | 2015 | 2016 | 2017 |
| (1) Increase in the average maize/soybean yield (MT per hectare) in partner cooperatives | | | | |
| Rwanda | 2.4 MT/ha maize<br>0.9 MT/ha soybean<br>(Baseline) | 2.9 MT/ha maize<br>No change on soybean | 3.5 MT/ha maize<br>1.1 MT/ha soybean | 4.1 MT/ha maize<br>1.3 MT/ha soybean |
| (2) Total smallholder farmers reached with improved agricultural technologies (broken down by gender)[9] | | | | |
| Rwanda | 12,000 | 12,000 | 16,000 | 20,000 |
| (3) Percentage of input crops procured domestically[10] | | | | |
| Rwanda | - | 50% | 60% | 70% |
| (4) Percentage of crop meeting quality standards for acceptance at factory[11] | | | | |
| Rwanda | - | 80% | 90% | 95% |
| (5) Increase (%) in average annual income per farmer involved in in the program | | | | |
| Rwanda | | 7% | 16% | 24% |

Note: These indicators are intended to reflect CHAI's goals under both the s9(2)(ba) and the MFAT grants. The s9(2)(ba) grant currently runs through 2016, while the MFAT grant runs through 2017.

[7] This language has been updated to align with DFID framework. The impact measurements will be tracked within the poorest / most vulnerable groups that will receive fully subsidized product from the government.
[8] This indicator has been changed from 0-6 months to 12-15 months, in order to measure the prevalence of continued breastfeeding rather than exclusive breastfeeding. This is intended to track whether there is any change in continued breastfeeding rates when an improved complementary food is introduced and promoted.
[9] This indicator is being added to ensure alignment between the s9(2)(ba) and MFAT results frameworks.
[10] A number of indicators, including this one, have been updated to track percentages, in order to reduce the number of updates that are needed as production and distribution schedules are refined.
[11] This is a new indicator to replace the indicators on post-harvest losses and aflatoxin levels. The quality standards relate to moisture content and aflatoxin levels, so this should capture the impact of post-harvest services in a more directly measurable way than the original indicators.