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Stories of Change - Rwanda

Final Report

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Acronyms

ANC	Antenatal care
BCC	Behavior change communication
CAADP	Comprehensive Africa Agriculture Development Program
CSO	Civil society organization
DHS	Demography and Health Survey
DF&NSC	District Food and Nutrition Steering Committee
DPEM	District Plans to Eliminate Malnutrition
ECD	Early child development
EDPRS	Economic Development and Poverty Reduction Strategy
FGD	Focus group discussion
FLW	Frontline workers
FNTWG	Food and Nutrition Technical Working Group
HAZ	Height-for-age Z score
IO	International organization
IYCF	Infant and young child feeding practices
JADF	Joint Action Development Forum
JAPEM	Joint Action Plan to Eliminate Malnutrition
MDG	Millennium Development Goals
MIGEPROF	Ministry of Gender and Family Promotion
MINADEF	Ministry of Defense
MINAGRI	Ministry of Agriculture and Animal Resources
MINALOC	Ministry of Local Government
MINEDUC	Ministry of Education
MINISANTE	Ministry of Health
NFNCS	National Food and Nutrition Coordination Secretariat
NFNP	National Food and Nutrition Policy 2013-2018
NGO	Non-governmental organization
OPM	Office of the Prime Minister
PP	Percentage point
RGB	Rwanda Government Board
R-HMIS	Rwanda Health Management Information System
SCF&NSC	Social Cluster Food and Nutrition Steering Committee
SoC	Stories of change
SUN	Scaling Up Nutrition
WASH	Water, sanitation, and hygiene

Executive Summary

Globally, undernutrition is related to almost half of the deaths in children younger than five years of age [1]. It leads to large human and economic costs to countries through increased morbidity and mortality in childhood, poor child growth and development, and hinders adult work capacity and productivity. These consequences, in turn, have serious implications for national development. Eliminating malnutrition has, therefore, been on the forefront of the political agenda of many countries worldwide and for global movements such as Scaling Up Nutrition (SUN). Extensive evidence on what nutrition-specific interventions work to reduce malnutrition exists[1]. Less is known, however, about how to effectively implement these interventions at scale, and what mix of interventions is needed to effectively address the multiple co-existing nutrition problems in different contexts (including nutrition-sensitive programs). Additionally, greater clarity is needed on the role that commitment, program and policy coherence, and context-specific factors, play in creating enabling environments to reduce malnutrition. The Stories of Change (SoC) case studies, originally conducted in Bangladesh, Ethiopia, India (Odisha state), Nepal, Senegal, and Zambia, and now in Rwanda, aim to fill some of these knowledge gaps by examining the “drivers of change” in reducing malnutrition across different contexts [2]–[7].

Rwandan Context

Over the last 25 years (1992-2017), Rwanda has experienced civil war, the 1994 genocide against Tutsi, and the reconstruction of the country post these unfortunate events. Though the country continues to face high burdens of malnutrition, it has experienced some positive trends in reducing the prevalence of wasting, stunting and anemia between 2005 and 2015. During this time, among children less than 5 years of age, wasting decreased from 5% to 2% and stunting decreased by 13 percentage points (pp) (from 51% to 38%) [2, 3]. Anemia also decreased among children 6 to 59 months of age (from 52% in 2005 to 37% in 2015) and among women 15-49 years of age (from 26% to 19%). Despite these improvements stunting and anemia remain important nutrition issues for the respective population groups in Rwanda [8], [9]. For example, the prevalence of stunting in Rwanda remains among the highest in the world[10]. Furthermore, stunting reductions have varied across the country’s 30 different districts with some districts experiencing large declines in stunting while others have seen stagnation or an increase in the prevalence of stunting.

Study Design

This study was developed in line with the original SoC case studies. Like these previous case studies, we used both quantitative and qualitative methods to address the overarching question of how and why changes in nutrition occurred in a specific context with a high burden of undernutrition. In Rwanda, the overall aims for this case study were to: 1) assess the driving factors of change in stunting and anemia reduction using available quantitative data, 2) understand how study respondents thought nutrition outcomes have changed in Rwanda over the years and what they believed contributed to these changes, 3) understand how these changes in nutrition and contributing factors differed between districts with reduced stunting compared to those with non-reduced stunting, and 4) understand the nutrition challenges that remain and potential solutions to these problems.

For the quantitative component of the study we drew on nationally-representative data from the Demographic and Health Surveys (DHS) from 2005, 2010, and 2014/2015¹ [11]–[13]. We used linear regression models and decomposition analysis to assess the contribution of different factors (e.g., asset accumulation, sanitation, parental education, and healthcare) to the observed changes in stunting and anemia among children less than 5 years of age and of anemia among women 15-49 years of age.

