THE MARKETPLACE FOR NUTRITIOUS FOODS

RWANDA LANDSCAPE REPORT

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Acknowledgment

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Acronyms

ADRA	Adventist Development and Relief Agency
AMS	Alternative Milk Sector
AVVAIS	Association des Veuves Vulnerables Affectees et Infectees par le HIV/AIDS
BCR	Commercial Bank of Rwanda
BoP	Base of the Pyramid
BHR	Banque de l'Habitat du Rwanda
BPR	Banque Populaire de Rwanda
BRD	Development Bank of Rwanda
CAADP	Comprehensive Africa Agriculture Development Programme
CHW	Community Health Worker
CIP	Crop Intensification Program
CSA	Civil Society Alliance
CSB	Corn-soya blend
CSO	Civil Society Organization
DF&NSC	District Food & Nutrition Steering Committees
DFID	Department for International Development
DHS	Demographic and Health Survey
DPEM	District Plan for Elimination of Malnutrition
DRC	Democratic Republic of the Congo
EAT	Enabling Agriculture Trade
EDPRS	Economic Development and Poverty Reduction Strategy
EGPAF	Elizabeth Glaser Pediatric AIDS Foundation
EICV	Integrated Household Living Conditions
EKN	Embassy of the Kingdom of the Netherlands
EPR	Eglise Presbyterienne au Rwanda
EU	European Union
FEWS NET	Famine Early Warning Systems Network
FAO	Food and Agriculture Organization
FAOSTAT	Food and Agriculture Organization Statistics
FFLS	Farmer Field Learning Schools
GAIN	Global Alliance for Improved Nutrition
GAP	Good Agriculture Practice
Ha	Hectares
HSCG	Health Sector Cluster Group
HSSP	Health Sector Strategic Plan
ICAP	International Center for AIDS Care and Treatment Program
ICT	Information Communications Technology
IRC	International Rescue Committee
KCB	Kenya Commercial Bank
MCC	Milk Collection Centre
MCHIP	Maternal and Child Health Integrated Program
MINAGRI	Ministry of Agriculture and Animal Resources
MINALOC	Ministry of Local Government
MINISANTE	Ministry of Health
MIYCN	Maternal, Infant and Young Child Nutrition
MOH	Ministry of Health
MT	Metric ton
NISR	National Institute of Statistics Rwanda
NAP	Nutrition Action Plan
NF&NTWG	National Food and Nutrition Technical Working Group
NFNP	National Food and Nutrition Policy

NFNSP	National Food and Nutrition Strategic Plan
NNP	National Nutrition Policy
NGO	Non-governmental Organization
PPP	Public Private Partnership
PSTA	Strategic Plan for the Transformation of Agriculture
RAB	Rwanda Agriculture Board
REACH	Renewed Effort Against Child Hunger and Undernutrition
RDB	Rwanda Development Board
RF	Rwandan Francs
SACCOS	Savings and Credit Cooperative Societies
SCF&NSC	Food and Nutrition Steering Committee
SILC	Savings and Internal Lending Communities
SFH	Society for Family Health
SME	Small and Medium Enterprise
SUN	Scaling Up Nutrition
UHT	Ultra-high temperature processing
UN	United Nations
UNICEF	United Nations Children's Fund
USAID	US Agency for International Development
USD	US dollar
WFP	World Food Program
ZOI	Zone of Influence

Executive Summary

The Global Alliance for Improved Nutrition (GAIN) has developed a successful program in several East African countries to address malnutrition through a market-based approach – the Marketplace for Nutritious Foods. This program is in place in Mozambique, Tanzania and Kenya, and is being expanded to Rwanda. GAIN engaged Elizabeth Rogers Consulting to carry out a landscape analysis to gather information on the current nutritional situation in the country. The landscape exercise was carried out to broadly look at nutrition, food production, marketing and access in the country. In addition, the enabling environment for business and other programs taking place for nutrition were analyzed.

The analysis was carried out with extensive desk research and a visit to Rwanda in September 2015 to interview key stakeholders along various value chains. It was determined early on to focus on four key food types:

1. Dairy
2. Animal products
3. Fruit and vegetables
4. Oilseeds and pulses (specifically beans)

In addition to these focus types, the geographic focus was in alignment with the Feed the Future's Zone of Influence (ZOI) as per USAID; this includes all districts in the country excluding the three encompassing Kigali City (Gasabo, Kicukiro and Nyarugenge). USAID also requested a particular focus and interest in rural rather than urban areas.

Technically, Rwanda has been able to produce sufficient calories per capita since 2008. However, there are still food security issues, particularly in relation to lean seasons in certain geographic areas that are unable to produce enough food. Those who are affected the most are generally the land-poor, who must rely on markets, as their own food production is limited. It also appears that behaviors play a role as many farmers sell harvest right away in order to earn income, yet later must purchase food; saving food for later appears to be limited.

The paradox in Rwanda is that despite improvements in food production and security, the levels of malnutrition are considered critical or very high[1]. Acute malnutrition, or wasting, has dropped dramatically to an acceptable 2%[2]. However, chronic malnutrition, or stunting, remains very high, at 38% of children under the age of 5. A decade ago, this was 51%, so the prevalence is decreasing, although the goal of 30% stunting rates set in 2005 has not yet been reached despite widespread focus by government and NGOs on food and nutrition (Ministry of Health, 2005). Stunting levels are particularly high in rural children, the poor, boys, and those with mothers with poor education. Stunting also increases with age, from birth, and most research suggests it is largely irreversible after around age 2. (Schott, 2013)[3]

Although there are many causes of chronic malnutrition, a major cause is a poor diet in the first 1000 days of life. A diet needs to be diverse and include sufficient protein, fats, vitamins and minerals. A typical Rwandan diet consists of cooking bananas, Irish and sweet potatoes, dry beans and perhaps cassava and some other vegetables. Beans and sweet potatoes make up the highest contribution to calories nation-wide. In poor

[1] WHO defines stunting levels above 40% as very high and WFP declares this level to be critical (WFP, 2012)

[2] WHO defines under 5% wasting as acceptable (WFP, 2012)

[3] A recent study in Ethiopia, Peru and Vietnam, however, found that 'growth trajectories may be malleable after infancy, particularly through the 1-5 year age range'. This provides the first indication that stunting may be reversible. (Schott, 2013)

districts, it can be difficult to get sufficient iron, Vitamin A and calcium in diets. For children, lack of zinc is also problematic. There are many reasons why these deficiencies occur – lack of affordable nutritious food is one of them. This landscape analysis aims to provide sufficient knowledge to guide GAIN's approach to operating the Marketplace for Nutritious Foods in Rwanda.

Production of nutritious and diverse foods has been increasing over the last decade. (MINAGRI, 2013) There is now surplus milk production, significantly more fruits and vegetables, more beans and more of all types of livestock except cattle. Much of this production is marketed locally, although a great deal moves towards Kigali and crosses borders to the DRC, Uganda and Burundi, where the prices are better. Some value chains are underdeveloped and mostly consist of small networks of traders, as for beans. While others have large commercial players that are developing networks for collection, such as Inyange Industries' milk collection centers. Overall, the largest constraints to food production are transportation of goods, although access to finance and lack of high quality raw food materials for processing are also important barriers. (Stakeholder Interviews, 2015)

For consumers, local markets are the source of rice, groundnuts, fish and meat, poultry, maize and fruits, while households generally produce their own cassava, sweet potato, banana and beans. According to a WFP report, overall food purchases make up 65% of food consumption[4]. The malnourished do not have any other specific food access channels, unless there is extreme or acute sickness that takes them to a health center or hospital where they can be given some food. But overall, own production (on perhaps limited land) and market purchases are the main food sources. The fresh markets visited had a wide range of fruits and vegetables, although they were lacking in any fortified foods or iron-fortified beans.

This analysis also looked at the business landscape, which is considered fairly good in Rwanda. The country scores well on the Ease of Doing Business Ranking, and businesses find the enabling environment conducive to doing business. The biggest hurdles are for SMEs; these are for access to financing, which still remains difficult. In comparison to the large group-owned companies, the SMEs and micro-businesses do not always have the business skills, financial records and collateral that can get them financing to scale. There is financing available, but the restrictions on it and the limited business skills of entrepreneurs limit the ability for SMEs and micro-businesses to access it. (Stakeholder Interviews, 2015) (World Bank)

The enabling environment for nutrition is also favorable. There is significant collaboration and coordination of activities in order to carry out the government strategies on nutrition. This cuts across sectors such as Health, Education, Agriculture and Gender, as well as across organizations, from government to civil society organizations to the private sector. There are a number of platforms and working groups already in place from which coordinated efforts are happening.

Despite this coordination and collaboration, there still remains much to be done, as stunting rates remain high. This landscape analysis identified some areas in particular that could be interesting for increasing affordable nutritious food availability and production. In particular, these include poultry, pork, avocado, fruit, eggs, mushrooms, soya bean, fish and iron beans. Given the high levels of stunting in specific districts in the north, south and west provinces, it also makes sense to focus on opportunities in those areas.

[4] It is not reported whether this is in value, calories or mass. (WFP, 2012)

1. INTRODUCTION

1.1 Objectives

The Global Alliance for Improved Nutrition (GAIN) engaged Elizabeth Rogers Consulting to carry out a Landscape Analysis for the Marketplace for Nutritious Foods in Rwanda. This Landscape Analysis provides information on the current nutritional situation in the country, to help inform the development of the Marketplace for Nutritious Foods in Rwanda. Information was gathered and analyzed on the nutrition situation, food production and access, the business and financing landscapes, and the current work being done by government and donor/implementing organizations.

As it was not possible to conduct this analysis for all value chains in Rwanda given the limited time, GAIN requested focus to be placed on the most important food types for improving the nutritional situation, namely:

1. Dairy
2. Animal products
3. Fruit and vegetables
4. Oilseeds and pulses (specifically beans)

In terms of geography, efforts and research were in line with the Feed the Future's Zone of Influence (ZOI) for Rwanda, which includes all districts in the country, except for the three encompassing Kigali City (Gasabo, Kicukiro, and Nyarugenge).

GAIN and the project donor (USAID) developed the outline for this report and consulting work has been carried out to fulfill these requirements, including the following tasks:

1. To extract and summarize the findings of the existing/ available reports (4 days)
2. To conduct additional desk research and to fill gaps (4 days)
3. To travel to Rwanda to carry out additional interviews with relevant parties to complete the gaps in the landscape analysis. This includes the development of interview questions and the organization of meetings in collaboration with the GAIN Marketplace Manager Rwanda. (10 days)
4. Write a draft report for feedback to be provided within 14 days by GAIN (and potentially USAID) (3 days)
5. Finalize the report incorporating the feedback (4 days)

1.2 Methodology

Primary and secondary research was carried out in September 2015. As requested, a literature review of the 18 reports supplied by GAIN was first conducted (see Annex III: Interviewee List & Contact Details), followed by additional desk research to fill gaps in information. The literature review guided the development of interview guides and target interviewees for the visit to Rwanda.

Primary research was carried out via stakeholder interviews during a 10-day visit to Rwanda. Twelve interviews were conducted with small and large businesses involved in the relevant value chains, financial suppliers, farmers, and international and local organizations involved in nutrition in Rwanda. Most interviews took place in Kigali City, although site visits were conducted in Bugesera District and Rwamagama District in Eastern Province. Due to time limitations and national holidays, visits to other provinces were not possible, so a farmer from Nyanza District in Southern Province travelled to Kigali for an interview.

Secondary production data was primarily obtained from the UN's FAOSTAT, as full datasets from the Ministry of Agriculture and Animal Resources (MINAGRI) were not available. However, there were some instances when the FAOSTAT data varied greatly from the available MINAGRI data, and following expert consultation, the MINAGRI data was used (in particular for milk and egg production). Nutrition data was obtained from recent Demographics and Health Surveys (DHS) published by the National Institute of Statistics Rwanda (NISR). A full list of sources can be found in the Bibliography.

2. UNDERSTANDING THE BURDEN OF MALNUTRITION: NUTRITION SITUATION

2.1 Food Security

Rwanda has made significant gains in food security in the last decade, producing enough calories per capita to feed the population since 2008. However, the 2584 kcal/capita/day[5] is not evenly distributed among Rwandans. Although four in five households had acceptable food consumption in 2012, 4% of households were considered food insecure and 17% were borderline insecure. Some of the food insecurity is related to seasonal food access, with 20% of households struggling in the lean seasons in March - May and more in September – November. Another 14% of households experience chronic, year-round difficulties accessing food (WFP, 2012). Typically these households struggle because they do not have any or enough land on which to produce sufficient food for their own consumption, and instead rely on markets. In lean seasons, prices are higher and the situation worsens for the food insecure.

In addition to limited land, geographic location contributes to food insecurity for households. The most vulnerable households are located in the rural areas of Lake Kivu (42% with unacceptable food consumption), West Congo Nile Crest (43%) and East Congo Nile Crest (29%), in the Western and Southern provinces. The land in these areas is more susceptible to erosion and is less fertile, thus being less productive. (WFP, 2012) Interviews confirmed that the most food insecure areas are in the districts bordering Lake Kivu, while recent poverty data also overlaps with these same areas (see Figure 1, Figure 2).

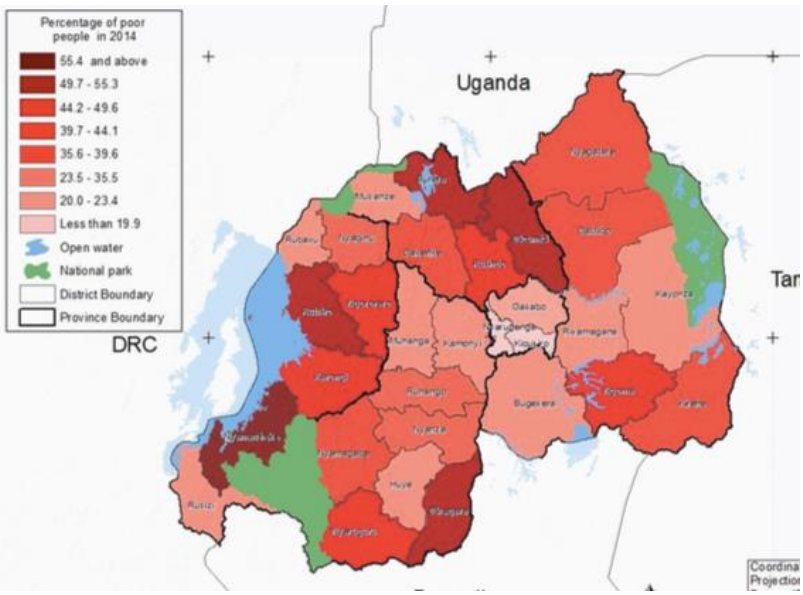

Figure 1: Percentage of Rwandan population identified as Poor in 2013/14, by District (WFP, 2012)

[5] The international standard requirement is 2100 kilocalories per adult. (World Food Programme, 2012)

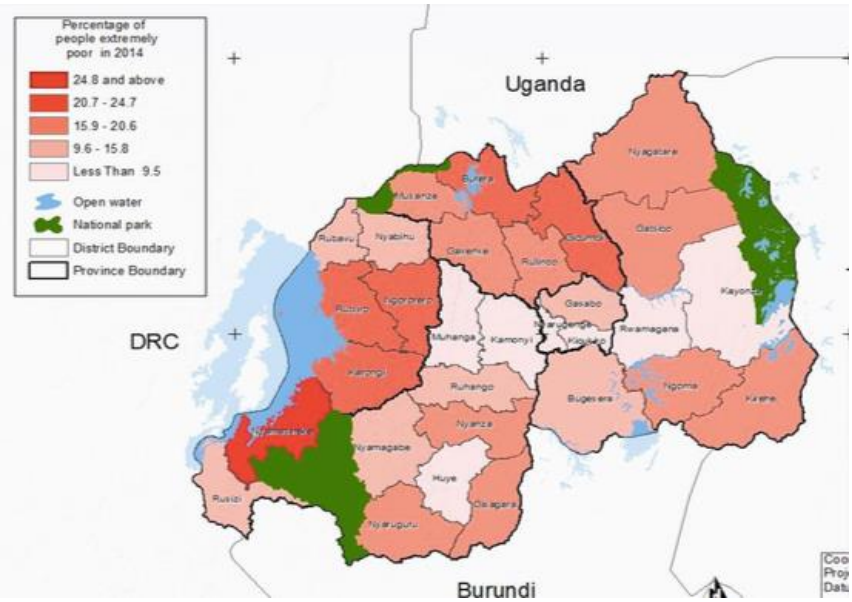

Figure 2: Percentage of Rwandan population identified as Extreme Poor in 2013/14, by District (WFP, 2012)

Additional factors that contribute to food insecurity are poor harvests, political situations and household behaviors. Harvests are affected by climate change, resulting in unusual seasonal rains, or lack of a strong second or third season. Diseases such as the Cassava Brown Streak Virus can also result in significant losses of staple crops, which reduce food availability at the household and national levels. The recent instability in Burundi has also contributed to food insecurity, as refugees flow into bordering Rwanda, adding pressure on the local communities or host families. This flow is subsiding, but as of August 2015, 75,500 refugees from Burundi remain in Rwanda. Another factor is the depreciation of the Rwanda Franc (RF), which has driven up costs associated with food production and transportation, putting pressure on those households that primarily rely on markets. (FEWS NET, 2015) Finally, it was observed in interviews that even malnourished farmers or producers would prefer to sell their produce, rather than consume or store it themselves, creating a situation where they later have to purchase food at high prices or go without.

> *"In general, the food of good quality in terms of nutrients is not consumed by those at risk of malnutrition (although sometimes it has been grown by them), they prefer to sell them."*
> *(Stakeholder Interviews, 2015)*

Overall, for most of the country, acute food insecurity is predicted by FewsNet to be minimal through to December 2015. Although, some Livelihood Zones (such as Bugesera Cassava) do experience longer and earlier lean seasons from time to time.

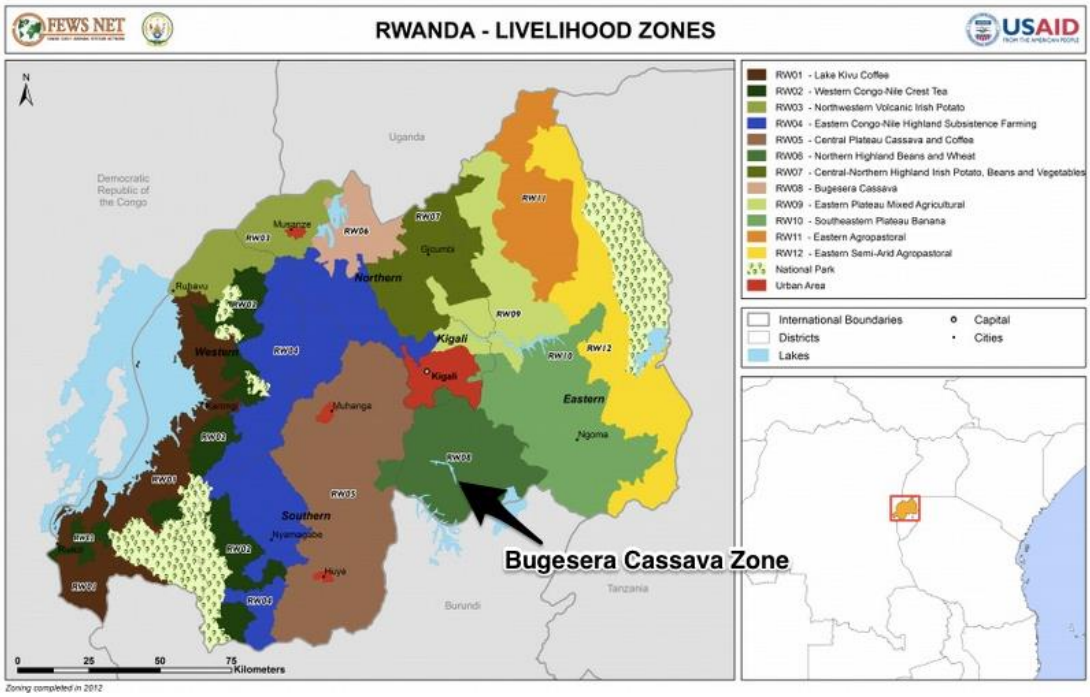

Figure 3: Rwanda Livelihood Zones Map with Bugesera Cassava Zone, July 2012[6] (FEWS NET, 2015)

Overall, Rwanda generally produces enough calories for its population, with insecurity issues confined geographically and by season. Beyond pure caloric availability though, there are certain needs that are not being met, such as food preferences or nutrients, and this is highlighted by the foods that Rwanda imports (see 3.5 Trade).

2.2 Stunting and Wasting

A decade ago, over half (51%) of all Rwandan children under 5 were stunted (too short for their age), and 5% were considered wasted (too thin for their height)[7]. The recently completed Demographic and Health Survey indicates that stunting is still very high at 38% nationally, while wasting is down to an acceptable level of 2%. This latest data reveal that stunting is higher among boys (43% vs 33%), rural children (41% vs 24%), the lowest wealth quintile (49% vs 21% in the highest), and in children whose mothers had no education (47% vs 39% with primary education and 19% with secondary or higher) (see Figure 4).

- ***38%** of children under 5 are stunted*
- *Stunting is more prevalent in boys, rural children, poor households and where mothers have no education*
- *(NISR, 2015)*

[6] Note: The legend for this map is incorrect – the Bugesera Cassava Zone should be identified as green in the legend.

[7] Stunting = too short for age, also called chronic malnutrition and Wasting = too thin for height, also called acute malnutrition

There are also geographic differences, with the highest stunting in 2014/15 in Western Province (45%), Southern Province (41%) and Northern Province (39%) while it is 35% in Eastern Province and down to 23% in Kigali City. (NISR, 2015) These recent results differ slightly from a 2012 survey where the highest stunting was found in the Northern Province (see Figure 5), although the lowest levels remain in Kigali City and Eastern Province.

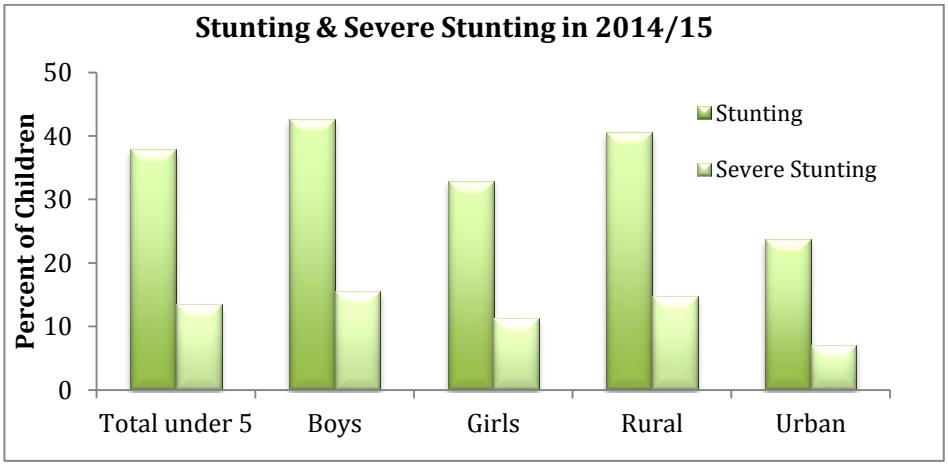

Figure 4: Stunting and severe stunting rates for children under 5 years old surveyed in Rwanda in 2014/15. (NISR, 2015) Severe stunting is 3 SD below the mean, stunting is calculated at 2 SD below the mean.

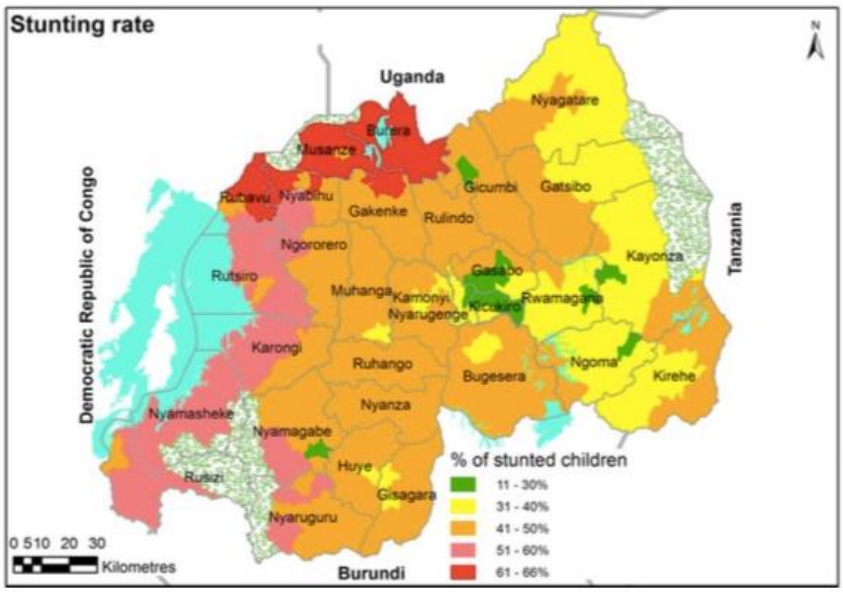

Figure 5: Distribution of stunting in children under five in 2012. (WFP, 2012)

Rates of wasting are significantly less than stunting rates. In 2014/15, 2.2% of children surveyed were wasted, with only 0.6% severely wasted. Similar to stunting, wasting is higher in boys (2.4% vs 2%), rural children (2.3% vs 1.8%), the lowest wealth quintile (2.3% vs 1.8%) and in children whose mothers have no education (3% vs 2.1% with primary education and 2.3% with secondary or higher). However, the geographic differences do not exist as significantly in wasting as in stunting. Kigali City has 2.3% wasting, as does Western Province, while the Southern Province is 2.4%, Eastern Province is 2.2% and the Northern Province is the lowest at 1.8%. (NISR, 2015)

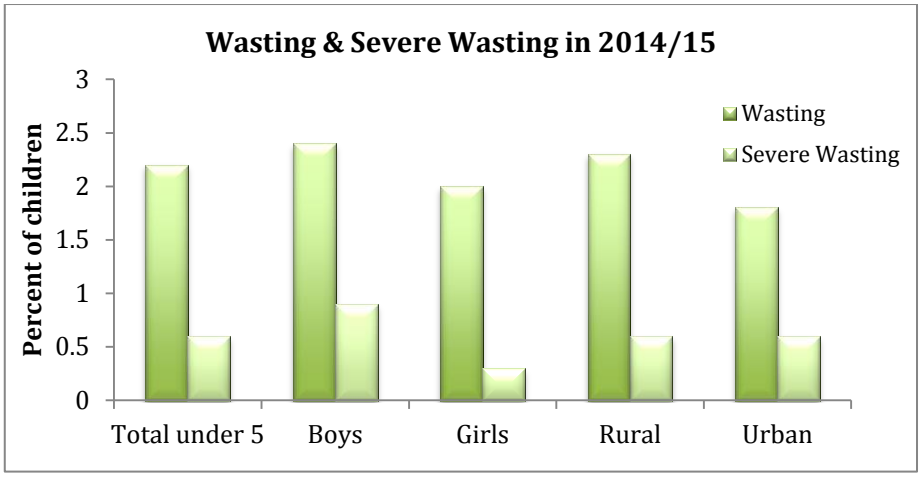

Figure 6: Wasting and severe wasting rates for children under 5 years old surveyed in Rwanda in 2014/15. (NISR, 2015) Severe wasting is 3 SD below the mean, wasting is calculated at 2 SD below the mean.

In both the recent and 2010 DHS analyses, it was shown that stunting increases with age, while wasting decreases with age (see Figure 7). The biggest increase in stunting happens between months 9-11 and 12-17, increasing from 21.3% to 41.6% in those months, and it peaks at 49.4% between the ages of 18-23 months. This highlights the importance of nutrition interventions for children between one and two. In contrast, wasting decreases from a peak of 5.4% for children under 6 months, to a low of 0.7% at 3 years. (NISR, 2015)

- *Stunting INCREASES with age - doubling from age 9-11 months (21%) to 12-17 months (42%)*
- *Wasting DECREASES with age*

(NISR, 2015)

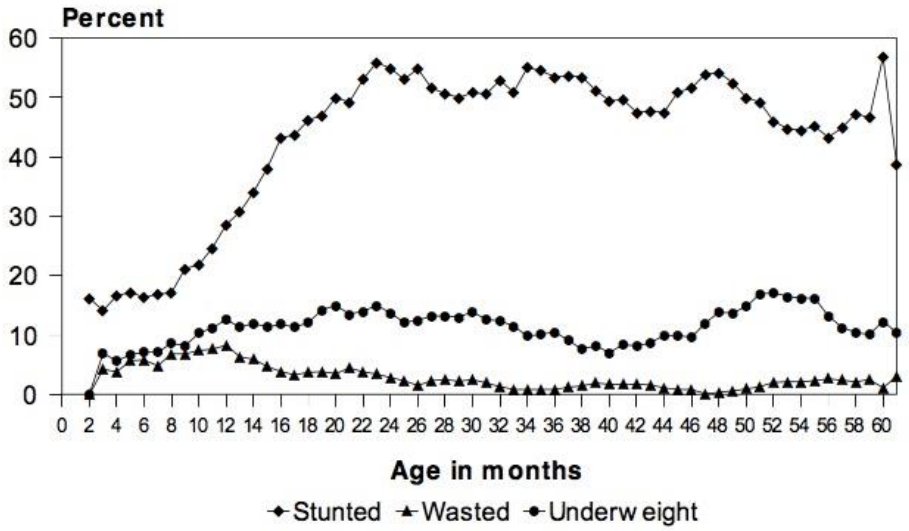

Figure 7: Nutritional status of children by age.[8]

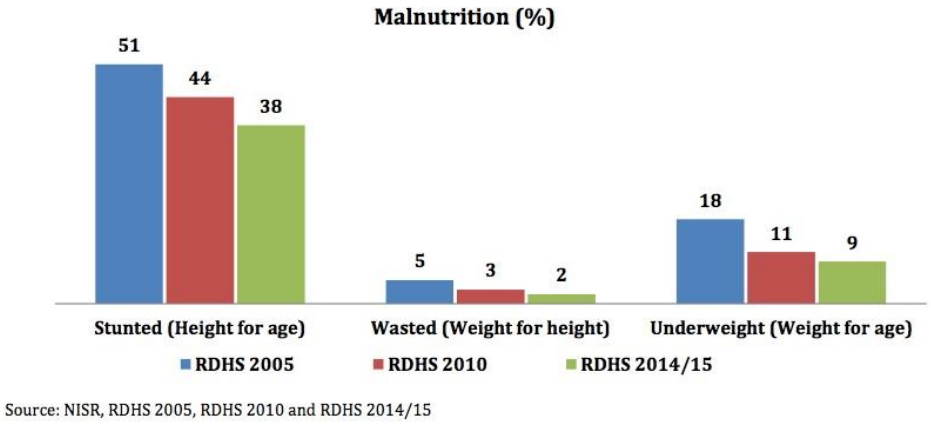

Figure 8: Malnutrition rates from surveys over the past decade. (NISR, 2015)

Although malnutrition has decreased over the last decade (see Figure 8), the level of chronic malnutrition in Rwanda is considered unacceptable by WFP and is one of the highest in the region. (WFP, 2012)

2.3 Micronutrient Deficiencies

As mentioned above, Rwanda produces sufficient calories for its population and there is very little acute malnutrition (wasting). However, there is significant chronic malnutrition (stunting) due in part to the consumption of foods lacking in quality protein, fats, some vitamins (B12, B2, A) and minerals (calcium, iron, zinc). According to the National Institute for Statistics Rwanda (NISR), the average diet is composed of cooking bananas, dry beans, sweet potatoes, cassava flour and root, Irish potatoes and sometimes fish. More specifically, the latest Integrated Household Living Conditions (EICV) survey indicates the contributions to the caloric intake of the poorest Rwandans (see Table 1); sweet potatoes (24%) and beans (21%) are by far the highest contributors to calorie consumption. (NISR, 2015) The good news is that cooked sweet potatoes are an excellent source of vitamin A and beans are a good source of protein and

[8] Stunting is determined by 'height-for-age' index, wasting by 'weight-for-height' and underweight by 'weight-for-age'. (NISR, 2015)

iron. However, despite this average diet, there are still major nutritional gaps as demonstrated in the high stunting rates among children.

Item	Kcal consumed	Percent of total
Corn flour	66.63	6%
Dry maize (grain)	49.17	4%
Local rice	25.89	2%
Sorghum flour	17.65	1%
Eggs	1.3	0%
Dry fish	25.33	2%
Avocado	17.03	1%
Cooking banana	58.74	5%
Other fruits	6.77	1%
Meat (all)	3.15	0%
Milk	7.75	1%
Dry beans	258.63	21%
Cassava (fermented)	40.91	3%
Cassava (flour)	132.15	11%
Cassava (root)	75.63	6%
Irish potato	84.2	7%
Sweet potato	286.53	24%
Oilseeds (groundnuts & soya)	1.8	0%
Vegetables	20.391	2%
TOTAL	1206	100%

Table 1: Normative food basket as used by EICV4 in determining the food poverty line. (NISR, 2015)

However, a recent diet study in Burera District concluded that iron, Vitamin A and calcium are the most difficult micronutrients to obtain in Burera residents' typical local diet which consists of sweet potatoes, Irish potatoes, beans, *dodo* leaf[9], avocado and onions. (Save the Children, 2011) Availability and affordability of food of animal origin (including milk, eggs, poultry, fish and meat) are limited and for the most part lead to these micronutrient deficiencies. (Unknown Author)

NISR reports that across the country, children's main deficiencies are likely iron and zinc, with 37% of children between 6 months and 5 years having some level of anemia in the most recent survey. The rate of anemia was highest among children age 6-11 months - a staggering 66% - and in children in the lowest wealth quintile. The rates are highest for rural children residing in the Southern and Eastern Provinces. On the positive side, Vitamin A consumption and iodine intake appear to be sufficient according to NISR; 73% of children consume enough Vitamin A, 93% receive twice-yearly supplement, and 99% of households use iodine-enriched salt. (NISR, 2015) (NISR, 2012)

Women are also at risk for micronutrient deficiencies, particularly anemia. In the 2014/15 EICV survey, 19.2% of women surveyed had some level of anemia, which

[9] Dodo is also known as amaranth

unfortunately is an increase from the 17.3% in the 2010 survey. Severe anemia[10] levels remained low at 0.2%. Anemia is more prevalent among rural women in the lowest wealth quintile, and is worse in the South and East provinces, as is the case for children. (NISR, 2015)

- *Increasing iron consumption is key for both women and children*
- *Children also miss zinc in their diets*

These results raise the question of the cause of the chronic malnutrition in children who appear to be able to access foods with iron, vitamin A and zinc. Perhaps children cannot consume sufficient beans to meet their iron needs, and perhaps diets are significantly different for children than the global consumption patterns provided by the EICV4 survey (see Table 1). It may be that there is a lack of education as to the importance of diverse diets with sufficient protein for children. Research reviewed did not reveal one cause for the chronic malnutrition paradox and it is recommended that further work be done, in collaboration with other organizations tackling this question, in order to better understand this problem.

***Recommendation**:*

***C**ollaborate with other organizations working on nutrition to continue to investigate the nutrition paradox*

2.4 Nutrition Opportunities

The Cost of Diet analysis in the Burera District identified a number of locally available foods that could meet the nutritional needs of the households given their specific diets and nutrient deficiencies (see Table 2).

Soya beans	Yoghurt	Avocados	*Dodo* leaves
▪ Protein ▪ Water soluble B-group vitamins ▪ Iron, zinc, copper	▪ Protein ▪ Water soluble B-group vitamins	▪ Fat for energy ▪ Fat to absorb fat-soluble vitamins ▪ Water soluble B-group vitamins	▪ β-carotene (Vitamin A precurser) ▪ Folate

Table 2: Foods that offer high potential to improve nutrition for the rural poor. (Save the Children, 2011)

Other potential foods to add to the diet explored in the above study included eggs, rabbit meat, maize (to replace sweet potato), micronutrient sprinkles, orange flesh sweet potatoes (to replace white), and small dried fish. (Save the Children, 2011)

As described above, this landscape analysis focuses on four food types:

1. Dairy
2. Animal products
3. Fruit and vegetables

[10] Severe anemia is defined as <7.0 g/dl of hemoglobin

4. Oilseeds and pulses (specifically beans)

These four types can each contribute to improving malnutrition, by adding variety to diets as well as addressing very specific needs around protein, iron and other micronutrients. In particular, dairy is considered a relatively inexpensive[11] source of protein and micronutrients, animal meat products are rich in protein (although considerably more expensive than milk), fruits and vegetables provide vitamins and minerals, and beans are rich in quality protein, energy, micronutrients and can also provide extra iron and zinc if biofortified varieties are used. (Ugen) These four food types are thus focused on for the remainder of this report and specific opportunities in each area are identified.