For the qualitative component we conducted semi-structured interviews with key stakeholders in nutrition such as policymakers, nutrition leaders and program implementers, and focus group discussions (FGD) with community members in selected districts. At the national level, we conducted key informant interviews with government actors, civil society organizations (CSO), non-governmental organizations (NGO), international organizations (IO), and donors. At the sub-national level, we purposefully selected 10 districts from the 5 provinces in Rwanda to participate in the study. From each province, we selected one district in which stunting decreased between 2010 and 2015 (reduced district) and one in which there was no change or in which stunting had increased (non-reduced district), for a total of 10 study districts. At the district and community levels, we conducted key informant interviews with district leaders and frontline workers (FLWs) in health and agriculture, as well as FGDs with male and female community members. Data from the key informant interviews and FGDs were analyzed by coding responses according to common themes. For analysis, data were disaggregated by type of respondent and by study district where appropriate.

The qualitative component complemented the quantitative analysis and provided more in-depth information about what was believed by study respondents to have contributed to the observed changes in nutrition and what could be done to further accelerate progress.

Drivers of Change

Between 2005 and 2015, Rwanda experienced substantial improvements in stunting and anemia among children and some progress, though inconsistent, in anemia among women of reproductive age. During this time, the prevalence of stunting and anemia among children younger than five years old declined (51% to 38% for stunting and 52% to 37% for anemia). Anemia among women 15-49 years of age also decreased during this time (from 26% to 19% in 2015²). Improvements across a range of health, fertility and socio-economic factors known to contribute nutrition outcomes were also seen. Specifically, insurance and vaccination coverage increased, as did the proportion of mothers who had four or more antenatal care (ANC) visits and who gave birth in a health facility. By 2015, Rwandan women were also having fewer children and birth spacing had increased. Lastly, this decade saw improvements in household wealth and both paternal and maternal education[13].

Based on the data available across the three rounds of DHS used in this study, the decomposition analysis revealed that maternal health factors were the largest drivers of change to improvements in stunting. These factors included the quality of ANC visits received (59%), the proportion of women who had given birth at a health facility (18%), and fertility factors such as the total number of children a

¹ The quantitative data available limited analysis of the drivers of change to the past 10 years. Some important changes occurred prior to these 10 years. These changes were captured in the qualitative component of this study which covered changes over the last 25 years.

² These are all the official figures reported on the DHS StatCompiler website (<https://www.statcompiler.com/en/>) and in the official Rwanda DHS reports for 2005, 2010, and 2015.

woman had (6%). At the household level, household wealth and parental education were associated with changes in stunting. Household wealth accounted for about 10% of the decline in stunting while parental education accounted for 4% of the change. Access to improved toilets accounted for 1% of the change in stunting between 2005 and 2010 but was no longer a driving factor between 2010 and 2015. Among the child-level factors, only insurance coverage was related to the decline in stunting. A decomposition analysis using child HAZ scores as the outcome of interest revealed a similar pattern of driving factors. However, in this analysis there were two additional significant driving factors – a woman having 4 or more ANC visits and increased birth spacing which contributed 3% and 1%, respectively to the improvement in HAZ.

For the anemia analysis there was limited relevant data available. Based on this limited data, the decomposition of changes in child anemia between 2005 and 2010 revealed very few driving factors. The prevalence of child fever was the largest driving factor (51%) followed by insurance coverage (49%). The decomposition of change in the underlying continuous variable, altitude adjusted child hemoglobin concentration yielded similar results. Child fever and insurance coverage were also the two primary driving factors for the improvements in hemoglobin (49% and 44%, respectively). However, in this analysis, child weight-for-height z-scores (WHZ) was also a significant driving factor at 7%.

Finally, the decomposition of women's anemia between 2005 and 2010 showed that fever prevalence at the village level was the largest driving factor for the reduction in women's anemia (46%). This was followed by use of hormonal contraceptives (43%). Other smaller contributions were made by an increase in household assets (4%) and having access to improved toilets (3%). The decomposition of women's altitude adjusted hemoglobin concentrations revealed slightly different results. Health facility births accounted for 38% of the change, followed by hormonal contraceptives (30%) and fever prevalence (24%). Increased household assets accounted for 4%, a reduction in the number of children born accounted for 2% and access to improved toilets accounted 1% of the change.

Leadership, Peace and Security and Decentralization

Between 1992 and 2017, Rwanda went from civil war and genocide to the reconstruction of the country. The leadership and governance, post the civil strife, created peace and security in the country which study respondents believed facilitated improvements in nutrition. Study participants highlighted that during the civil war and genocide there was a lack of focus on policies and programs which led to chaos, famine, and poor nutrition. During the reconstruction period, respondents believed that the leadership had improved both in terms of its orientation and through the decentralization of the government.

Study respondents noted that during the reconstruction phase and since, the leadership has become more "people-focused". They believed that this improved, "people-focused" leadership provided guidance and solutions to the problems faced by the population, including the country's nutrition problems, and helped create peace and security which allowed for stability. Stability, in turn, helped people to feel safe and free to work and invest in their development, well-being, and future and well-being. In addition, they believed that the increased stability helped facilitate the implementation of nutrition and nutrition-related programs.

Another major change during the reconstruction period was decentralization. With this, study respondents explained that the country's leadership came closer to the population through decentralized administrative and health infrastructures. They said that these efforts created

administrative levels with the ability and responsibility to act at the decentralized levels, increased and improved interaction between leaders and the population, and helped local leaders to be more informed on the problems facing their constituents. Furthermore, study respondents believed that the decentralized health infrastructures helped increase access to health services for communities due to the increased proximity of health centers and health posts to their communities and to an expanded cadre of health FLWs. These decentralized and expanded health services and health service providers also helped facilitate the implementation of nutrition and nutrition-related programs.

Commitment

Over the last 25 years, Rwanda increased its commitment to nutrition as evidenced by improvements in political, institutional and financial commitment to nutrition. However, some respondents noted that the level of financial commitment was still insufficient. Overall, responses from study participants pointed to a key role for the recently bolstered enabling environment³ for nutrition in Rwanda for driving reductions in malnutrition.

Improvements in political commitment were evidenced by leaders in Rwanda, such as the President, championing nutrition and inspiring the prioritization of nutrition through speech, discourse, and organization of nutrition summits. Study respondents felt that these efforts helped to increase nutrition awareness across administrative and leadership levels and put nutrition on the agenda. These stated intents in commitment led to the development of the first nutrition policy in the country and eventually to the development of the multisectoral National Food and Nutrition Policy 2013-2018 (NFNP).

The NFNP led to institutional changes that brought together different ministries or sectors to address nutrition. Three ministries, the Ministry of Health (MINISANTE), Ministry of Agriculture and Animal Resources (MINAGRI), and the Ministry of Local Government (MINALOC), co-owned the policy along with three key support ministries: Ministry of Education (MINEDUC), Ministry of Gender and Family Promotion (MIGEPROF), and Ministry of Defense (MINADEF). Each of these involved ministries had a specific role in nutrition and joint ownership or collaborations across the policy's seven key strategies. To aid the implementation of the NFNP, Rwanda invested in different nutrition coordination mechanisms and platforms to facilitate actions across the different sectors involved in nutrition at both the national and district levels. Furthermore, these changes in policy led to the creation and scale-up of programs designed to address the underlying and immediate determinants of malnutrition.

Lastly, some respondents believed that the country backed its actions through financial commitments as evidenced by the increase in nutrition and nutrition-related programs and services. Some study participants, however, believed that government spending in nutrition remained low and that overall funding for nutrition remained insufficient to carry-out all planned activities.

Coherence

Coherence in nutrition encompasses the clarity and consistency of communication and actions across coordination institutions (institutional coherence), sectors (horizontal coherence), and administrative levels (vertical coherence), and individual actors working to address nutrition. Over the past 25 years,

³ An enabling environment for nutrition is defined as “the political and policy processes that build and sustain momentum for the effective implementation of actions that reduce malnutrition [64].”

several improvements in institutional, horizontal, and vertical coherence were identified by study participants as having contributed to the improvements in nutrition observed. Despite the numerous improvements in coherence, several study respondents also noted areas that they thought could be strengthened to further support improvements in nutrition.

Rwanda established national level coordination bodies aimed at overseeing and facilitating coordination in nutrition. One of the national level coordination platforms established was the Social Cluster Food and Nutrition Steering Committee (SCF&NSC), comprised of the country's Social Cluster Ministries, which was established to oversee the coordination and the monitoring and evaluation of the NFNP. The Food and Nutrition Technical Working Group (FNTWG) was also established to bring together different stakeholders in nutrition to provide technical assistance and advice to the SCF&NSC. More recently in 2016, the National Food and Nutrition Coordination Secretariat (NFNCS) was established to improve synergy among nutrition stakeholders and to improve coordination and monitoring and evaluation.⁴ These platforms were believed to have helped increase nutrition awareness among leaders both at the national and sub-national levels, provided technical assistance to the government, and facilitated planning, implementation, and monitoring and evaluation of nutrition and nutrition-related activities across different sectors. It remains, however, important to clearly delineate the specific roles and responsibilities of each of the national level platforms and how they should work together as many respondents were unclear about how these different platforms should work together.

Horizontal coherence was demonstrated through the country's national and district multisectoral plans that promote cross-sector planning and monitoring and evaluation of nutrition activities and the joint implementation of nutrition and nutrition-related programs between ministries. The Joint Action Plan to Eliminate Malnutrition (JAPEM) is a yearly plan of all nutrition activities. The District Plans to Eliminate Malnutrition (DPEM) are derived from the JAPEM and are annual district level plans that consist of the nutrition community-based interventions and services outlined in the NFNP and offered within districts. DPEMs are monitored by multisectoral committees that consist of the actors from the different ministries involved in nutrition. Study respondents credited both the JAPEM and the DPEMs with contributing to increasing nutrition awareness at the leadership level and with helping the different ministries involved in nutrition to better understand how their responsibilities and activities could and would contribute to improvements in nutrition. Furthermore, these plans and the committees associated with them, increased coordination across sectors and the collective monitoring of these plans. The country also increased horizontal coherence through the joint implementation of nutrition and nutrition-related programs in the country. Implementation of these programs and vertical coherence were also facilitated by the country's decentralization efforts, which helped to improve clarity and consistency of actions across administrative levels.