[11] One kilogram of fresh milk costs on average 200 RWF, whereas chicken costs 2000 RWF/kg and pork, sheep or beef 1500-1700 RWF/kg. The food poverty line for one adult per day is 288 RWF. (NISR, 2015)

3. AVAILABILITY OF FOOD

3.1 Food Production

Rwanda's agriculture is diverse, and the country grows a wide variety of crops, due to fertile soil and a favorable climate. This allows for two (and in some cases, three) seasons per year (see Figure 9). Rural livelihoods rely on agriculture and most farming families have less than 1 hectare. They generally and traditionally grow a mix of crops, including beans, tubers (sweet and Irish potatoes), cereals, plantains, bananas, and some vegetables. (CAADP, 2013) Agriculture is predominately rain-fed; despite recent government efforts to develop irrigation programs, only 4% of households reported irrigating some of their land. (WFP, 2012) Most farming is done by hand, with only 13.5% of farm operations mechanized in 2012. (MINAGRI, 2013) In terms of geography, tubers and root crops predominate in the west, due to the longer growing periods and drier periods between rains. In the drier east, cereals such as sorghum and maize are grown. Cooking bananas also grow in the east, while beans grow throughout the country. (WFP, 2012)

The Crop Intensification Program (CIP), launched in 2007, has shifted production patterns and contributed greatly to the productivity gains over the last years, largely due to land consolidation and input provision for the focus crops - maize, wheat, rice, Irish potato, beans, cassava, soya bean and sunflowers. For these crops, farmers with contiguous plots synchronize production to improve productivity and environmental sustainability. This program has also increased fertilizer use from 4kg/ha in 2007 to 30kg/ha in 2012. This helps to make up for the fact that 70% of agricultural land is hilly, which has made mainstream industrial agriculture difficult. (MINAGRI, 2013) (World Bank Group, 2015)

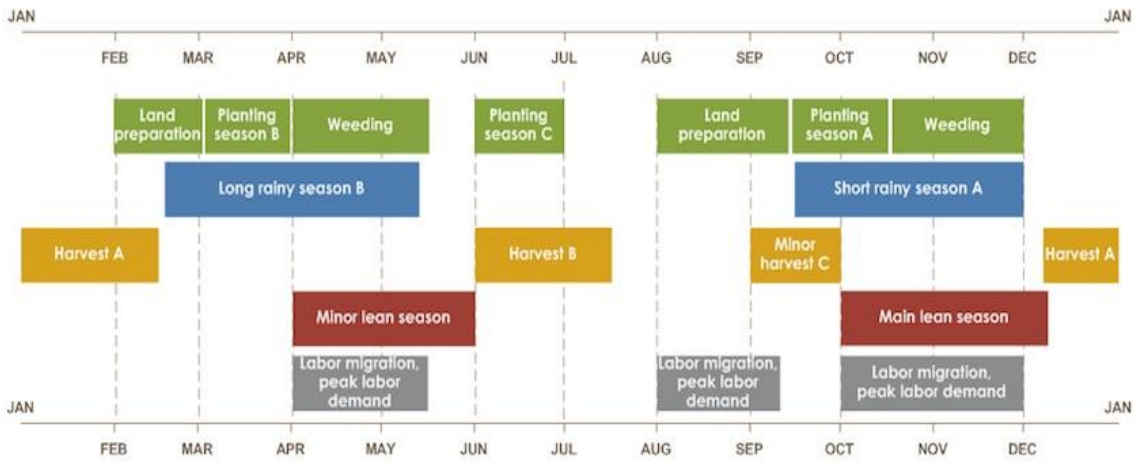

Figure 9: Seasonal calendar for a typical year in Rwanda. (FEWS NET, 2015)

The most important crops in terms of national production volume in 2013 were banana, Irish potato, sweet potato and cassava, each yielding over 1 million MT per year (see Figure 10 and 11). Approximately 1 million MT of fruits and vegetables were also produced that year. At the household level, beans are the most important crop in terms of breadth of production, grown by 90% of farming households, followed by sweet potatoes (45%), maize (42%), cassava (40%) and banana (28%) (WFP, 2012). In terms

of consumption of calories, beans and sweet potatoes are the most important for the poorest Rwandans[12]. (NISR, 2015)

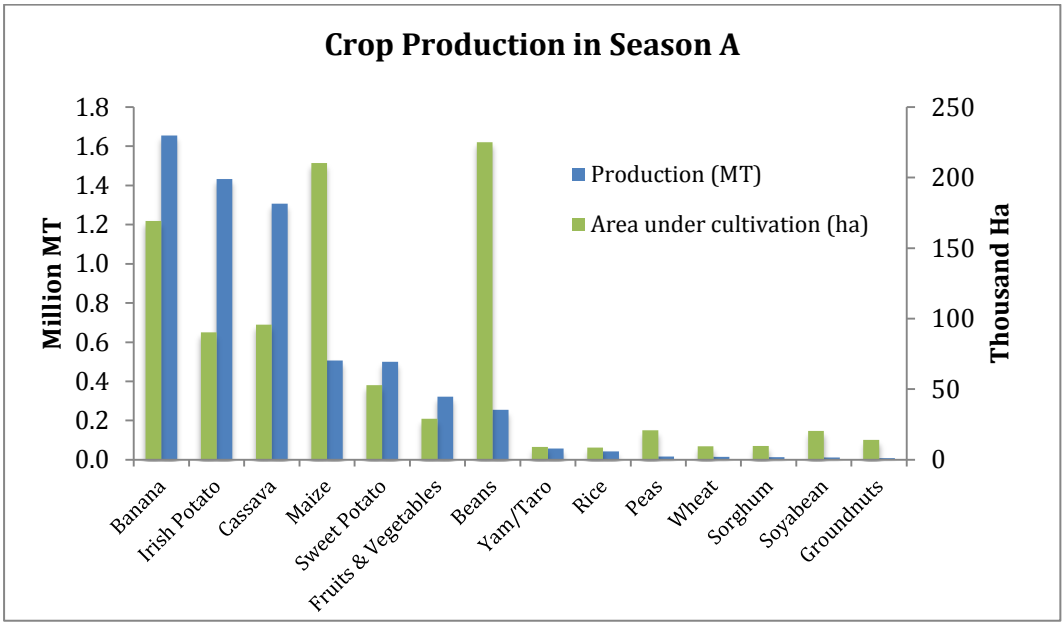

Figure 10: Season A crop production data from MINAGRI 2012/2013

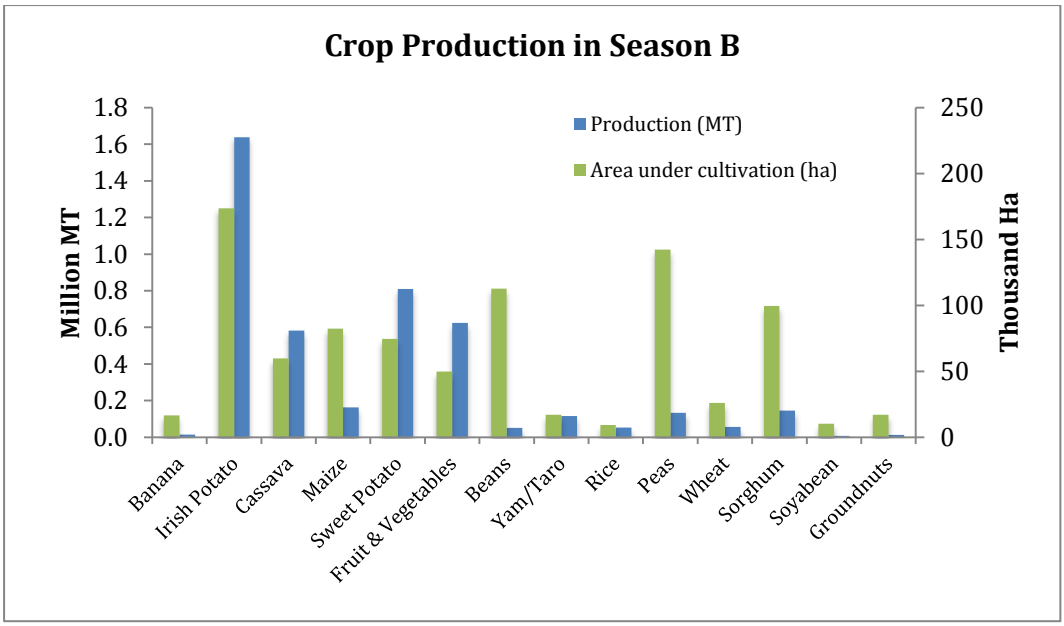

Figure 11: Season B crop production data from MINAGRI 2012/2013

Production has increased across the four theme areas over the past decade. Vegetable production has doubled since 2003, with the biggest gains in tomato, eggplants and cabbage (see Figure 12). In 2013, pumpkins, squashes and gourds made up the majority of vegetable production, with cabbages and tomatoes following. There was significant production increase from 2008 to 2009; this may be attributed to changes in agriculture policies at the time or the global food crisis.[13]

[12] A Food Balance Sheet is not available for the average population

[13] Interviews and desk research were not able to explain this increase

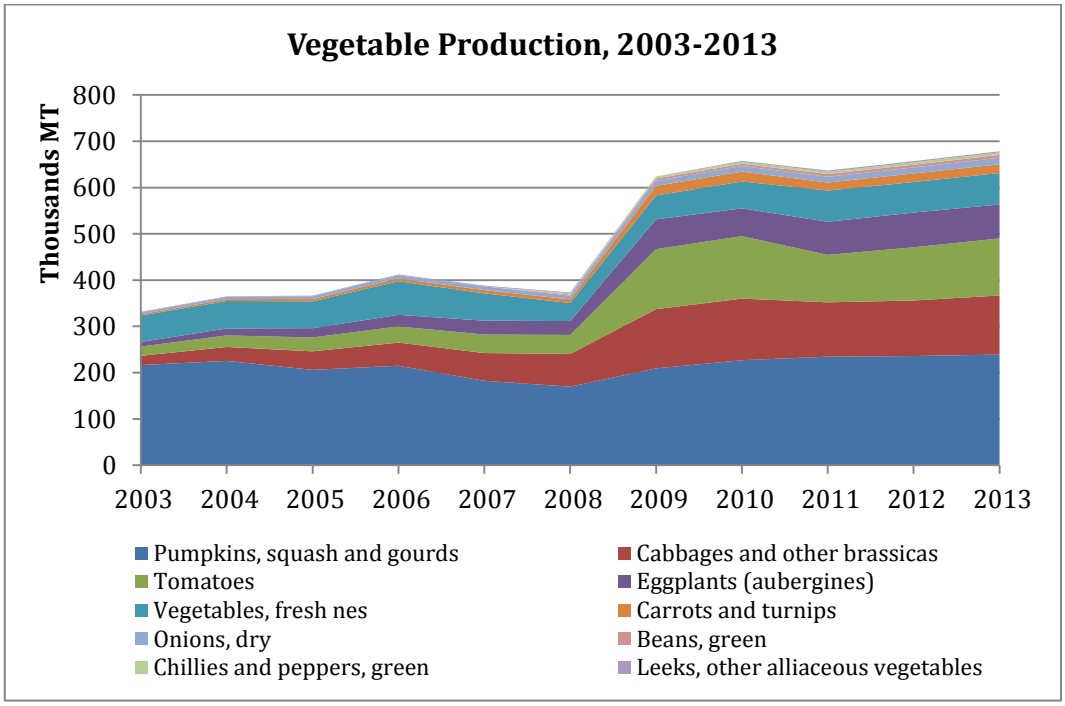

Figure 12: Vegetable production over time in Rwanda. (FAOSTAT, 2015)

Fruit production increased even more significantly than vegetables, almost quadrupling since 2003 (see Figure 13). This increase is mainly due to pineapple and avocado production. Pineapple is used in local processing for juice production, and avocado is both consumed locally and exported. There was a significant increase in production from 2008 to 2009, as for vegetables, perhaps with the same cause[13].

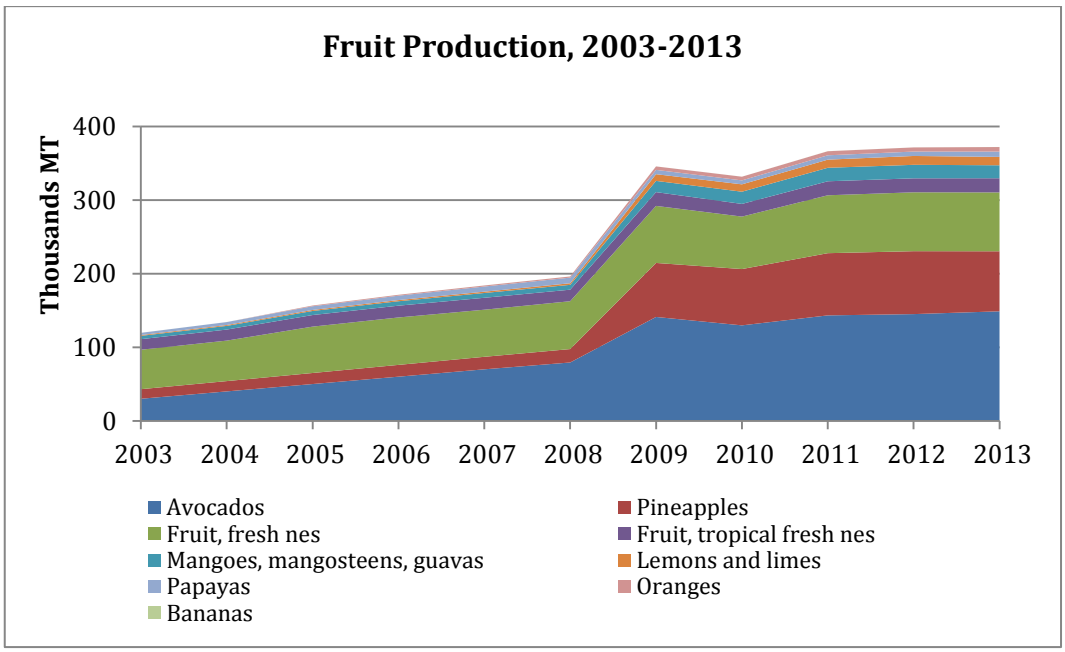

Figure 13: Fruit production (excluding plantains) over time in Rwanda. (FAOSTAT, 2015)

Bean production has steadily increased by on average 20,000 MT each year since 2003 to over 400,000 MT in 2013 (see Figure 14). Beans are also cultivated on the largest amount of land compared to any other crop (see Figure 10 and Figure 11). These numbers do not show the quantity of iron beans produced in recent years, however, by the end of 2013, iron bean seed had been distributed to 714,000 households and it is hoped by the distributor that market share will be 50% by 2018. (Katsvairo) Farmers in the areas visited had planted iron beans for the first time last season, but no national numbers on market share were available.

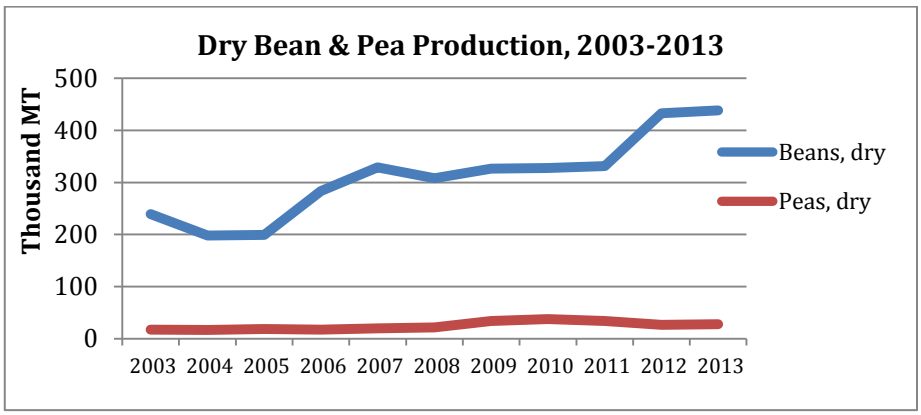

Figure 14: Bean and pea production over time in Rwanda. (FAOSTAT, 2015)

Livestock production is relatively small in Rwanda, but it is becoming more important as demand increases domestically and regionally. Although cattle production contributes the greatest amount of meat, it has stabilized, both in production and in headcount (see Figure 15 and Figure 16). This is likely explained by the Government of Rwanda's zero grazing policy, which has meant farmers must keep their cattle fed and contained on their own land. In addition, the headcount may have stabilized because new breeds of cows were introduced that produced more milk, so fewer cows are needed. (MINAGRI, 2013)

Growth in headcount can be seen for small animals, such as poultry, pigs and rabbits, which has benefited lower income households that cannot afford to feed cattle. MINAGRI data show an increase in poultry and rabbit meat production, although the FAOSTAT production data do not reflect this increase (see Figure 17). These numbers reflect consumer preferences and past production capabilities. Interviews indicate that pork is currently the most preferred meat, as it is relatively new and affordable, due to the ability to purchase smaller amounts at one time.[14] Poultry is also growing, although it is considered a luxury product as it is relatively expensive and has to be purchased as a whole chicken. (Stakeholder Interviews, 2015) Indeed, 70% of all households own some type of livestock. (WFP, 2012)

[14] The available data is not current enough to show this recent demand for pork yet.