According to study respondents, Rwanda's decentralized governance structures also helped to improve the joint action of agencies at different government levels, or vertical coherence, through the availability of staff responsible for nutrition at different administrative levels, and a well-integrated vertical chain of collecting monitoring and evaluation data. Good communication was also seen as a strength of the relationships between actors involved in nutrition at national and sub-national levels including between the different levels of government administration as well as between community leaders and NGOs and CSOs. District level respondents generally had favorable or neutral feelings regarding their relationships

⁴ Since our study was conducted, the National Food and Nutrition Secretariat was moved from the Ministry of Local Government and has been integrated with the national Early Childhood Development (ECD) program within the Ministry of Gender and Family Promotion.

with the national government, with some describing these relationships as reciprocal. Despite the positive views of many study respondents in relation to vertical and horizontal coherence, some concerns were raised. For example, some sub-national respondents had concerns regarding NGOs and IOs not delivering on the promises made regarding the implementation of programs and providing programs that do not address the population's needs. These stakeholders also cautioned on the duplication of efforts by organizations who conduct similar work in the same districts. These types of concerns were more often mentioned by respondents from non-reduced stunting districts compared to reduced districts.

Community

With established political and policy processes, Rwanda focused on expanding the provision of health and nutrition services and programs at the community level. Most of the programs mentioned were implemented by the health or agriculture sectors and have primarily targeted pregnant and lactating women (PLW) and children under the age of 5. However, programs led by other sectors such as gender, water, sanitation and hygiene (WASH), infrastructure and education were also mentioned as having contributed to improvements in nutrition.

In the health sector, study respondents explained that the government has increased the number and geographic spread of health centers and health posts. They explained that this increase, in combination with the Mutuelle de Santé or Community-Based Health Insurance Program, allowed for greater access to- and utilization- of health services. At the same time, the government also increased the number of health providers and improved their training, thereby improving the trust and relationship between health providers and the population and the quality of care provided. Furthering support at the community level, the government increased the number of community health workers (CHWs) to three per village, to sensitize the population on optimal nutrition and health practices such as breastfeeding, complementary feeding, and hygiene practices and to provide healthcare services such as treating malaria and supporting family planning.

The availability and access to these health and nutrition-related programs and services was believed by many to have led to an increase in the utilization of health services. For example, the increased proximity of health services at the community level, the availability of CHWs, and access to health insurance was thought to have helped to increase the number of children born in health facilities, participation in ANC visits, some improvements in the use of family planning, and improvements in the timeliness of care-seeking for both children and adults. These results are supported by the results found in the quantitative analysis of drivers of change, which showed that participating in 4 or more ANC visits, having had better quality ANC visits, giving birth in a health facility, having insurance coverage, and changes in women's fertility were key drivers of change in the decrease in stunting between 2005-2015.

Study respondents also noted changes in the agriculture sector to which they attributed some of the improvements in nutrition. Some of the services and programs within the agriculture sector that respondents credited with contributing to improvements in nutrition included the land consolidation program, kitchen gardens, One Cow per Family, and biofortification. FLWs in agriculture were also said to complement the work of CHWs through their work with kitchen gardens and their promotion of nutrition in their line work.

Programs and services in agriculture were believed by some to have led to increased food production, another key driver of improvements in nutrition according to study participants. Many study participants thought that increased food production had helped decrease famine and severe acute

malnutrition and helped increase consumption of healthier foods such as vegetables and household income. Those who thought that income had increased stated that this helped to pay for necessary goods such as food, clothing, soap, health insurance, livestock and school-related fees. Increased food production was also thought by a few to have helped improve the consumption of healthier foods. These respondents explained that people could now sell their surplus production and could use the profits to purchase other foods or that they could now afford to keep some of the healthier foods such as vegetables and eggs for household consumption.

Respondents also noted that changes in WASH contributed to nutrition improvements. Some respondents mentioned that efforts from the Ministry of Infrastructure had increased access to clean sources of drinking water and that households increased construction and use of latrines. Furthermore, study respondents believed hygiene practices had improved such as wearing shoes and washing hands and clothes more frequently. They believed these improved practices had positive effects on nutrition.

Many respondents also discussed the contribution of the education sector towards to improved nutrition. Since 2009, the country adopted the 9-Years of Basic Education policy which guaranteed free access to education for all children until the 9th grade. This policy, according to respondents, helped to decrease economic burdens on households and to increase school enrollment leading to an increase in the number of educated people in the country. The country also invested in nutrition-related school programs such as providing milk in some elementary schools, feeding programs in secondary schools, kitchen gardens, and covering nutrition topics in the primary and secondary school curriculum.

Respondents also credited improvements to nutrition to the availability of social protection programs and to improvements in infrastructure such as improved housing quality and accessibility of roads and electricity. Lastly, some study participants also mentioned that gender relations had improved which they believed led to women participating more in programs and in society, more generally. Some also noted more involvement of women in household decision-making. In-line with these changes, a few study participants believed that men's awareness of the nutritional needs of PLW and of children had increased. They also mentioned that more men were now attending preventive health services with their partners and children. Lastly, and perhaps most importantly, a few study participants believed that these changes in gender relations and women's roles in society and the household have contributed to a decrease in gender-based violence.