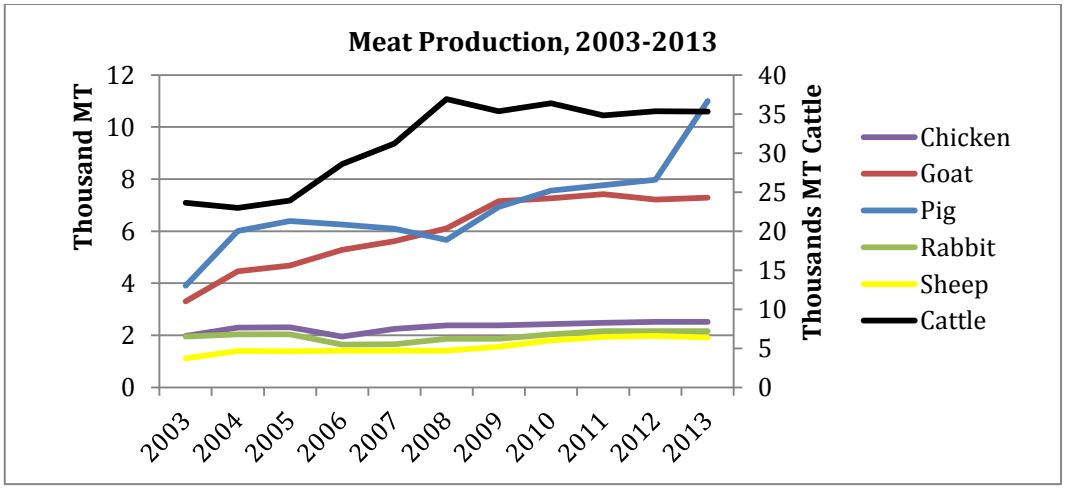

Figure 15: Meat production in MT over time (cattle shown on secondary axis). (FAOSTAT, 2015)

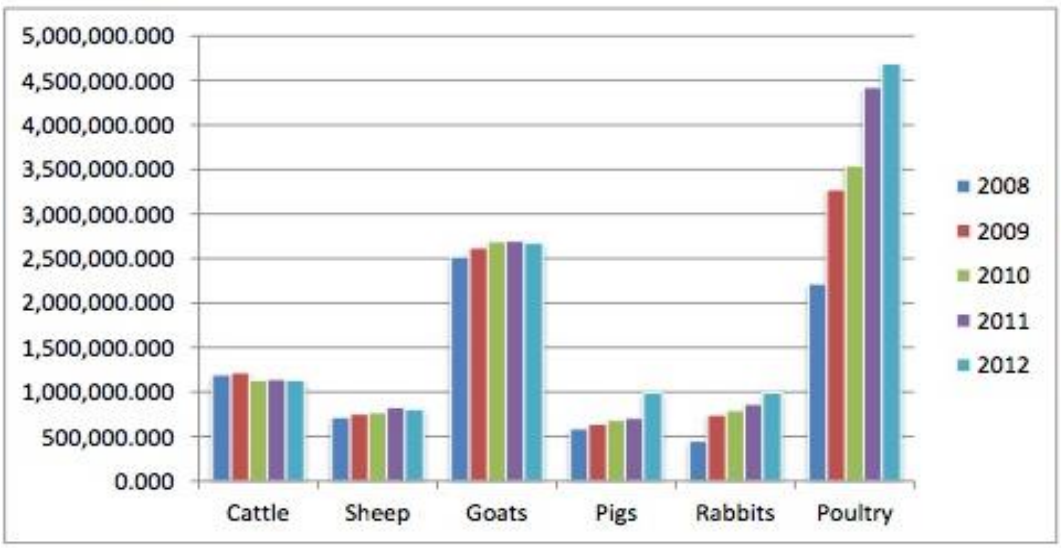

Figure 16: Animal head count for 2008-2012. (MINAGRI, 2013)

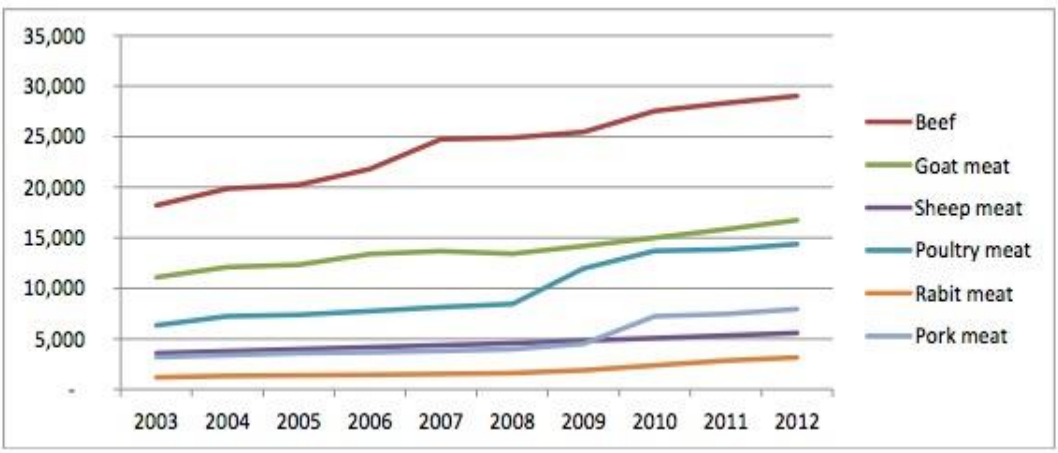

Figure 17: Meat production (MT) according to MINAGRI. (MINAGRI, 2013)

Both milk and egg production have increased over the last decade (see Figure 18). There is now sufficient milk production (~500,000 MT) to meet demand in the country, thanks in part to the One Cow per Poor Family Program (GIRINKA). In fact, a surplus of 100

million liters is predicted to be available in 2017 due to improved dairy cattle and the efforts of the 2013 Dairy Strategy. (MINAGRI, April 2013)

Despite huge increases, egg consumption is still relatively low – less than 700g (or about 10 eggs[15]) per person per year. Avian flu decimated the chicken population in 2005 and an import ban was in effect from 2005-2008, both of which limited the access to chicks as well as eggs during this time. This is expected to increase with growing demand for eggs due to nutrition education campaigns. (MINAGRI, 2013)

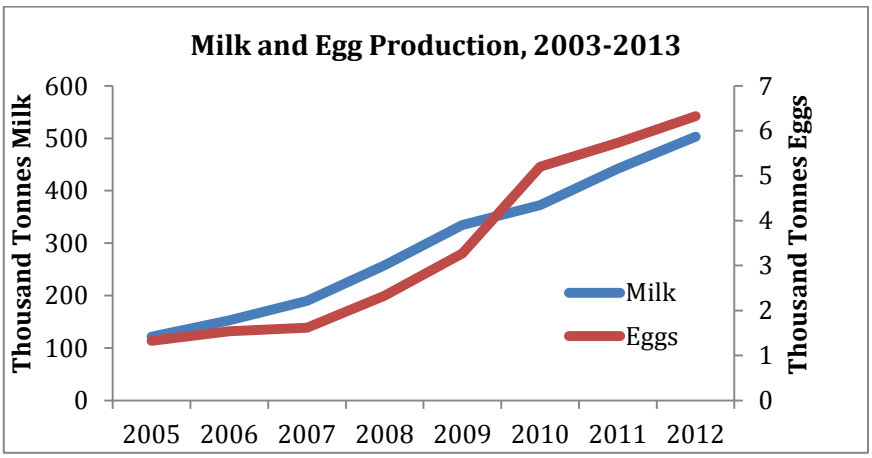

Figure 18: Milk and egg production over time. (MINAGRI, 2013)[16]

3.2 Agricultural Food Production Systems and Value Chains

Agriculture is important throughout the country, and food is produced in every area apart from national parks. There are twelve Livelihood Zones, as shown in Figure 3, producing a large variety of agricultural products. Many farmers grow cash crops for export, while many serve the local and regional markets. The most important value chains for the domestic market and in the four theme areas are highlighted below. Each value chain has its own constraints and opportunities, but issues common to many value chains are discussed in Section 3.4. In general, the value chains are lacking in quality or improved seed and plant material, large amounts of land, storage, high quality processing and cold transportation. (World Bank, 2014)

Dairy

Dairy is produced across the country, with five primary milk sheds with unique production systems. Intensive production (zero grazing) occurs in Gicumbi and Kigali, while extensive production has traditionally occurred in Nyagatare in the Eastern province. Up to 75% of the milk produced remains local in the alternative milk sector (AMS). The remainder is taken to the 61 milk collection centers (MCCs) where processors purchase high quality milk from farmers. The milk amassed at the MCCs goes to the approximately 25 processors in the country, with Inyange Industries being the largest and most modern. Others include Masaka Dairy, Rubirizi Dairy and Nyanza Dairy, which is the only one located outside of Kigali. Most of the processed milk is sold as various types of milk (UHT, fermented or flavored milk), while some is turned into yoghurt, cheese and butter or ghee. (MINAGRI, April 2013; MINALOC, MOH, MINAGRI, 2014) (Rutamo)

[15] Based on an average egg mass of 60g.
[16] FAOSTAT and MINAGRI data differed significantly for milk and egg production. The MINAGRI data was used upon recommendation of interviewed stakeholder in the dairy sector.

Animal Meat Products

Traditional farmers produce most of the meat available in the country; they keep a small number of animals at their households and sell to nearby small markets. Previously, open grazing of animals was common, but now, with the zero grazing policy farmers must keep their livestock contained and fed. Access to animal feed has thus become an important component of any livestock value chain. One pork farmer interviewed mixes his own feed from purchased maize bran, wheat flour and nutrients. An egg farmer just outside of Kigali struggled each day to purchase feed mix of maize, soy and sorghum for his chickens; he was constrained by financing and forced to purchase daily as needed. Many farmers also supplement grains with greens in order to meet the taste and quality requirements of their markets. (Stakeholder Interviews, 2015)

Farmers sell their animals to traders (called 'commissioners') or directly to markets or butchers, depending on the location and type of animal. Wealthy merchants sponsor these commissioners who traverse the rural areas to buy animals and bring them on foot to abattoirs. At the 17 officially registered abattoirs, the merchants buy the animals from the traders and the animals are slaughtered. The meat is transported by pick-up truck to butchers at their own expense, of which four modern facilities exist in Kigali. In rural areas the animals may not be slaughtered at official abattoirs although the meat is still sold at a local butcher. Restaurants, households and supermarkets are the main customers; fresh meat is purchased within hours of preparation. There is only one cold facility for processing meat in Kigali and thus options for distribution of prepared meat are limited and live animal trade remains predominant. (MINAGRI, 2012)

Small-scale farmers dominate production of eggs, with few large-scale production facilities (the largest of which was 10,000 hens in 2013). (USAID - EAT, 2013) Interviews with small-scale farmers indicated that most eggs are marketed directly from the production facility itself (with neighbors coming to pick up eggs) and the remainder are transported to the local market for sale. There was also a local brand available in the Nakumatt grocery store, so there is evidently a supply chain to feed that market.

Fruits and Vegetables

The value chain for most domestic fruits and vegetables is straightforward. Farmers purchase inputs at local agrodealers, or they receive free or subsidized seeds and seedlings from specific government programs. Interviewed farmers indicated most seed comes from Kenya. Production occurs throughout the country, depending on the crop and livelihood zone. Raw produce is sold at local markets via traders and remains fairly local for fragile fruits or vegetables. More robust products move throughout the country, ending up either in Kigali or crossing borders to neighboring markets. There are markets that sell only fruit and vegetables, such as the one in Rwamagana that was visited on the field visit (see Annex II: Market Visits for details of available products). Households buy directly from these local and regional markets.

There is little processing of fruit and vegetables for the local market. Inyange Industries does use local pineapple and passion fruit for their juice production, but sources apple, orange and mango concentrates from abroad. Urwibutso Enterprises also produces juices, jams, hot sauces and wines, although it was not determined whether they source all fruits locally. Kigali Farms processes mushrooms[17] into dried mushrooms and powders. Sorwatom is a tomato processor that is struggling financially, and another company, Mayaga Processing Company, was shut down by the Rwandan Bureau of

[17] Mushrooms are not technically a fruit or vegetable, but a fungus, but they have been included under Fruits & Vegetables here as their value chains and consumption are similar.

Standards for poor hygiene. No other examples of fruit and vegetable processing were seen during the visit to Rwanda.

Oilseeds and Pulses

Beans, although grown throughout the country, are predominantly grown in the Western Province over the two main seasons. The value chain for beans is underdeveloped and mostly consists of small networks of traders with very few commercial buyers (WFP, MINAGRI, schools and prison). (USAID - EAT, 2013) There is little grading or sorting and no packaging or branding. As for other crops, beans are collected by traders from farmers and transported to market. There is currently no differentiation of bean varieties in the value chain – beans of all types are mixed together and traded as mixed beans. One bean processor exists – Rwanda Agribusiness Industries – but they supply food to the prison system only and are struggling with their finances. No other processing takes place except for sorting of beans by female traders into single varieties at the markets. (USAID, 2011)

3.3 Productivity vs. Food Losses

Increasing productivity has been a major goal of the PSTA III and EDPRS II policies on agriculture and economic development. As such, productivity of the agriculture sector as a whole has increased since 2005 for all crops. Yields have increased and land is being used more effectively. The Crop Intensification Program has increased yields and production for the priority crops. (MINAGRI, 2013) That being said, it appears that there are opportunities to increase production by addressing transportation and storage losses, in addition to the focus on yields.

There is little large crop storage available, aside from silos owned by large companies such as Bakhresa and Pembe Flour. This results in crops being marketed almost immediately. A detailed assessment was carried out by USAID for the bean and maize value chains; it showed the storage and transportation losses amounting to 14-15% along the value chains (see Table 3).

	Storage on farm	Farm to aggregation point	Aggregation point to regional center	Storage at regional center	Regional center to Kigali end market	Storage Kigali market	Total
Maize	2.9%	2.5%	2.0%	4%	2.0%	2.0%	**15.4%**
Beans	2.7%	2.5%	2.0%	3%	2.0%	2.0%	**14.2%**

Table 3: Post-harvest maize and dry bean storage and transportation losses from farm to end market. (USAID, 2011)

Another report by USAID indicates that maize storage losses are as high as 17.5%, while post-harvest losses for rice are 13%. (USAID - EAT, 2013) MINAGRI reports that postharvest losses for maize have been reduced to 9.24% in 2013 season A. (MINAGRI, 2013) Given these varying numbers, it can be assumed that post-harvest losses range from 10-20% for crops such as maize, beans and rice that can be stored and easily transported. For fruits and vegetables, a 2009 study saw staggering physical and quality losses from farm to retail market for tomatoes, amaranths, bananas and pineapples. At the farm level, 20-30% of produce was sorted out and discarded before it was marketed. Over 30% losses were seen at the wholesale level and 40-50% at the retail level. (Kitinoja, 2010)

For dairy, a TechnoServe study in 2008 estimated losses of 35% due to spoilage or spillage. (TechnoServe Rwanda, 2008) The current National Dairy Strategy does have an objective to reduce losses in milk collection, but unfortunately does not provide an up-

to-date estimate of losses. Poor road networks between production and the market result in losses due to spoilage from exposure to the sun or shaking on the back of a bicycle.

For eggs, the losses are also not well established, perhaps because of the short supply chain and novelty of the industry. One interview indicated that farmers lose 30% of egg production potential due to sick or under-fed chickens. (Stakeholder Interviews, 2015). Egg production in the country was decimated by avian flu in 2005 and has been recovering from that ever since. Farmers' flocks are very susceptible to diseases so losses could be substantial. (USAID - EAT, 2013)

It is not known if there are specific nutrient losses associated with these losses along the value chain and research did not reveal if storage, processing or even cooking practices affect nutritional value. This question requires further investigation in order to gain understanding of the impact of storage and handling on nutrition along the value chains.

***Recommendation**:*

Investigate the specific nutrient losses along value chains of interest

3.4 Opportunities and Constraints to Food Production

One of the biggest constraints to food production in Rwanda is the cost and difficulty of transportation, despite the small size of the country. Although main roads are well developed and maintained, the smaller feeder roads are usually dirt and create barriers for farmers trying to get their products to market. For dairy and animal meat products, the lack of cold chains adds to the difficulty of sourcing from more rural or remote areas of the country. Opportunities thus exist for the development of innovative cheap transportation (more bicycle or motorcycle transport?), government development of roads or encouraging very local food production that remains on location (although there are other considerations such as the desire to tap into export markets).

The second biggest constraint heard in interviews with farmers and small business owners was lack of access to finance. Small producers are being encouraged by the government to farm specific foods and become entrepreneurs, but they say they are having a hard time gaining access to finance. They need financing for working capital, or to expand or invest in their business. Banks require business registration, collateral and/or history with the bank before providing loans. Most small businesses are not registered and have a hard time accessing the financing they need to run or scale their business. In addition, they do not have the collateral and banking history to fulfill the requirements of the loan. (Stakeholder Interviews, 2015) Part of this could be addressed with business skills training – keeping accounts, management, guidance on dealing with banks. As well, there is a clear need to help these businesses become registered, and perhaps for building the financial case to convince them of the benefits of registering. As discussed below, there are a few organizations providing these services in Kigali, and it is recommended to determine what the gaps are for these organizations. It may be that there simply are not enough services, they are not know to business owners, their

services are too expensive, or simply that they are located in Kigali and these businesses are outside of the city.

For some value chains, such as rice and wheat, access to reliable and high quality raw materials is an issue. Local processors cannot access the type and quality of crops they need in order to produce food for the local market. For example, wheat is imported because the wheat produced in Rwanda is not sufficient and not of high enough quality to produce bread. A USAID report indicated that quality wheat could be produced in Uganda or Tanzania and transported into Rwanda for a lower cost than Rwandan-grown wheat. Rice has been imported from Tanzania and Pakistan because the locally grown rice did not suit local consumer preferences. In addition USAID reported that imported rice could be cheaper than locally grown rice. (USAID - EAT, 2013) For farmers, production inputs such as fertilizers, seeds, and medicines, can also be costly, as these are all currently imported into the country. Animal feed for both dairy and meat can also be difficult to source or afford. In one farmer visit, pigs were fed with an animal feed mix made from imported maize and wheat. (Stakeholder Interviews, 2015) There is an opportunity here to work with large businesses to connect them to farmer groups and cooperatives in order to secure these supply chains. However, there are already a number of NGOs and partnerships in Rwanda working on this. GAIN may be able to provide assistance by connecting these potential partners in the Community of Practice.

With respect to other East African countries, Rwanda has higher costs of labor and production, so imported goods are often more affordable than locally produced goods. In countries like Kenya and Uganda, production and processing benefit from economies of scale and thus costs can be lower. However, as is described below, there are still market opportunities in the region, particularly for the DRC and Burundi, as Rwanda's production is geographically closer to major DRC cities, for example, than that country's production. The implication of this is that any value chain opportunities in Rwanda need to be considered in a larger regional context.

CONSTRAINTS	OPPORTUNITIES
Transportation – costs and difficulties	Develop transportation alternatives Really local production at village level
Difficulty accessing finance	Business development training and basic business skills Education on what it takes to become registered and the long-term financial implications of doing so Financing for businesses that are not yet registered
Access to reliable and high quality raw materials	Connecting large businesses to smallholder farmers and cooperatives
Higher costs of labor than neighboring countries thus imports may be more affordable	*(Be sure to consider regional food production when looking at any value chain opportunities)*

Table 4: General Food Production Constraints and Opportunities

3.5 Trade

Overall, Rwanda has a large formal trade deficit, of which agriculture constitutes 37% of all exports and 14% of imports. Formally, Rwanda is a net importer of food, despite recent increases in production and caloric sufficiency. However, in informal trade, exports exceed imports. This informal trade is estimated to be 23% of total cross-border

trade with Uganda, Tanzania, Burundi and Democratic Republic of Congo. Taking into account the informal exports, Rwanda appears to have a positive trading balance. (WFP, 2012) (USAID - EAT, 2013)

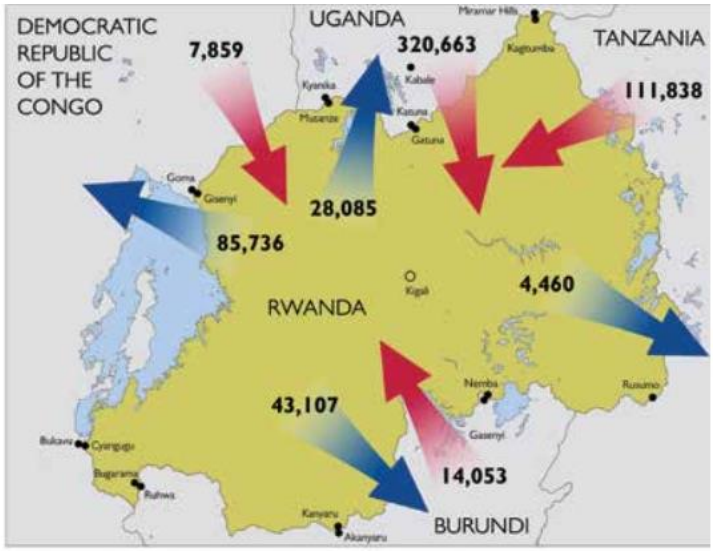

Figure 19: Movement of six CIP agricultural commodities across borders from 2009-2012. (USAID - EAT, 2013)

	Imports	Exports
Formal	Maize grain Rice grain Wheat Cassava Chicken hatchlings Cotton, palm oil, sugar Seed, fertilizer	Livestock (live cattle)
Informal		Livestock (sheep, goats, cattle) Meat Beans (green) Maize meal Wheat flour Cassava flour Eggs Coffee, tea

Table 5: Major food and agricultural products traded informally and formally in Rwanda. (USAID - EAT, 2013) (WFP, 2012) (FAOSTAT, 2015)

Key imports are cereals (maize, rice, wheat), inputs (seed & fertilizer), cassava, chicken hatchlings and commodities such as cotton, palm oil and sugar. Other specialty foods, such as mangoes and apples, are imported for specific purposes (ie. Inyange imports these for their juices). Rwanda also imports nearly all other consumer goods and products, as there is little local manufacturing. Most of these imports come through formal channels. Rice is imported from Tanzania as local production is not sufficient and does not meet taste preferences and quality standards. Rwandans have a particular preference for rice from Tanzania, and they also import from Pakistan. For maize, the quality and quantity grown have not been sufficient, and since Tanzania usually has surplus production, importing makes sense. Other imports of note include sorghum and animal oils, both of which were greater than 10,000 MT in 2012. (FAOSTAT, 2015) This

reliance on imports for some key staple foods means that the cost of food and the food basket is often driven by external forces, which causes food insecurity, particularly for the rural poorest who still buy a large portion of their food as they have no land to on which to produce food. The government is attempting to mitigate this by producing more staples, such as rice, locally, but this still needs to be taken into consideration when calculating affordability and availability of foods.

Informal trade across neighboring borders is more important for exports from Rwanda. Much of the cereals that are imported are processed in Rwanda and cross back over the borders as maize, wheat and cassava flour. This processing is likely done by the large millers such as Bakhresa, Minimex and Pembe Flour, after which it flows to neighboring countries with high demand for flour. Other products, such as green beans and eggs, also flow informally out of Rwanda. Stakeholder interviews indicated that this cross-border trade is predominantly resulting from high demand from neighboring countries, so prices are higher just across borders into the DRC and Uganda. Most of the fish harvested in Lake Kivu seems to flow to DRC and Uganda as well, even if fished by Rwandans, due to higher prices abroad. This means that even though there may be local lack of supply, the food still flows out due to market demand elsewhere. This appears to be a pattern in general from rural to urban and from rural to export routes. (Stakeholder Interviews, 2015)

Livestock cross-border trade is considerably higher than for any other food – more than 25% of production is traded compared to less than 5% for other foods. In addition, livestock flows out of the country in both formal and informal channels, unlike most other exports, which are largely informal. In 2012, FAO recorded over 21,000 goats, 13,000 cattle and 2000 sheep leaving the country. In the same year, about 7000 cattle entered the country. However, the USAID EAT Cross-Border report points out that animal trade is very mobile and does not necessarily take place at the recorded border crossings. Likely the value of informal animal trade is much higher than reported. For meat, volumes leaving the country were small and informal, although made up 20% of the value of live animal exports. (FAOSTAT, 2015) (USAID - EAT, 2013)

Dairy appears to be a unique and potentially highly demanded export product as Rwanda milk and dairy have a renowned taste and are in demand in Burundi and DRC. The recent focus on milk production has resulted in reliable and known-quality dairy products that are appreciated throughout the region. As there is a surplus of milk production in the country, this is potentially a way to strengthen the value chain further. (USAID - EAT, 2013)

This import/export story has some serious implications when considering affordability and availability of food in the country. For the most part, if producers can get higher prices for their products by exporting, then they will export. With export markets having higher populations and higher demand (DRC and Uganda in particular), with close proximity to Rwandan production, this appears to often be the case. Therefore when looking at intervening in any value chain in Rwanda, an assessment into the value chain and product availability and prices on a larger regional basis needs to be done. For pork, for example, the demand, supply and prices in neighboring countries strongly impacts the Rwanda market and needs to be considered when looking at any local interventions. This may also mean that any interventions that are simply aimed at increasing production or introducing a new product to market may not guarantee an increase in local consumption. These products may simply flow out of the country. With an increase in local supply, the local prices may actually drop and there may be an even greater incentive to export to countries with limited supply and higher prices. It is key to

consider the greater markets when looking at any value chain in Rwanda, particularly for Uganda and DRC.

***Recommendation**:*

Look closely at the regional markets, particularly DRC and Uganda, when assessing the Rwanda market for nutritious foods

4. ACCESS TO FOOD

A wide variety of foods was found in markets during the visit to Rwanda (see Annex II: Market Visits for full details and prices, where available). In general, a wide variety of fruits and vegetables was available, despite it being the start of the lean season. The Kigali market had the most selection, and although it did not specifically sell flour, dairy or meats, these are available in different markets and kiosks in the city. The Rwamagana market was specific for fruits and vegetables so no other foods were available there; customers need to attend other markets and buy from local butchers for other products. A wide variety of food was available in Ntyazo as well, although there did not seem to be any fortified products, such as flours or iron beans (although farmers are planting iron beans). There was also a limited selection of dairy products (besides fresh milk) available outside of Kigali.

The most recent Integrated Household Living Conditions Survey (EICV4, 2013/2014) calculated the minimum food basket cost per person as 105,064 RWF per year and the total spending (non-food and food) as 159,375 RWF per year. They defined extreme poverty as those falling below the food basket cost (or poverty line), and this entails 16.3% of the population, while 39.1% of the population falls below the total spending (or total poverty line). These statistics give an indication that for a large proportion of the population, food is not affordable, although these numbers are trending downwards as shown in Figure 20. (NISR, 2015)

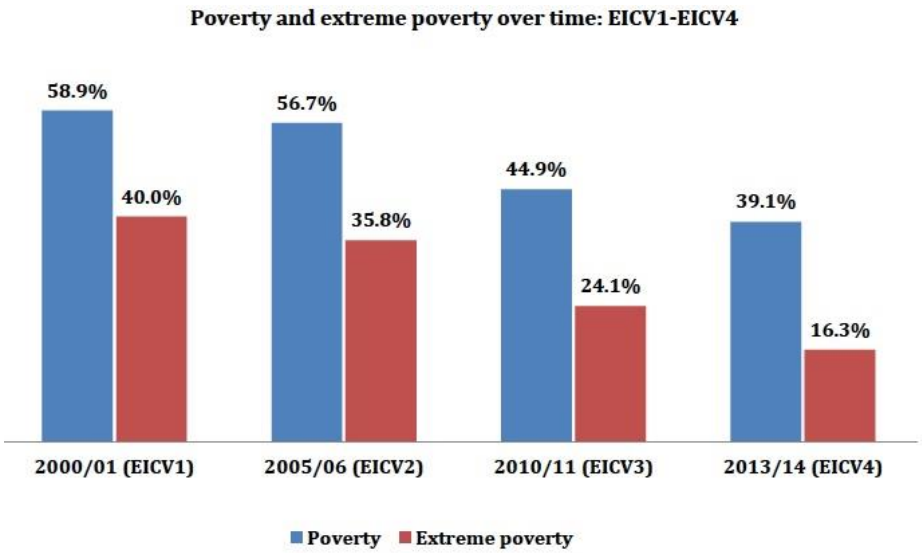

Figure 20: Distribution of Rwandan population identified as poor and extreme poor: EICV1-EICV4 (NISR, 2015)

Given a food basket cost of 105,064 RWF per year, the daily cost is 288 RWF per person. The average household size is 4.6 persons, thus food spending for a household is 1324 RWF per day. Expert interviews suggest daily incomes are 700-1000 RWF per day, thus a household with two earning adults would barely have enough income to purchase food for the family. For example, 4kg of Irish potatoes costs 1000 RWF, and then on top of that there are costs for salt, oil and charcoal for cooking, etc. Thus even a basic staple food is almost too expensive for an average household. (Stakeholder Interviews, 2015) (NISR, 2015)

4.1 Food Logistics

Production of food occurs throughout the country, and the majority of it is transported to minor or major markets. In many cases traders arrange for transportation of crops from farms to markets; often women are the traders and they hire men to transport their goods by bicycle to market. Larger traders buy from these local markets and rent a vehicle to transport it to Kigali or another area. Most food products exit the country informally, crossing borders via bicycle or vehicle. Major border crossings are found in the west of the country, with the eastern portion of the DRC, which is Rwanda's largest market. There is also significant movement of food to Burundi, Uganda and some to the remote northwestern region of Tanzania (see Figure 19). (WFP, 2012) (USAID - EAT, 2013) This highlights that food is moving to these poor areas of the country, it just is not staying there because of higher demand (and higher prices) in export markets.

For dairy, farmers may take their milk themselves to MCCs, or, more commonly, traders transport the milk for them to the MCCs. There are milk traders or bike boys who collect milk from the farmers or MCCs and then travel around communities selling it by bicycle. These MCCs are mostly owned and staffed by farmer cooperatives, although Inyange Industries does manage and staff a small number of them. From these, companies transport the milk to their processing centers. For example, Inyange arranges for transportation from MCCs to their processing facility in Kigali. In some cases, the milk is transported from their MCC to a chilling center and from there it is put in refrigerated trucks and then transported to the processing facility. Some farmers in the Northern Province actually have their own chilling unit with their own trucks for transporting their milk to market. After collection, milk moves to retail milk bars in Kigali, shops, kiosks and supermarkets, or directly to consumers. (Rutamo) (Stakeholder Interviews, 2015)

The majority of meat is moved around the country (and across borders) as live animals. Farmers sell their livestock to traders or directly to butchers at rural markets. If via traders, then the traders move (by foot for large animals) the live animals to the abattoir themselves, where merchants take over their purchase. There are 17 registered abattoirs in the country, only one of which in Kigali is modern and has cold storage facilities. Animals are also slaughtered informally in rural areas. Once slaughtered, meat is sold within a few hours from a butcher. (USAID - EAT, 2013)

4.2 Access to Market

According to the CFSVA and Nutrition Survey 2012, in which respondents were asked to recall their consumption and purchases over the past week, Rwandans purchase 65% of their food, and produce the other 30% for home consumption. In practice, urban Rwandans produce only 10% of their own food while their rural counterparts produce 33%. Markets are the main source of rice, groundnuts, fish and meat. Half of poultry, maize and fruits are purchased at the market and own production supplies the other half. Cassava, sweet potato, banana, beans and peas, cassava leaves and sunflower are sourced from own production. (WFP, 2012)

Access to markets can be difficult for a rural Rwandan as only 6% of households have an established market in their village. There are currently 520 markets, of which about 240 are roofed, paved and have proper facilities; the remainder are ill equipped and very well may be under-utilized. (Nkurunziza, 2015) Without a market, the walk is on average 75 minutes to another village with one. In Rulindo district, this walk is almost 2.5 hours. However, 71% of Rwandans can access a main road with public transportation within 5km from their home, which in theory can bring them to larger

markets, but this entirely depends on the level of rural bus service in their location. (WFP, 2012)

In secondary cities and larger villages, there is generally a large weekly market, as well as smaller daily markets. These larger markets usually take place in government built structures specifically for that purpose. In addition, there are small kiosks and shops that may sell processed or fresh food. Animal meat products can be found at local abattoirs and butchers, or purchased directly from the farmer for eggs and poultry.

In Kigali, there are numerous types and sizes of markets, ranging from small informal kiosks or shops to large supermarkets such as the Kenyan chain Nakumatt. Large markets such as Kimironko Market are major end markets for Rwanda's production. Inyange Industries supplies milk to Milk Zones in Kigali, which are small shops owned by individuals that provide fresh milk to the local neighborhood.

4.3 Food Access Channels for the Malnourished

Apart from the markets mentioned above, and own production, there are very few other options for the malnourished to access food. In many communities there are community health volunteers that weigh children every month and refer them to a community health center in cases of acute malnutrition. In some cases, these children are provided with milk, corn-soya blend (CSB)[18], or other nutritious high-energy foods, and could be referred to a hospital if malnutrition is severe. The same may also be true for moderate malnutrition, depending on the health services in the area. However, for chronic malnutrition, little is available in terms of food access. According to interviewees, in most cases a recommendation is provided for foods to add to the child's diet, but food is not handed out.

There are also three school feeding programs that provide nutritious food to school children to tackle malnutrition, create markets for local food, and improve education systems. The One Cup of Milk per Child, Secondary School Feeding Programme and WFP school lunch program provide healthy food to students. Since attendance at primary school for the first three years of education is mandatory, these programs in theory reach all children and can help to provide nutritious foods to malnourished children. However, since the first 1000 days are the most crucial, these programs are actually addressing malnutrition after the most important years of development. (Habimana, 2014)

[18] A project is being developed to produce CSB locally, but it is not being done as of yet

5. BUSINESS LANDSCAPE

5.1 General Overview

In 2013 a study was conducted to map Rwanda's largest businesses (over US$1 million in revenues), resulting in a description of 47 companies, of which about half are involved in agriculture. Three agriculture companies had annual revenue above $20 million, 5 firms between $10-20 million and 4 with $5-10 million. This study categorized firms with over $5 million annual revenue as large, and noted a clear change in the sector at this transition. Beverage manufacturer, Bralirwa, was by far the largest firm, with turnovers of $130-135 in 2010-11. The authors consider this to be an exception due to its history in the country and the support of the Heineken Group. The next largest agriculture firms, at the time of this study, were Pembe Flour Mills (wheat), Bakhresa Grain Mills (wheat), Rwanda Mountain Tea (tea), Rwacof (coffee), ICM Rwanda Agribusiness (rice) and Coffee Business Center (coffee). Missing from this top list is Inyange Industries, which now claims to be the second biggest company in Rwanda, and the largest locally owned company. Its turnover was $10-11 million in 2010-11. Also missing is the large maize miller Minimex, which had a turnover of $4-5 million in 2010-11, although the 2012 annual report shows the company is operating at a loss. (Minimex, 2012) (Gathani & Sotelinga, 2013)

Many of the largest businesses are owned by large groups (Crystal Ventures Group, Horizon Group and Rwanda Investment Group) that are driving the growth in agribusiness, while the medium firms owned by individual investors (turnover of $1-5 million), are finding it difficult to compete. There are approximately 5 agribusinesses of this size and they face very different constraints than the large group-held companies. According to the study, they have a harder time accessing long-term finance, struggle to find skilled workers, are less specialized and do not benefit from economies of scale, which makes problems of electricity and transport costs, irregular demand, and securing raw materials worse. (Gathani & Sotelinga, 2013)

In 2014 the Rwanda Establishment Census calculated that there are approximately 154,000 establishments in the country, including sole proprietorships, limited companies and non-profits. More than 96% of these are sole proprietorships and 99% are owned entirely by Rwandans. The huge majority of these are micro-businesses (90%), with 1-3 workers, while small businesses (4-30 people) make up 8.7%, medium 1.1% and large 0.2%. Approximately 7% of these enterprises are considered to be in the formal sector. Only 751 of the establishments operate in agriculture, forestry and fishing, which highlights the small number of business activities associated with agriculture. However, a large number of establishments (50.9%) are related to wholesale and retail trade, which would include food trade. (NISR, 2015)

While all establishments are required to register at a number of agencies (Sector, District, Social Security Fund, Rwanda Development Board and Rwanda Revenue Authority), the Establishment Census found that only 24% are registered with Rwanda Revenue Agency, while almost 80% are registered at the Sector level. Most of the micro and small agriculture businesses interviewed during the visit to Rwanda indicated they were not yet registered and were either in the process or planning to register, primarily as a means of accessing finance and potential partnerships. (NISR, 2015) There is thus an opportunity to help these companies get formally registered and be able to access formal assistance such as bank financing or formal markets.