Differences Between Study Districts

Though changes in undernutrition, specifically in reducing stunting are moving in a positive direction at the country level - this trend has not been uniform across the country. The qualitative component of the study was designed to dive into this issue through the purposeful inclusion of districts in which stunting had decreased (reduced districts) between 2010-2015 and those in which it stayed stagnant or increased (non-reduced districts) over the same time. The results from the study highlighted some key differences between these two types of districts such as differences in the integration of agriculture in nutrition, implementation of DPEMs and participation in associated activities, relationships between actors, monitoring and evaluation, perceived changes in nutrition and the perceived contributors to those changes. Taken together, these results on differences between districts help explain what likely contributed to success in the reduced stunting districts and what prevented success in the non-reduced stunting districts. These results can aid program implementers and policymakers in identifying areas for future improvements to further reduce stunting in Rwanda and decrease disparity across districts.

The first main difference between the two types of districts was related to coherence, both horizontal and vertical, which were both weaker in non-reduced districts. Related to horizontal coherence, issues with the implementation of the DPEMs were more apparent in non-reduced compared to reduced districts. For example, in non-reduced districts the implementation of the DPEMs was characterized by study respondents having less participation and organization, less integration of sectors outside of the health sector, especially with the agriculture sector, and weaker evaluation of DPEMs. In addition, a few respondents from non-reduced districts expressed concern about the lack of support from development partners and believed that increased support from these types of partners would help facilitate better implementation of the DPEMs. When it comes to vertical coherence, non-reduced districts highlighted more shortcomings in their relationships with other actors and called for improvements in their relationships with the national government, NGOs, CSOs, and IOs.

Respondents from reduced stunting districts compared to non-reduced stunting districts described monitoring and evaluation activities differently. Respondents from reduced districts were more likely to discuss using a multisectoral approach for monitoring and evaluation for nutrition and using process and outcome indicators in their assessments of what was working in nutrition and what wasn't. The multisectoral approach described by respondents from reduced districts encompassed evaluating the nutritional situation in their district by integrating data from the different ministries or sectors involved in nutrition. In addition to using a multisectoral approach, respondents from reduced districts also noted that during DPEM meetings, they discussed results related to process and outcome indicators (e.g. number of households with established kitchen gardens or latrines, number of ANC visits women attended, etc.) to assess progress in nutrition. Comparatively, respondents from non-reduced stunting districts discussed using input indicators (e.g. amount of food products distributed, number of cooking demonstrations conducted and the number of participants, etc.) to assess progress. From the key informant interviews, it appeared that monitoring and evaluation for nutrition was more robust and integrated in reduced compared to non-reduced districts. Supporting this general impression, some respondents from non-reduced stunting districts specifically called for improvements in monitoring and evaluation, whereas, this was not the case in reduced districts. They asked for more training in nutrition, generally, and in the use of monitoring and evaluation tools because they believed that the lack of this knowledge and skills led to the poor use of data already available to them. Lastly, a few respondents suggested the need for better indicators to evaluate nutrition.

At the community level, the differences in observed nutrition trends appeared to be apparent to study participants. For example, only a few respondents mentioned a deteriorating nutrition situation in their communities over the last 25 years, but of those who did, almost 80% were from non-reduced districts. Regarding the deterioration in nutrition, the most commonly mentioned contributor mentioned was decreased food availability. This was more commonly expressed by participants in FGDs in non-reduced stunting districts compared to reduced districts (35% and 10%, respectively). Regarding improvements in nutrition respondents from reduced stunting districts were more likely to attribute these changes to improvements in leadership, the availability of programs and services in the health and WASH sectors and to improvements in knowledge. Respondents from non-reduced districts, on the other hand, were more likely to discuss changes in the agriculture sector describing increased availability of programs and services and increased visibility of agronomists. Although a similar proportion of respondents attributed changes in the nutrition to changes in the education sector, the aspects of education to which they attributed improvements differed. Respondents from reduced, compared to non-reduced districts, were

more likely to emphasize the role of increased access to education as having played a role in improving nutrition (92% and 71%, respectively). Whereas, those in non-reduced compared to reduced districts were more likely to attribute positive changes in nutrition to the nutrition-related programs delivered through the education sector (75% and 67%, respectively) and to the nutrition-related curriculum provided through schools (46% and 21%, respectively).

The perceived contributors to improvements within population groups also differed by the two types of districts. For PLW, respondents from reduced stunting districts were much more likely to discuss the role of health services in the improvements in PLW nutrition than were those from non-reduced districts. Specifically, they were more likely to discuss the increase in the availability of health services, the increase in CHWs and the increased utilization of health services as contributing to improvements in PLW nutrition. For children 0-2 years of age, respondents from reduced districts compared to non-reduced districts were more likely to attribute the improvements in nutrition to health services (50% and 22%, respectively), improved practices (40% and 0%, respectively) and specifically improved infant and young child feeding (IYCF) practices (32% and 24%, respectively). On the other hand, respondents from non-reduced districts were more likely to attribute improvements in the nutrition of children 0-2 years of age to programs in general, compared to those from reduced districts (67% and 20%, respectively).

Challenges and Moving Forward

The Government of Rwanda has made many important achievements in their quest to improve nutrition, especially for PLW and children under five years of age. These achievements have spanned the three main themes addressed in the qualitative study; commitment, coherence and in changes at the community level. These achievements have contributed to decreases in the prevalence of stunting and anemia among children under five years of age and in anemia among women of childbearing age. Despite these achievements, several challenges to further progress were highlighted through this study. Rwanda will have to keep the momentum of positive changes it has achieved while also looking for new ways to address the remaining challenges such as those related to financial constraints and subsequent financial commitment to nutrition, policy and institutional coherence, horizontal coherence, monitoring and evaluation and community-level issues related to poverty, food security, gender relations and health, nutrition and hygiene practices.

Financial commitment, specifically, funding was one of the main key challenges highlighted in the study. Some respondents thought that government funding for nutrition should increase and that the country should seek innovative ways to increase financial commitment to nutrition. They believed that securing such commitment could improve the implementation of the NFNP, the country's nutrition and nutrition-related programs, and provide adequate resources to coordinate nutrition.⁵

Although many improvements were made in coherence over the past 25 years, several respondents noted areas for further improvements across institutional, horizontal and vertical coherence. Institutional coherence can be further improved by clearly differentiating and outlining the responsibilities of the different coordination bodies at the national level. In relation to horizontal coherence, respondents highlighted three main areas for improvement related to the scope of the

⁵ Post our study, Rwanda did receive large investments in nutrition and other nutrition-related sectors from the World Bank, USAID, and the European Union, which may help to address challenges in funding for nutrition.

JAPEM meetings, coordination across ministries to implement policies and programs and the implementation of DPEMS. Some respondents felt that JAPEM meetings could be better utilized to ensure clear coordination of activities across sectors and that results from those meetings could be more widely shared to help others understand how well the plan was working and if changes were needed. The second area of improvement mentioned was around coordination. Overall, there was a consensus that the mission and roles of the different sectors or ministries involved in the nutrition policy were clear, but some believed that there was a lack of clarity on the actions needed to achieve those missions. This lack of coordination led ministries or sectors to work in silos, implementing their own sector policies but not necessarily working together, according to respondents. It also had implications for the implementation of DPEMs and DPEM committee meetings. While DPEM committees provided a space for the different sectors to convene together to work on nutrition at the district level, some felt like the DPEMs were not always well implemented or that they functionally worked towards integration. In addition, study respondents highlighted issues related to funding and the lack of a nutrition convener to oversee the implementation of the DPEMs. A few study respondents, especially from districts with non-reduced stunting stated that there were still several challenges related to monitoring and evaluation for nutrition including the need for; adequate training to use monitoring and evaluation tools, improvements in the quality, validity, and relevance of the data collected, and the establishment of a national integrated monitoring and evaluation system for nutrition. Related to vertical coherence, respondents from non-reduced districts were more likely than those from reduce districts to mention the need for improvements in their relationships with different types and levels of actors. First, respondents from non-reduced districts requested more support from the national government. In addition, they mentioned the need to have better designed programs that were tailored to the needs of the population and that had greater coverage. It was also evident that from the perspective of the district and community respondents, that improvements in planning and coordination were needed, again, especially in districts with non-reduced stunting.

Study respondents had a few suggestions related to improving coordination through hiring nutrition conveners to oversee the implementation of DPEMs, through the development of the new nutrition policy and through the creation of a clear coordination framework. Respondents asked for the new policy to reinforce the integration of nutrition in all sectors and to clearly define through action plans how nutrition would be integrated within those sectors. It was also suggested that DPEMs be reinforced at the different sub-district levels (e.g., sector, cell, village) and receive increased staff support such as a focal person to make sure the plan is operationalized and monitored well. Lastly, two interviewees suggested that the new policy consider creating more bachelor's and master's nutrition programs to increase the number of nutrition experts in the country. Respondents also suggested that Rwanda develop a clear coordination framework that differentiates the roles of the different coordination bodies that exist and how they should work together.

Many of the different stakeholders who partook in this study also placed a strong emphasis on the need to improve monitoring and evaluation for nutrition. They recommended establishing an integrated national monitoring and evaluation and results frameworks for nutrition that goes beyond reporting on activities to include evaluation and learning from what is happening in the country. It was also noted that improvements in these frameworks should go along with increasing training for the proper use of such tools. Lastly, it was also suggested that more context-specific data should be collected and used to inform revisions to policies and programs instead of relying solely on theories of change in nutrition and studies from other countries.