OVERVIEW:

- *Dominated by micro-enterprises (90%)*
- *SMEs make up 9.8%*
- *Handful of large group-owned businesses driving growth*

5.2 Key Players

As referred to throughout this report, there are a few key commercial players in the relevant value chains (see Table 6).

Value Chain Theme	Company
Dairy	Inyange Industries Masaka Dairy Rubirizi Dairy Nyanza Dairy (Laiterie de Nyanza)
Animal products	Urwibutso Enterprise
Fruits & Vegetables	Inyange Industries Kigali Farms Urwibutso Enterprise Fresh Pack (export focus) East African Growers (export only) Shekina Enterprises (export focus + dried cassava leaves) Sorwatom (not currently operating)
Oilseeds & Pulses	Soyco Rwanda Agribusiness Industries Farmfresh Company

Table 6: Key companies in the relevant value chains.

In addition, a number of small businesses were interviewed that may be of interest for the Marketplace for Nutritious Foods (see Annex III: Interviewee List & Contact Details – Aldo Eggs, macadamia farmer, pork farmer). These businesses were identified by GAIN's Marketplace Manager while attending conferences and workshops on agriculture and nutrition in Rwanda. Other small businesses certainly exist and could also be identified via working groups, conferences and workshops. These would likely benefit from attending the Community of Practice, if they were aware of it and could afford to attend. Some interviewees were aware of various training sessions and conferences taking place in Kigali, but could not justify the travel expenses to attend these sessions. There may be opportunities here to support these business owners to access opportunities such as these.

5.3 Existing Relationships and Business Models

Within food production a handful of examples of outgrower relationships or business models connecting larger businesses to smaller ones or farmers was identified.

Kigali Farms has established relationships with its mushroom tube customers/growers. They have 3-month contracts with their tube customers in which those customers agree

to sell back their mushrooms to Kigali Farms over the three-month production cycle of the mushroom tube. Kigali Farms buys back the production from their tube customers, guaranteeing that they have a market for the production. Kigali Farms combines this with their own production in order to meet their mushroom customer needs (some processing, some fresh mushrooms). Kigali Farms provides its tube customers with training and education on growing the mushrooms, as well as encouraging own consumption to reap the benefits of the nutritious product. At the time of the interview, 90% of their customers were based in Kigali, as mushrooms are ideal for smaller spaces and the prices for mushroom products are higher in urban areas than in rural areas.

Inyange Industries has contracts with farmer cooperatives to supply raw materials such as pineapple and passion fruit. They provide these cooperatives with GAP training and extension services, in addition to a guaranteed market. For their dairy business, they do manage and staff a small number of Milk Collection Centers, as well as work with a large number of cooperative-run MCCs throughout the country. At the MCCs they purchase quality milk that the farmers can provide. They also provide training to dairy farmers so as to obtain high quality milk and reduce rejections.

Bramin Farm is a joint venture between Bralirwa and Minimex in Eastern Province that produces maize and soya beans on 250 ha. It is one of the first modern and large scale farms in Rwanda, producing maize that Minimex turns into grits for Bralirwa. The farm employs locals and supports them with health and educational activities in addition to providing incomes. One of the main goals of the farm is to increase knowledge transfer to smallholder farmers surrounding Bramin. (Braliwra & Minimex)

Another example is Kabuye Sugar Works that sources sugar cane from 850 outgrower farmers and hopes to expand this to 1500 outgrowers who can supply the factory on 3000 ha. Soyco Mount Meru is partnering with the Clinton Development Initiative to scale up soya bean production in the country and process it into cooking oil. Soyco will provide inputs to and source from 30,000 farmers, in addition to employing staff on its commercial farm. There are likely also other outgrower examples in other export crops like coffee, tea, macadamia nut, avocadoes, etc. which were not sought in this analysis. (Clinton Foundation)

5.4 Examples of Supplying the Base of the Pyramid (BoP)

Few examples were found of supplying nutritious foods to BoP consumers. The main innovative example is partnership that Inyange Industries has with supplying bulk milk to Milk Zones, which are located throughout Kigali. At these locations, milk is sold in bulk format for a reduced price and consumers are required to bring their own containers. Milk is sold for 400 RF per liter, considerably less than the 1000 RF/L for Inyange's packaged milk in grocery stores. Milk can be purchased at any volume, so if a customer only had 100 RF, they can buy 250mL of milk if desired. This innovative solution allows BoP customers to access the same high quality milk, without paying for the value addition of packaging that they do not require. Inyange Industries currently only supplies Milk Zones in Kigali City, but they aim to help establish at least one in each province. They are opening a new factory in the northwestern area of the country that will allow them to more easily provide products in rural areas, although they are still struggling with transportation and the logistics of doing so.

Outside of food, there are a number of organizations aiming to supply the BoP. The mobile phone company, MTN sells credit in small amounts from small kiosks throughout the country. Agents for MTN sell the credit, reaching the BoP and creating opportunities for livelihood. NOTS Rwanda sells solar lamps in partnership with a telecom company –

offering affordable alternatives to kerosene. Inyenyeri has a business model that involves selling fuel pellets but giving away stoves (the 'razor blade' model) via a fuel supply and service contract made with their customers.

There are numerous other examples of supplying the BoP from around the world. They range from Danone's room temperature yoghurt in South Africa (Danimal), branchless banking via one-stop kiosk shops from Nedbank in South Africa, M-Pesa from Safaricom in Kenya, to CEMEX's sustainable construction solution in Mexico. However, there is no 'one size fits all' approach for creating successful BoP products. All of these examples are a result of careful understanding of customer's needs and behaviors, and most required significant shifts in how the large companies thought about BoP customers. In Rwanda, certainly there are more opportunities for large companies to serve the BoP, but this will require creativity, a long-term approach and careful consideration of customer's needs and behaviors. An excellent reference on this subject is the book New Markets, New Mindsets (2012) by Tashmia Ismail et al and Dr. Ismail assists large companies in understanding these markets in South Africa.

5.5 General Enabling Environment for Business

Rwanda is known for its relative ease of doing business, compared to other African countries. In 2015 it ranked as 46th in the world, with only Mauritius and South Africa ranking ahead in Sub-Saharan African countries. The next closet country is Ghana, which is ranked 70th. There is a low tolerance for corruption and a highly structured government. Investors feel that this governance and the regulatory framework are key strengths of Rwanda. (World Bank)

However, there are also challenges to investing in the country. The domestic market is relatively small compared to its neighboring countries, although much of it is untapped. The costs of labor, energy and taxes are reportedly higher than in other East African countries, which adds to the costs of business. Despite being a small country, transportation and infrastructure are constrained. There is also a lack of skills and land for operations. It is also more expensive or difficult to access overseas export markets without a seaport. (United Nations Conference on Trade and Development, 2012)

6. FINANCING LANDSCAPE

6.1 General Financing landscape: Access to Finance

According to the Rwanda Development Board, 72% of Rwandan adults are financially included, with 42% in the formal financial system. Rwandans access finance through commercial banks (usually in a group), microfinance institutions and through SACCOS such as the Umurenge SACCOS (of which 22% of adults have and are more likely to be actively used than any other product). In 2012, 52% of Rwandan adults accessed some sort of credit, although most of that was informal, such as store credit. FinScope suggests that formal credit mechanisms are not used not because of lack of access, but because of consumer attitudes towards debt. Indeed, physical access to financial institutions is not considered a barrier to adoption as more than 90% of Rwandans live within 5km of a formal institution. (FinScope, 2012)

For businesses, access to finance can be easier, particularly if collateral is provided. Large group-owned businesses are often able to access long-term finance from, for example, the IFC, which individually owned or smaller companies are not able to do. Banks continue to be reluctant to provide financing to SMEs, or they have requirements that are impossible for many small companies to meet. This may be because, in general, they are less profitable, have fewer assets and have more constraints. (Gathani & Sotelinga, 2013)

However, the enabling environment for SME lending is described as one of the best in Sub-Saharan Africa. There is a strong legal framework for creditor's rights and the financial infrastructure has dramatically improved. There is now a framework for secured transactions in both movable and immovable assets as well as a private credit bureau, among other initiatives, that have improved the general lending environment for SMEs. (Berg & Fuchs, 2013)

6.2 Key Players

There are a growing number of commercial (9) and microfinance banks (3) now in Rwanda (see Table 7). Five of the commercial banks indicate that they provide financing to SMEs (BPR, Cogebanque, Ecobank, Guranty Trust, and KCB) and BPR and Crane Bank have loan products specifically for agriculture borrowers. There are also 490 institutions in the microfinance sector, most of which are SACCOS.

Commercial banks	Microfinance banks
Access Bank Rwanda	AB Bank Rwanda
Bank of Kigali	Agaseke Bank
Banque Populaire du Rwanda SA (BPR)	Unguka Bank
Compagnie Générale de Banque (Cogebanque)	Urwego Opportunity Bank
Crane Bank Rwanda	Zigama CSS
Ecobank	
Equity Bank (Rwanda)	
Guaranty Trust Bank (Rwanda)	
I&M Bank (Rwanda) - Formerly Commercial Bank of Rwanda (BCR)	
Development Bank of Rwanda (BRD) - Owns 100% of Housing Bank of Rwanda (Banque de l'Habitat du Rwanda) (BHR)	
Kenya Commercial Bank (KCB)	

Table 7: List of commercial and microfinance banks operating in Rwanda.

There are also a handful of large private domestic investors that largely were responsible for privatization of government entities after 2005: Crystal Ventures, Rwanda Investment Group, the Horizon Group and Rwanda Mountain Tea. Together these groups are responsible for 15% of total manufacturing and agroprocessing output. The Rwandan Social Security Board is the pension provider in the country and is an institutional investor. There are also foreign investors, primarily from Kenya, Uganda, Belgium, Australia and the United States. In 2013, the largest of these included the Heineken Group (Netherlands), Unibra (Belgium), Madhvani Group (Uganda), ICM Agribusiness (Australia), Pembe Flour Mills (Kenya), Bakhresa Group (Tanzania), Dillux (Kenya) and individual investors Mr. Mansell (Netherlands) and Mr. Dakik (Lebanon). (Gathani & Sotelinga, 2013)

Business incubators are beginning to become established in Rwanda as well. These provide access to training, coaching, mentorship, and shared spaces as well as financing. At least five were found during the research (see Table 8). There are opportunities to support these organizations – either by filing in gaps, referring potential businesses to them, or even offering similar services if they are not able to meet all demand. It is recommended to investigate these services further to determine if there are sufficient services being offered and it's just that businesses aren't accessing them, or if there is insufficient help available.

Business incubators	Focus
Rwanda Development Board (RDB) – Business Development Centre	Service, ICT, Tourism, Export
Rwanda Business Accelerator	Business accelerator program
The Beehive	Education
Think	Technology
Impact Hub Kigali	Social Impact

Table 8: Incubators operating in Rwanda

Finally, there are also a growing number of platforms for investment in African countries. Grow Africa is a platform that is bringing together investors and governments to develop agriculture in Africa, which has been responsible for $1.7 million in

investments reaching 150,000 smallholder farmers since 2011. (MINAGRI, 2013) (Grow Africa)

6.3 Opportunities and Challenges for Financing SMEs

From the banking sector's perspective, SMEs are a risky investment and thus banks place restrictions on loans to them. For example, KCB provides SME loans to registered businesses with collateral, with insurance an extra requirement for farmers, which is often prohibitively expensive. These loans are up to 200 million RF (approximately $270,000 USD at time of writing). They only provide financing to existing businesses with track records (and not start-ups), and often require interviews and site visits to verify the business' operations and finances. These requirements are in line with the risks that the banks have to take, however, they mean there are considerable barriers for most SMEs in the country. (Stakeholder Interviews, 2015) This highlights the importance of assisting businesses to register and develop good financial records and management. This ties in with the need to offer business training and development for these small start-ups.

One major barrier is that Rwandan banks find SMEs are reluctant to transact through the banks themselves, and thus do not build up financial history with the banks or have records that are reliable. The banks also find that SMEs have poor quality financial statements and business plans, with an overall lack of business skills. Finally, most SMEs lack the collateral that banks request. (Berg & Fuchs, 2013) Interviewed SMEs and micro-businesses confirmed that access to finance is a large barrier. For many, this first has to do with their informal status and lack of financial accounts and records. Others would prefer not to use banks for financing, although it wasn't clear what they thought the other options were aside from government or grants. Again, there is an opportunity for business support and training. One specific opportunity could be developing a tool that shows the financial benefits of registration and transacting through banks for small businesses.

That being said, a 2013 World Bank study highlighted that Rwanda is actually providing a high amount of lending to SMEs, relative to other Sub-Saharan African countries. In Rwanda the share of SME lending compared to overall loans is 17%, while in Kenya it is 17.4%, Tanzania 14%, South Africa 8% and Nigeria 5%. They found that most banks in Rwanda do lend to SMEs, likely due to high competition and foreign competitors. KCB mentioned that banks move quickly in Rwanda and are thus able to innovate, applying models that work well in other markets (such as Kenya) in order to gain market share. (Berg & Fuchs, 2013)

KCB also provides micro-loans of up to 3.5 million RF (~$4800) to groups without the collateral requirement. In this case, the group guarantees that the borrower will pay back the loan. According to KCB, this is functioning well and they have a zero default rate. The relationships and trust built into the group assure that loans will be paid back.

CONSTRAINTS	OPPORTUNITIES
• **Poor quality financial statements and business plans** • **Lack of business skills** • **Informality and reluctance to transact through banks** • **Lack of collateral**	• Business development training and basic business skills • Education on what it takes to become registered and the long-term financial implications of doing so • Financing for businesses that are not yet registered

Table 9: Constraints and Opportunities for SME funding

7. ENABLING ENVIRONMENT FOR NUTRITION

There is a strong desire by the government and organizations to improve the nutrition situation in Rwanda. The Government of Rwanda has had a strategy to address malnutrition since the adoption of the country's first National Nutrition Policy (NNP) in 2007. Since then, nutrition has become a strong component of the national agenda. This section describes the current government policies, civil society actors and how they are working together to tackle malnutrition in Rwanda.

7.1 Government

Tackling malnutrition is a high priority for the Government of Rwanda, and as such nutrition is included in policies and action plans across sectors and from national to district levels. In general there appears to be strong collaboration and coordination across the relevant ministries and sectors at all levels of government.

The nutrition policies in Rwanda flow out of other overarching strategies for socio-economic development. Vision 2020 is the national policy document that aims to transform the country into a knowledge-based middle-income country with a diversified, integrated, competitive and dynamic economy. Poverty reduction and agricultural growth are major goals, from which further policies have been developed. The goal to reduce acute malnutrition in children to less than 10% by 2020 had already been achieved by 2013, which indicates the success of these policies. The Economic Development and Poverty Reduction Strategy of 2013-2017 (EDPRS II) establishes the framework for reaching Vision 2020 in four theme areas: economic transformation, rural development, productivity and youth employment and accountable governance. (MINAGRI, 2013)

The National Food and Nutrition Policy (NFNP) was developed in 2013 by a group led by the Ministry of Health (MINISANTE), as an update of the National Nutrition Policy (NNP) of 2007. The NFNP policy was formulated in alignment with the goals of Vision 2020 and EDPRS II and also drew from MINAGRI's Nutrition Action Plan (NAP) for 2013-2018 and the corresponding Strategic Plan for the Transformation of Agriculture, Phase III (PSTA III), 2013-2018. It covers multiple sectors and is jointly owned by MINISANTE, MINAGRI and MINALOC. A National Food and Nutrition Strategic Plan (NFNSP) 2013-2018 was created as the implementing plan for the NFNP. Both the NFNP and NFNSP were validated in the National Food and Nutrition Technical Working Group (NF&NTWG), which is made up of the Social Cluster Ministries, UN agencies, NGOs, academia, donor and businesses. These were also both priorities of the Health Sector Strategic Plan III (HSSP III, 2012-2018), which has specific nutrition targets to reduce stunting for children under two from 44% to 24.5% by 2018. (MINALOC, MOH, MINAGRI, 2014)

At the district level, District Plans to Eliminate Malnutrition (DPEM) were first developed in 2011. Each district has a plan that has a specific emphasis on addressing malnutrition. The districts report at a national level on their plans and progress. (MINALOC, MOH, MINAGRI, 2014)

Thus, the key government policies regarding nutrition are:

- National Food and Nutrition Policy (NFNP, 2013)
- National Food and Nutrition Strategic Plan (NFNSP, 2013-2018)
- Strategic Plan for the Transformation of Agriculture in Rwanda Phase III Plan (PSTA III, 2013-2018)
- Nutrition Action Plan (NAP, 2013-2018)

- Health Sector Strategic Plan III (HSSP III, 2012-2017)

While the main government agencies involved in nutrition are:

- Prime Minister's Office
- Ministry of Health (MINISANTE, MOH)
- Ministry of Agriculture and Animal Resources (MINAGRI)
- Ministry of Local Government (MINELOC)
- Ministry of Gender and Family Promotion (MIGEPROF)
- Ministry of Education (MINEDUC)
- Social Cluster Ministries
- District Governments

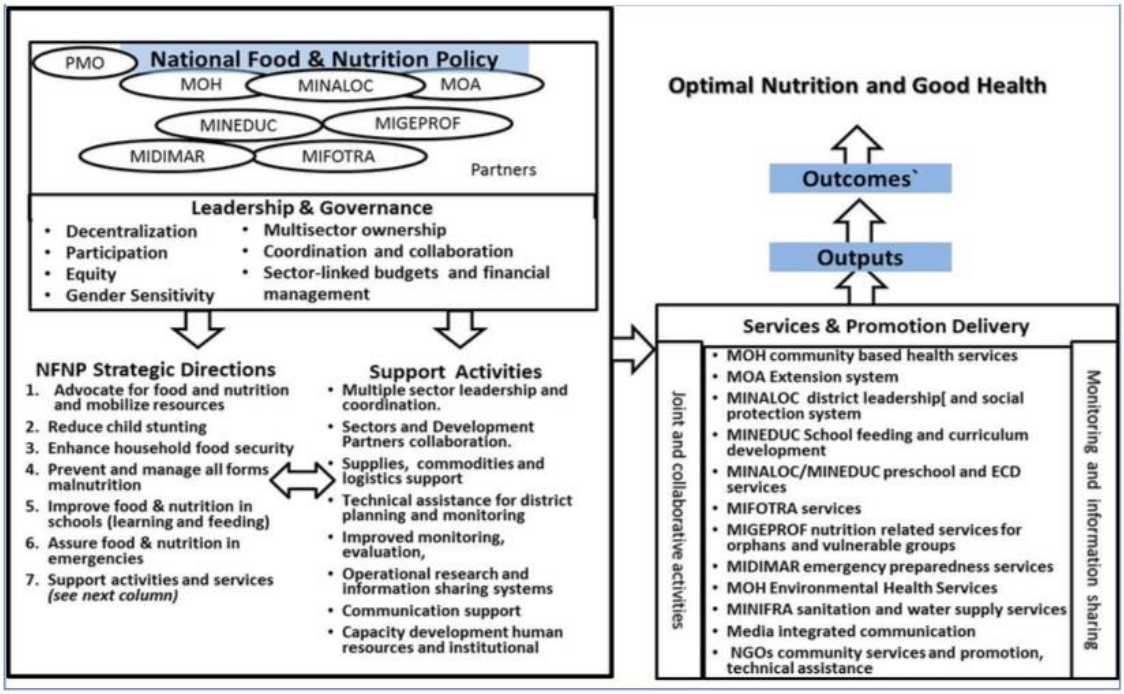

Figure 21: Conceptual Framework for National Food and Nutrition Policy. Note: MOA = MINAGRI. (MINALOC, MOH, MINAGRI, 2014)

Intervention	Schedule	Details
1st 1000 Days in the Land of 1000 Hills	2013-2015	National campaign to introduce problems and solutions to stunting
1st 1000 Days Community-Based Food and Nutrition Programs	Started with 10 districts in 2013	Village-level promotion, training, kitchen gardens, etc. Implemented by Community Based Organizations
GIRINKA, the One-Cow-per-Poor-Family Programme	2006-2015	Distribution of cows to provide milk to poor farmers
One Cup of Milk per child	Ongoing	Part of Home-Grown School Feeding Programme
Maternal, Infant and Young Child Nutrition (MIYCN)	Ongoing	Promotion and support to improve nutrition during pregnancy and lactation, promote and counsel on breastfeeding and complementary feeding
Kitchen gardens	Ongoing	Training households to grow vegetables in their kitchen gardens for home consumption

Table 10: Government interventions in nutrition

In addition, there are a number of specific policies that affect the nutrition and agriculture environments. Standards for food fortification were passed in 2013 and other policies exist for trade, quality, competition and consumer protection.