Improvements in the political and policy processes, along with the reinforcement of nutrition and nutrition-related programs already in existence in the country could help the country continue its positive trend in reducing undernutrition. While the agriculture sector has improved food production, it will be important to address how issues related to food security, including access and affordability of healthy foods, and food diversity at the household level will be addressed. Because of the perceived impact of climate change and the reported low use of innovations and technology in agriculture, the country may also need to find new nutrition-sensitive solutions for the agriculture sector. Lastly, while behavior change communication (BCC) and community sensitization have played big roles in increasing the sharing of health, nutrition and hygiene information and changing some behaviors such as health-seeking behaviors, food preparation, and some hygiene practices such as using latrines, washing hands, and wearing shoes and clean clothes, it will be important to continue sensitizing and promoting optimal behaviors. Lastly, policies and programs will need to continue to address the structural barriers that hinder households from implementing some of these optimal practices in hygiene, child and maternal feeding practices (e.g. access to clean water, increasing food security and reducing poverty, etc.).

Conclusion

Rwanda made significant progress in improving nutrition outcomes over the last 25 years. The push for change was facilitated by strong political commitment to nutrition and developments in institutional commitment that solidified multisectoral approaches. The government also took steps to develop institutional, horizontal, and vertical coherence, though it will need to improve the operationalization of these different forms of coherence in order to improve implementation of the NFNP, increase integration of nutrition in different sectors involved in nutrition, and collaborations between these sectors. The country will also need to develop a more integrated monitoring and evaluation system for nutrition nationally. To achieve these things, the country will need to move from a focus on raising awareness to providing more technical trainings to the leaders in charge of nutrition, improving monitoring and evaluation tools and systems, and increasing financial commitment to nutrition. Improving coherence will be instrumental for continued progress in improving nutrition outcomes, as it was one of the biggest differences observed between the two types of study districts. At the community level, FLWs in health and agriculture helped to improve the implementation of nutrition and nutrition-related programs and collaboration across sectors also seemed to be stronger at this local level than at the district and national levels, but improvements in this area were still needed especially in non-reduced districts. It was not surprising then that FLWs, especially CHWs, were viewed as key to the changes observed in nutrition, by respondents. It will be important to sustain their achievements in coming years which may include increasing incentives and being cognizant of their workloads so as not to overburden them. Lastly, it will also be important to address food security for the most vulnerable households in communities and the impact of climate change on agriculture and nutrition as these things were perceived as key barriers to improving nutrition by many community members.

1. Introduction

Globally, undernutrition is related to almost half of the deaths in children younger than five years of age, with the largest burden occurring in Africa and South Asia [14]. Increased mortality and morbidity in childhood, along with poor child growth and development, and decreased productivity in adulthood are all consequences of undernutrition that lead to large human and economic costs to countries.

Undernutrition can be prevented through interventions that are available today, are feasible to implement in low-income countries, and have been shown to work [14]. However, less is known about how to effectively implement these interventions at scale, and what mix of interventions is needed to effectively address the multiple co-existing nutrition problems in different contexts (including through the use of nutrition-sensitive programs) [15]. Reducing and ultimately eliminating undernutrition has, therefore, been on the forefront of the political agenda of many countries and global movements such as Scaling Up Nutrition.

Over the last 25 years (1992-2017), Rwanda has experienced civil war, genocide, and the reconstruction of the country post these unfortunate events. During the reconstruction phase, Rwanda has experienced positive trends in the reduction of undernutrition. Between 2005 to 2015, wasting decreased from 5% to 2% among children less than 5 years of age [2]. Stunting has also decreased from 51% in 2005 to 38% in 2015. Likewise, over this same time period, the prevalence of anemia among children (aged 6 months to 5 years) and adult women (15 – 49 years) has decreased (14 pp from 51% to 37% for children and about 6 pp for women from 26% to 19%). Despite these improvements, stunting and anemia remain public health concerns due to the remaining high prevalence of these nutritional issues. Furthermore, while undernutrition may be decreasing nationally, the change has not been uniform across the country. Rather, there have been variations in both stunting prevalence and rates of change in stunting across the country's 30 different districts. To address the remaining malnutrition problems in Rwanda, the Rwandan government in recent years has continually increased its commitment to nutrition and has implemented multiple actions to address these problems both directly and through actions to address the underlying and basic causes of malnutrition.

The Stories of Change (SoC) case studies, previously conducted in Bangladesh, Ethiopia, India (Odisha state), Nepal, and Zambia, aimed to document the drivers of change in undernutrition and the narratives of how different countries were able to foster enabling environments and reduce undernutrition [16]. Similarly, in Rwanda, the SoC study described herein, aims to document the drivers of change for the observed reductions in undernutrition within the Rwandan context and to gain greater clarity on the roles that commitment, program and policy coherence and context-specific factors have played in creating an enabling environment for nutrition, and in turn, have contributed to reducing undernutrition. In addition, considering the Rwandan context in which the decrease in stunting over the past 10 years has varied across districts, we also sought to understand what contributed to this differential success across districts. Lastly, through this study we aimed to identify opportunities to accelerate progress in reducing undernutrition in Rwanda. These results can be used for guiding future strategies and investments in nutrition within the Rwandan context. In addition, these results may also be informative for other countries with similar profiles seeking to address undernutrition problems.