7.2 Donors and Implementing Organizations

Many of the NGOs and organizations in Rwanda have a nutrition component in their programs. The Civil Society Alliance (CSA), in partnership with Scaling Up Nutrition (SUN), is currently undertaking a mapping exercise to understand all of the organizations working on nutrition in Rwanda. These organizations consist of donors, national organizations and community based or local implementing organizations. SUN does provide a list of Civil Society Organizations (CSO) working to support the government's objectives at the community level.

CSOs Working on Nutrition
Catholic Relief Services
World Vision
Project Healthy Children
Adventist Development and Relief Agency (ADRA)
World Relief
International Rescue Committee (IRC)
Global Communities – Partners for Good (with Save the Children)
Concern Worldwide
Elizabeth Glaser Pediatric AIDS Foundation (EGPAF)
IntraHealth
Maternal and Child Health Integrated Program (MCHIP)
Gardens for Health International
International Center for AIDS Care and Treatment Program (ICAP)
Family Health International

Table 11: Civil Society Organizations working on nutrition in Rwanda. (Scaling Up Nutrition, 2013)

These organizations work to implement the strategies and objectives of the National Food and Nutrition Policy and other government policies as discussed above. The role of development partners is outlined in the National Food and Nutrition Policy and is:

- Support and participation in sustained advocacy for nutrition
- Technical and financial support
- Participation in the NF&NTWG
- Information sharing
- Program development, implementation and communication

There are a number of donors active in nutrition in Rwanda. The SUN Donor Convener funds the SUN activities. Other major donors include United States Agency for International Development (USAID), the European Union, the UK Department for International Development (DFID), the Belgian Development Agency, the Netherlands and the World Bank. (Scaling Up Nutrition, 2013)

The budgets for the NGOs and CSOs were not readily available on websites nor provided during interviews. However, the EU has agreed to commit 10 million USD for nutrition over 3 years, the Swiss Agency for Development Cooperation pledged 3 million USD and the Embassy of the Netherlands is supporting a 4 years nutrition program worth 25 million USD. USAID has recently awarded a 19 million USD over five years to CRS for Integrated Nutrition and WASH activities.

7.3 Agriculture and Nutrition Coordination Platforms and Mechanism

There are a number of multi-stakeholder platforms that allow for coordination and collaboration on the country's goals. The Food and Nutrition Steering Committee (SCF&NSC) exists at the national level under the Prime Minister's Office and is co-chaired by the Ministries of Health, Agriculture, and Local Government. This platform publishes reports and provides advice on nutrition and food security at the household level. Also at the national level is the National Food and Nutrition Technical Working Group (NF&NTWG). (Scaling Up Nutrition, 2013)

Key platforms and groups:

- Food and Nutrition Steering Committee (SCF&NSC)
- National Food and Nutrition Technical Working Group (NF&NTWG)
- District Food and Nutrition Steering Committees (DF&NSC)
- Renewed Effort Against Child Hunger and Undernutrition (REACH)
- National Food Fortification Alliance
- SUN Civil Society Alliance
- Government and Development Partner's Group
- Health Sector Cluster Group (HSCG)
- District Good and Nutrition Steering Committee (DF&NSC)

In December 2011 the Republic of Rwanda joined the Scaling Up Nutrition (SUN) movement, a global movement started in 2010 by a number of agencies and working groups who saw the need to coordinate efforts to tackle malnutrition. They published a "Framework for Action" and a "Road Map" that highlights the needs around tackling stunting, focusing on the first 1000 days and tackling the underlying causes of malnutrition. Their main goal is to 'scale up nutrition' in participating countries via a participatory and collaborative approach. (Scaling Up Nutrition, 2013)

At the private sector level, the National Food Fortification Alliance has formed from industry and consumer associations. They have recently developed a national standard for food fortification. The National Food and Nutrition Policy outlines the role of the private sector in nutrition:

- Investment in production, processing and marketing of high quality, safe and beneficial food products for local consumption and export
- Support of NFNP at national and local levels
- Specific support of 1st 1000 Days campaign

The government thus sees a role for private sector in the fight against malnutrition and expects support of its policies and programs by all companies in Rwanda. (MINALOC, MOH, MINAGRI, 2014)

8. RECOMMENDATIONS

The general opportunities in Table 12 below were identified based on the interviews carried out in Rwanda during the country visit and during conversations with the Rwanda Marketplace manager. Only foods with a nutritional benefit that met a malnutrition gap were selected. From these listed opportunities and market gaps, specific opportunities for the Marketplace for Nutritious Foods were developed in collaboration with GAIN, including recommendations for the Innovation Accelerator and the Community of Practice programs, which are provided in Table 13. The specific opportunities are provided in Annex I: Recommendations Synthesis Table.

Food	General Opportunities	Nutritional Benefits
Poultry	Smaller portions Sharing whole chickens Decrease price Affordable feed (increase soy production) Household chicken farming Incubators in villages to scale up production	High quality protein Essential amino acids Can be enriched depending on feed
Pork	Scale up pork production Processing & packaging of small portions for domestic consumption Support and scale up animal feed production	Protein, Amino acids Fat for energy Zinc, iron Various minerals & vitamins
Red meat	Develop/improve cold chain Process and/or dry meat Smaller portions	Iron Protein
Eggs	Education campaign Improve production (feed, medicines) Improve distribution in rural areas Explore quail egg production Develop innovative and affordable packaging	High quality protein Essential amino acids Lutein Can be enriched depending on feed
Dairy	Expand milk zones Research milk ATMs Improve cold distribution	Vitamin A Protein
Fish	Improve distribution Scale up for animal feed	Protein Iron
Fruit & Veg	Production of dried fruit and other processed fruit products Production of seeds locally	Various vitamins
Avocado	Increase domestic consumption Take advantage of export production systems Development of local oil production	Protein & amino acids Vitamin A, B, C, G Fat for energy
Mushrooms	Scale up Kigali Farms model Processing to create reliable market for surplus Education to dispels myths[19]	Biotin Folic acid Iron, Zinc B vitamins
Soya bean	Increase production for local markets	Protein Water soluble B- vitamins Iron, zinc, copper
Iron beans	Packaging to differentiate from regular beans Improve production and distribution	Iron Protein
Other pulses & oilseeds	Introduce new varieties Processing and canning	Protein

Table 12: Potential value chain opportunities (Farrell) (Pigs and Human Nutrition) (FAO, 1997) (Kivaisi)

[19] There is a myth that consuming mushrooms will cause your cows to stop making milk

Some of the above opportunities are to support businesses with new product development, and to develop and scale value chain activities for a number of nutritious foods. Product development is not restricted to large, established businesses; as seen in interviews, small businesses are seeing opportunities themselves, such as pork production, and acting on these quickly.

One potential approach to supporting the private sector is via demand creation for nutritious foods. Interviews indicated that a number of educational campaigns are underway for certain foods with the intention of increasing consumption via increased awareness of the benefits. Campaigns were cited for iron beans, milk and dairy products, as well as kitchen garden vegetables. It was explained that these campaigns are effective in changing behavior and purchasing decisions – for instance interviews revealed that where campaigns for iron beans have been conducted, demand now exists and is increasing as more people become aware of the benefits. Interviewees stated that campaigns have been successful and it is recommended to explore this aspect of increasing demand further. Specifically, education around the importance of eating a varied diet with specific foods included (high protein foods) could be impactful. There may also be an opportunity to try to change selling behavior; farmers seem to sell their nutritious foods, rather than consume it themselves. Medium size businesses that are already operating could benefit greatly from these types of campaigns. For instance, Kigali Farms is working hard to educate their farmers to both sell and consume mushrooms themselves, however they do not have large marketing budgets and would likely benefit greatly from a campaign on the benefits of mushroom consumption.

In addition, the gap between small and micro businesses and formal financing appears to be largely due to a lack of entrepreneurial skills – business registration, business plan preparation, accounting, working capital management, etc. There is an opportunity here for GAIN to provide additional business development services, or work with the existing BDS, to help bring these small and micro businesses into the formal business sector, where they may be able to access the financing they require to scale or access new markets. A component of this could also be to provide loan guarantees so that lending without collateral is possible.

Foods	Opportunities for Innovation Accelerator	Opportunities for Community of Practice
Sweet potato, amaranth, leafy greens, carrots, pumpkins, squash	Encourage value addition by targeting calls and specifically encouraging companies that produce these products to apply.	Obtain information about value addition of root crops and share (special content).
Fish	Seek aquaculture companies and encourage them to apply.	Provide training in collaboration with government initiatives (aquaculture content).
Dairy products	Explore whether Milk ATM model used by Marketplace grantee in Kenya may be applicable in Rwanda. Support milk collection centers that work with Land O Lakes as part of the call for proposals.	Liaise with producers to see whether there are QA/QC training needs that the CoP can address.
Eggs	Improve the quality of production for existing companies. Provide packaging & distribution support. Support egg farms to produce their own feed.	Connect producers in order to obtain the scale needed to purchase affordable feed and antibiotics.
Iron-fortified beans	Encourage companies marketing iron beans to apply for support.	Provide training on differentiation. Research and share similar businesses and successes from other countries.
Normal beans	Research and bring in technologies for drying beans (in collaboration with	N/A

	GAIN's work in Tanzania).	
Dark leafy greens	Encourage companies marketing greens to apply for support.	Training on drying practices
Soyabeans and other pulses/legumes	Share lessons learned from producers of soy products in other countries.	Training on benefits of soybean cultivation and consumption
Red meat	Share lessons learned from other Marketplace countries.	Share lessons learned from other Marketplace countries.
Poultry	Encourage poultry companies to apply for support.	Research what has worked in other countries (MNF Kenya).
Pork	Provide funding for pork farmers to expand businesses and support development of processing to serve all farmers. Targeted calls to pork producers.	Connect pork farmers to share best practices & scale up. Create special CoP targeted to pork producers.
Quail eggs	Evaluate whether iron content is significantly higher to merit supporting this niche product.	N/A
Pulses & oilseeds	Target small processors and invite them to apply. Support oil processors to scale up and further develop to reach more of local market.	Share best practices for oilseed processing and connect processors. Liaise with buyers such as WFP P4P to explore pulses market.
Cassava leaves	N/A	Share information about nutrition content.
Fruits and vegetables	Support companies who produce dried fruit and veg products.	Bring in information about dehydrating fruit and veg (current GAIN work in Tanzania).
Kitchen garden	Support companies who produce and sell inputs for kitchen gardening.	N/A
Avocado	N/A	Assist in creation of local demand through education campaigns.

Table 13: Specific opportunities for the Marketplace for each food type

Following identification of the specific opportunities shown in Table 13, GAIN worked to prioritize these based on the potential for creating sustainable, investible businesses. The comments and prioritization are summarized by food in Annex I: Recommendations Synthesis Table, with Table 14 below outlining the prioritized foods. The highest priority foods are nutritious vegetables, dairy, affordable meats (poultry, pork and fish) and soyabeans. Other foods that were assigned a lower priority are nutritionally important but the business opportunities are not as clear. It is recommended that this prioritization be followed, particularly in the beginning of the Marketplace for Nutritious Foods in order to achieve the most impact and support for businesses.

Priority	Food	Deficiency
High	Sweet potatoes, amaranth, leafy greens, carrots, pumpkins	Vitamin A
	Fish	Vitamin A
	Dairy	Vitamin A, Protein
	Poultry	Iron, Protein
	Pork	Iron, Protein, Zinc
	Fruit and vegetables	Diet diversity
	Soyabeans	Zinc
Medium	Eggs	Vitamin A, Protein
	Iron-fortified beans	Iron
	Dark leafy greens	Iron, Zinc
	Soyabeans & other pulses/legumes	Iron, Protein
	Kitchen garden	Diet diversity
Low	Normal beans	Iron
	Red meat	Iron, Protein
	Quail eggs	Iron
	Cassava leaves	Protein
	Avocado	Diet diversity
	Mushrooms	Zinc

Table 14: Prioritized actions as determined by GAIN.

ANNEXES

Annex I: Recommendations Synthesis Table

Deficiency	Vitamin A						
Summary	73% of children consume sufficient Vitamin A and 93% receive a twice-yearly supplement. There is no data on geographic distribution.						
Foods	**Business & Product Landscape**	**Challenges**	**Market Gaps**	**Opportunities for Innovation Accelerator**	**Opportunities for Community of Practice**	**Prioritization & Comments**	**Potential Partners**
Sweet potato, amaranth, leafy greens, carrots, pumpkins, squash	Produced by smallholders and sold without packaging or processing at rural and urban markets.	Low-income consumers may not always have cash for purchases and they may have to travel (walk) a significant distance to get to the market. Production relies on the rains, as there is little irrigation, and seeds are imported from Kenya.	N/A	Encourage value addition by targeting calls and specifically encouraging companies that produce these products to apply.	Obtain information about value addition of root crops and share (special content).	High Explore potential for value addition to increase dietary diversity	Via Nutrition Steering Committee, CIP (International Potato Center)
Fish	Fish & dried fish are available on the market. The government is promoting fish farming to increase supply as much of the lake fish is sold to neighbouring countries.	It is difficult to transport and market fresh fish throughout rural areas where road access is poor. Lake fishing is at borders and has competition from fishermen from other countries.	Improve distribution channels and increase production for use as animal feed.	Seek aquaculture companies and encourage them to apply.	Provide training in collaboration with government initiatives (aquaculture content).	High Coherence with Government of Rwanda priorities	Government of Rwanda

		Fish farming requires dedicated land (this may be government directed) and inputs such as feed. Dried fish is available and easier to distribute.					
Dairy products	Milk is produced by smallholders across the country, with accumulation at Milk Collection Centres. A number of established companies collect, process and sell milk and other products to all levels of consumers, including BOP. Households can also purchase locally from farmers. Expect milk surplus of 100 million L in 2017.	Most (75%) milk produced remains in the alternative milk sector, which needs to be purchased daily or stored under refrigeration. Distribution of bulk milk requires refrigerated truck and packaged milk is too costly for BOP. The processors are only in and around Kigali. There have been previous quality issues, which may affect the market.	Expand Milk Zones throughout Kigali and entire country to bring high quality bulk affordable milk to BOP. Increase refrigerated transport capabilities.	Explore whether Milk ATM model used by Marketplace grantee in Kenya may be applicable in Rwanda. Support milk collection centers that work with Land O Lakes as part of the call for proposals.	Liaise with producers to see whether there are QA/QC training needs that the CoP can address.	High High potential for nutrition and employment of smallholders	Land 'o Lakes
Eggs	Mostly small-scale production with few large-scale facilities. Supermarkets have some local brands in packaging, otherwise production and	Consumers prefer yellow yolks, which are more expensive to produce because of the need to add supplements or greens to feed. Feed and antibiotics are expensive and	Development of affordable feed and antibiotics. Improve distribution in rural areas. Create innovative or cheap packaging solutions. Provide	Improve the quality of production for existing companies. Provide packaging & distribution support. Support egg farms to produce their own feed.	Connect producers in order to obtain the scale needed to purchase affordable feed and antibiotics.	Medium Is there potential to create an investible, scalable, innovative business model for egg production?	

	distribution is mostly from the farm itself, or in local markets (without branded packaging).	small-scale businesses have working capital constraints and difficulty in maintaining healthy flocks. Consumers tend to come to farms to purchase eggs directly, so if there are no farms nearby, it is difficult for low-income consumers to buy eggs.	business development services for producers.				

Deficiency	Iron						
Summary	37% of children between 6 months and 5 years having some level of anemia, while 66% of 6-11 month olds are anemic. The highest rates of anemia are in in rural areas of Southern and Eastern Provinces, with 19.2% of women being anemic.						
Foods	**Business & Product Landscape**	**Challenges**	**Market Gaps**	**Opportunities for Innovation Accelerator**	**Opportunities for Community of Practice**	**Prioritization & Comments**	**Potential Partners**
Iron-fortified beans	Most beans are produced by smallholders and sold without packaging. HarvestPlus/CIAT supply free iron-bean seeds to farmers in 25 districts and aim to reach 1 million farms by 2018.	There's no way to differentiate iron beans from normal beans in the market as they are without packaging.	Develop packaging to differentiate from regular beans. Improve and scale production & distribution.	Encourage companies marketing iron beans to apply for support.	Provide training on differentiation. Research and share similar businesses and successes from other countries.	Medium Explore potential to differentiate these from normal beans.	CIAT, HarvestPlus
Normal beans	Most beans are produced by	The value chain is underdeveloped	Scale processing (canning) and	Research and bring in technologies for	N/A	Low Low potential for	Sarura, FarmFresh Ltd.

	smallholders throughout the country, although more in the West, and sold without packaging. There is only one bean processor that produces solely for the prison system.	with few businesses or commercial buyers. No differentiation of bean varieties.	develop branding and packaging.	drying beans (in collaboration with GAIN's work in Tanzania).		product differentiation.	
Dark leafy greens	Produced by smallholders and sold without packaging or processing at rural and urban markets.	Low-income consumers may not always have cash for purchases and the may have to travel (walk) a significant distance to get to the market. Production relies on the rains, while seeds are imported from Kenya.		Encourage companies marketing greens to apply for support.	Training on drying practices	Medium Low opportunity for differentiation.	
Soybeans & other pulses/legumes	Produced by smallholders and sold without packaging or processing at rural and urban markets.	Low-income consumers may not always have cash for purchases and the may have to travel (walk) a significant distance to get to the market. Production relies on the rains, while seeds are imported from Kenya.	Provide knowledge & inputs for farmers on soybean production.	Share lessons learned from producers of soy products in other countries.	Training on benefits of soybean cultivation and consumption	Medium Explore lessons learned from other Marketplaces.	Mt Meru, CHDI
Red meat	Small traditional farmers keep livestock on their	BOP consumers cannot afford to buy large cuts of	Develop/improve cold chain and processing/drying	Share lessons learned from other Marketplace	Share lessons learned from other Marketplace	Low Limited affordability by	

	farms; with no open grazing allowed they need to provide animals with feed. Traders move animals from farm to abattoirs to butchers. Very limited cold-chain that serves hotels and supermarkets.	meat (or whole animals) and red meat is very expensive. Lack of cold chain and refrigeration means distribution of live animals is predominate, and mostly done by small traders with local sales and processing. Zero-grazing policy makes rearing large animals expensive.	of meat so it can be stored without refrigeration and in smaller portions.	countries.	countries.	low-income consumers	
Poultry	Most is small-scale local free-range production. Recently, large production has started (PEAL). Chickens hatchlings are imported and chicken meat is imported for high-end markets.	Chicken is considered luxury meat and it is expensive to purchase an entire chicken at once (may not suitable for one person to purchase as too much food). There is a need for good, affordable feed.	Production of smaller portions or develop an innovation for sharing whole chickens (a mobile phone app?). Decrease price by reducing cost of feed. Support more household chicken farming and local village incubators.	Encourage poultry companies to apply for support.	Research what has worked in other countries (MNF Kenya).	High Demonstrated successes from other Marketplace countries (Kenya)	
Pork	A handful of small/medium farmers are producing pork with no established processors. Pork is the most preferred meat as it is novel and affordable.	There is a lack of processing. Inputs such as feed are expensive and access to sufficient water is difficult.	Support new businesses to scale up production. Develop processing and packaging for pork. Support and scale animal feed production.	Provide funding for pork farmers to expand businesses and support development of processing to serve all farmers. Targeted calls to pork producers.	Connect pork farmers to share best practices & scale up. Create special CoP targeted to pork producers.	High Impact on nutrition and smallholder farmers.	
Quail eggs	One institution	Quail eggs have a	Scale up production	Evaluate whether		Low	Eden Business

	(Eden Business Centre) in Kigali is promoting quail egg production. They provide the chicks and training to egg producers. Eggs are primarily sold to high-end restaurants and hotels.	much higher selling price than chicken eggs (3-4 times). Potential exists for quail egg craze and subsequent crash as has occurred in other East African countries.	enough to be affordable for BOP (risk of oversupply needs to be mitigated).	iron content is significantly higher to merit supporting this niche product.		Niche product, limited impact, limited affordability	Centre

Deficiency	Protein						
Summary	Protein can address many nutritional issues, but there's not specific data available on deficiencies in Rwanda						
Foods	**Business & Product Landscape**	**Challenges**	**Market Gaps**	**Opportunities for Innovation Accelerator**	**Opportunities for Community of Practice**	**Prioritization & Comments**	**Potential Partners**
Pulses, oilseeds	Produced by smallholders and sold without packaging or processing at rural and urban markets.	The value chain is underdeveloped with few businesses or commercial buyers. No differentiation of bean varieties.	Provide agricultural support for farmers. Improve and create mid-level processing for oil production. Increase pulses production to meet export demand, while diverting some for local consumption.	Target small processors and invite them to apply. Support oil processors to scale up and further develop to reach more of local market.	Share best practices for oilseed processing and connect processors. Liaise with buyers such as WFP P4P to explore pulses market.	Medium Low cost, potential for value addition.	
Red meat	Small traditional farmers keep livestock on their farms; with no open grazing allowed they need to provide animals	BOP consumers cannot afford to buy large cuts of meat (or whole animals) and red meat is very expensive. Lack of	Develop/improve cold chain and processing/drying of meat so it can be stored without refrigeration and in smaller portions.	Share lessons learned from other Marketplace countries.	Research what has worked in other countries.	Low Limited affordability to low-income consumers	

	with feed. Traders move animals from farm to abattoirs to butchers. Very limited cold-chain that serves hotels and supermarkets.	cold chain and refrigeration means distribution of live animals is predominate, and mostly done by small traders with local sales and processing. Zero-grazing policy makes rearing large animals expensive.					
Dairy products	Milk is produced by smallholders across the country, with accumulation at Milk Collection Centres. A number of established companies collect, process and sell milk and other products to all levels of consumers, including BOP. Households can also purchase locally from farmers. Expect milk surplus of 100 million L in 2017.	Most (75%) milk produced remains in the alternative milk sector, which needs to be purchased daily or stored under refrigeration. Distribution of bulk milk requires refrigerated truck and packaged milk is too costly for BOP. The processors are only in and around Kigali. There have been previous quality issues, which may affect the market.	Expand Milk Zones throughout Kigali and entire country to bring high quality bulk affordable milk to BOP. Increase refrigerated transport capabilities.	Explore whether Milk ATM model used by Marketplace grantee in Kenya may be applicable in Rwanda. Support milk collection centers that work with Land O Lakes as part of the call for proposals.	Liaise with producers to see whether there are QA/QC training needs that the CoP can address.	High High potential for nutrition and employment of smallholders	Land 'o Lakes
Eggs	Mostly small-scale production with few large-scale facilities. Supermarkets have some local brands	Consumers prefer yellow yolks, which are more expensive to produce because of the need to add supplements or	Development of affordable feed and antibiotics. Improve distribution in rural areas. Create	Improve the quality of production for existing companies. Provide packaging & distribution support. Support	Connect producers in order to obtain the scale needed to purchase affordable feed and antibiotics.	Medium Is there potential to create an investible, scalable, innovative business model for egg	

	in packaging, otherwise production and distribution is mostly from the farm itself, or in local markets (without branded packaging).	greens to feed. Feed and antibiotics are expensive and small-scale businesses have working capital constraints and difficulty in maintaining healthy flocks. Consumers tend to come to farms to purchase eggs directly, so if there are no farms nearby, it is difficult for low-income consumers to buy eggs.	innovative or cheap packaging solutions. Provide business development services for producers.	egg farms to produce their own feed.		production?	
Pork	A handful of small/medium farmers are producing pork with no established processors. Pork is the most preferred meat as it is novel and affordable.	There is a lack of processing. Inputs such as feed are expensive and access to sufficient water is difficult.	Support new businesses to scale up production. Develop processing and packaging for pork. Support and scale animal feed production.	Provide funding for pork farmers to expand businesses and support development of processing to serve all farmers. Targeted calls to pork producers.	Connect pork farmers to share best practices & scale up. Create special CoP targeted to pork producers.	High Impact on nutrition and smallholder farmers.	
Poultry	Most is small-scale local free-range production. Recently, large production has started (PEAL). Chickens hatchlings are imported and chicken meat is imported for high-end markets.	Chicken is considered luxury meat and it is expensive to purchase an entire chicken at once (may not suitable for one person to purchase as too much food). There is a need for good,	Production of smaller portions or develop an innovation for sharing whole chickens (a mobile phone app?). Decrease price by reducing cost of feed. Support more household chicken	Encourage poultry companies to apply for support.	Research what has worked in other countries (MNF Kenya).	High Demonstrated successes from other Marketplace countries (Kenya)	

		affordable feed.	farming and local village incubators.				
Cassava leaves	Produced by smallholders and sold without packaging or processing at rural and urban markets.	Low-income consumers may not always have cash for purchases and they may have to travel (walk) a significant distance to get to the market.			Share information about nutrition content.	Low Could a scalable business be created for cassava leaves?	

Deficiency	Dietary diversity						
Summary	Lack of variation in diet						
Foods	**Business & Product Landscape**	**Challenges**	**Market Gaps**	**Opportunities for Innovation Accelerator**	**Opportunities for Community of Practice**	**Prioritization & Comments**	**Potential Partners**
Fruit & vegetables	Produced by smallholders and sold without packaging or processing at rural and urban markets. There are some large buyers of specific crops (pineapple, passion fruit, tomato, mushrooms) for processing into juices, pastes and other products. Most commercial activities are focused on export.	Low-income consumers may not always have cash for purchases and they may have to travel (walk) a significant distance to get to the market.	Produce dried fruit and other processed products for local markets (fruit leathers, dried fruit, juices & squashes, sauces, chutneys, canned whole fruits & veg).	Support companies who produce dried fruit and veg products.	Bring in information about dehydrating fruit and veg (current GAIN work in Tanzania).	High Supports nutrition as well as enterprise development.	
Kitchen gardens	A number of NGOs are working with	Challenges include seed distribution,	Produce seed locally.	Support companies who produce and		Medium Is there potential	AVRDC (Tanzania)

	Government of Rwanda to supply seeds and training for households to plant kitchen gardens (free of charge). There are no known businesses involved.	providing training on growing and cooking foods, and knowledge of nutritional benefits.		sell inputs for kitchen gardening.		for impact at scale?	
Avocado	Produced primarily for export market.		Increase production for local markets and investigate development of local oil production.		Assist in creation of local demand through education campaigns.	Low Limited potential for impact at scale among low-income consumers.	

Deficiency	Zinc						
Summary	No specific data available						
Foods	**Business & Product Landscape**	**Challenges**	**Market Gaps**	**Opportunities for Innovation Accelerator**	**Opportunities for Community of Practice**	**Prioritization & Comments**	**Potential Partners**
Soyabeans	Produced by smallholders and sold without packaging or processing at rural and urban markets. There is some contract farming for specific buyers.	Low-income consumers may not always have cash for purchases and the may have to travel (walk) a significant distance to get to the market. The value chain is underdeveloped with few businesses and production is low.	Increase production for local consumption (not just for the few commercial buyers).		Provide training on benefits of soybean cultivation and consumption.	High Low cost, potential for value addition.	
Pork	A handful of	There is a lack of	Support new	Provide funding for	Connect pork	High	

	small/medium farmers are producing pork with no established processors. Pork is the most preferred meat as it is novel and affordable.	processing. Inputs such as feed are expensive and access to sufficient water is difficult.	businesses to scale up production. Develop processing and packaging for pork. Support and scale animal feed production.	pork farmers to expand businesses and support development of processing to serve all farmers. Targeted calls to pork producers.	farmers to share best practices & scale up. Create special CoP targeted to pork producers.	Impact on nutrition and smallholder farmers.	
Dark leafy greens	Produced by smallholders and sold without packaging or processing at rural and urban markets.	Low-income consumers may not always have cash for purchases and the may have to travel (walk) a significant distance to get to the market. Production relies on the rains, while seeds are imported from Kenya.		Support companies who produce and innovatively market leafy greens. Support those who dry vegetables.	Bring in technical expertise around dehydrated vegetables (work in TZ).	Medium Low opportunity for differentiation.	
Mushrooms	Currently produced & distributed by Kigali Farms and some NGOs.	Demand is too low for current production, farmers may not consume themselves and distribution is difficult.	Scale up Kigali Farms model and support a processor that can take surplus production.	N/A	N/A	Low Niche product, limited impact, limited affordability.	Kigali Farms, AVVAIS

Annex II: Market Visits

	Price (RF) per kilogram / availability			
Item	**Kigali Kimisagara**	**Rwamagana**	**Ntyazo**	**EICV4 National survey**
Cereals				
Fortified flour (any type, specify)				
Other	350 (maize)			400 (maize)
Oilseeds & Pulses				
Beans (mixed)	500		450	350
Beans (specify type)	500 (single variety)			
Beans (biofortified)	900			
Groundnuts			850	800
Groundnut powder			1000	
Peanut butter				
Oils (specify types)			1500	
Soyabeans			700	400 (dry)
Soya bean flour			850	
Cassava	200	Yes		
Vegetables & Fruit				
Pineapple	350 per piece	250 per piece	600 per piece	150
Cassava leaf (*isombe*)			700	300
Tomatoes	750	Yes	400	200
Carrots	400	Yes	650	300
Pepper (sweet)	700	Yes	1400 (rare)	
Pepper (hot)	2500	Yes		

Pumpkin	700 per piece		Rare	100
Pumpkin seeds				
Banana	150	Yes	200	150
Avocado		Yes	300	100
Irish potato	300		250	140
Sweet potato (orange)	200	Yes	100	100
Sweet potato (white)			100	
Green leafy vegetables			400	500
Eggplant	500	Yes	400	
Eggplant – purple	600			
Passion fruit	1000	900		
Mushrooms			2500 (rare)	
Dodo leaf			400	
Onion - red	400	Yes	1000	400
Onion – white	600	Yes		
Beans - fresh	700	Yes		
Peas - dried	1300			
Peas - fresh	1800			
Cabbage	200 per piece	Yes		100
Cucumber	600	Yes		
Beets	500	Yes		
Orange/citrus	1200			200
Lime	600			
Tree tomato	1100-1300	Yes		
Apples	2300			
Mango	2000			200

Papaya	5000-1000 per piece			
Watermelon		Yes		
Dairy				
Milk (UHT)			400	
Milk (fresh)			Yes	
Milk (fermented)				
Yoghurt			1000	
Cheese				
Butter				
Ghee				
Animal Meat Products				
Chicken	Yes		3000	
Beef			1800	
Pork			1500	
Goat			1400	
Lamb / Sheep			1400	
Rabbit			2000	
Fish (dried)	Yes		3000	
Fish (fresh)			4000	
Honey			4000 (rare)	
Eggs	Yes		80 per egg	
Other				
Infant Formula				
Therapeutic foods				
Micronutrient sprinkles				
Iron supplements				

Annex III: Interviewee List & Contact Details

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Annex IV: Interview Guides

Form 1: Processors & Businesses

General	
Size of business & type (multinational, local, etc)	
Products or value chain	
Value add (processing? Packaging?)	
Value Chain	
From whom do you source your (raw) material/product, where are they located, what kind of arrangements/agreements do you have?	
Any outgrower contracts? What is your supplier model?	
Where do you sell your products and to whom? (which markets - local, national, export?)	
How/do you engage the BOP? Do you know of any interesting examples of engaging BOP?	
Where do you think the losses in this value chain occur? What are the losses?	
What are the major constraints or barriers in this value chain?	
What are the main opportunities?	
What are the major trends?	
Nutrition	
Are there any nutrition or health regulations that are relevant to you (i.e. fortification?)	
What are the most important areas (crops, products, food, etc.) to focus on for biggest wins for nutrition? (dairy, meat, fruit/veg, oilseeds/pulses)	
Financing & Business	
How do you see the investor landscape? Why do/don't investors invest	
How difficult is it to get financing you need? (Particularly for SMEs)	
What is your opinion of doing business in Rwanda (opportunities & constraints)	
Do you partner with any organizations in your business (NGOs, gov't)	

Form 2: Financial Actors

General Finance	
What are the traditional financial products available?	
What products/services are available to SMEs?	
Specific opportunities and challenges for financing SMEs?	
Any thing innovative going on in finance (beyond usual banks)?	
What are the trends in finance sector?	

Nutrition	
Any trends in nutrition or agriculture sectors?	
What partnerships exist that involve nutrition?	
Specific opportunities and challenges for financing nutrition?	

Form 3: NGOs and Government

General Projects / Policies	
What are your current policies on nutrition?	
What projects do you have that specifically address nutrition?	
What are the policy & regulatory constraints specific to nutrition? and what are you doing to tackle these?	
What are the most important areas (crops, products, food, etc.) to focus on for biggest wins for nutrition? (dairy, meat, fruit/veg, oilseeds/pulses)	
Partnerships	
Any important partnerships and coordination platforms in nutrition?	
Who do you collaborate or work with > what is your mechanism for collaboration?	
Are there any NGOs or orgs focused entirely (or very specifically) on nutrition?	
Do you know of any interesting examples of engaging BOP?	
Do you know of any interesting supplier models (outgrows, etc)?	
Opportunities	
What are the opportunities in nutrition?	
What are the opportunities in finance for SMEs?	
What are the constraints in nutrition?	
What are the constraints in finance for SMEs?	

Annex V: For Further Investigation

It was not possible to investigate all options during this analysis and the field visit. Potential opportunities came up that were not referred to or discussed in this report. They are listed here for further investigation.

- Smart Adaptive Sustainable Horticulture (SMASH) PPP between Dutch horticulture and Rwanda Best Company managed by BoP Innovation Center
- Gumaho – Milk logistics smartphone app
- One Egg Rwanda
- TradeMark East Africa work with Rwanda Standards Board to improve quality along value chain

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