In this report we will describe the quantitative and qualitative methods used for this study in Section 2. We will then present the results for the quantitative analysis that assessed the drivers of change in

nutrition between 2005 to 2015 based on nationally representative data (Section 3). In section 4, we will present the perceptions of study respondents as to what has changed in nutrition over the past 25 years. In section 5 we describe key events in nutrition over the past 25 years and in sections 6, 7 and 8 we will explore how commitment, coherence, and changes at the community-level contributed to changes in nutrition according to study respondents. In Section 9 of this report, we'll highlight the differences observed between the two types of study districts included in the study (those in which stunting had decreased between 2010-2015 (reduced districts) and those where it had either increased or was stagnant over the same period (non-reduced districts). We will then conclude with a discussion of the main findings from the study and recommendations for future programs and policies based on the findings detailed in this report.

2. Methods

Overview

This study was developed in line with the original SoC case studies. Like these previous case studies, we used both quantitative and qualitative methods to address the overarching question of how and why changes in nutrition occurred in a specific context with a high burden of undernutrition. In Rwanda, the overall aims in conducting this case study were to 1) assess the drivers of change in stunting and anemia reduction using available quantitative data, 2) understand how nutrition outcomes were perceived to have changed in Rwanda over the years and what study respondents believed contributed to these changes, 3) understand how these changes in nutrition and contributing factors differed between districts with reduced stunting compared to those with non-reduced stunting, and 4) understand what the remaining nutrition challenges are and potential solutions to these problems (**Table 1**).

Table 1:Key questions addressed through the quantitative and qualitative analysis

Overarching questions	Theme	Specific questions	Quantitative/ Qualitative or both
1. Based on available quantitative data, what were the factors that drove the observed reductions in undernutrition over the last 10 years (2005-2015) ?		<ul style="list-style-type: none"> • What were the drivers of changes in stunting and anemia among children (0-59 and 6-59 months of age, respectively)? • What were the drivers of change in anemia among women 15-49 years of age? 	Quantitative
2. Based on the perceptions of study participants, how have nutrition outcomes changed in Rwanda over the last 25 years and what contributed to these changes?	Commitment [17], [18]	<ul style="list-style-type: none"> • What nutrition-related policies and programs has the government of Rwanda adopted? • Which sectors are implicated in addressing nutrition and how have these sectors addressed nutrition? 	Qualitative
	Coherence [19]	<ul style="list-style-type: none"> • What are the processes followed to coordinate actions across the involved sectors in addressing nutrition (i.e. how is horizontal coherence achieved)? • How has the NFNP been translated and implemented at the district and community levels through partnerships with local government staff, national, and international NGOs (i.e. how is vertical coherence achieved)? 	Qualitative
3. How did the changes in nutrition and factors perceived to have contributed to those changes differ by reduced and non-reduced districts?	Community	<ul style="list-style-type: none"> • How have monitoring and evaluation activities been used to inform policies and programs? • How do community members perceive the current state of nutrition in their communities? • What factors do community members believe have led to the perceived changes in nutrition? 	Qualitative
4. What are the remaining nutrition challenges and how could these be addressed?	Commitment	<ul style="list-style-type: none"> • What are the perceived current and future challenges in commitment and how can these be addressed? 	Qualitative
	Coherence	<ul style="list-style-type: none"> • What are the perceived current and future challenges in coherence and how can these be addressed? 	Qualitative
	Community	<ul style="list-style-type: none"> • What are the remaining nutrition problems and how can these be addressed? 	Both

Quantitative component

The primary objective of the quantitative component of this study was to use available data that were nationally representative of Rwanda to identify the “drivers of change” or the “driving factors” that plausibly contributed to the reduction in stunting among children 0-59 months of age. A secondary objective was to identify the factors that plausibly contributed to improvements in anemia among children 6-59 months of age and women 15-49 years of age.

To identify potential drivers of nutritional change, we used a regression-decomposition approach. Following previous applications of this approach by Headey and Hoddinott in several South Asian and sub-African countries [20]–[23], we followed four basic steps:

1. Prepared DHS data from 2005, 2010, and 2014/15 so that all variables were standardized across surveys.
2. Analyzed trends over time in child stunting (0-59 months), child anemia (6-59 months), and anemia in women of reproductive age (15-49 years) and potential determinants (explanatory variables).
3. Conducted multivariate regression analysis to identify factors that had statistically significant associations with the nutrition outcomes (regression coefficients) and ran tests to assess any significant differences in the coefficients across the multiple time periods.
4. Used the observed changes in the means of the explanatory variables and the regression coefficients to estimate the predicted change in nutrition status that was attributable to each explanatory variable.

In the following sections, we expand on each of these steps. We describe the overall approach, which was similar for each of the three nutritional status outcomes and highlight aspects of the analysis that differed by outcome.

Data preparation

For this study component, we used Rwanda DHS data from 2005, 2010, and 2014/15 [11]–[13]. We chose these datasets for several reasons. They are nationally representative, have multiple rounds of data collected using similar methods, include data on anthropometry (to determine stunting) and hemoglobin concentration (to determine anemia status) of children younger than 5 years old and women of reproductive age (15-49 years), and had data on several factors known to be associated with these nutrition status outcomes [20], [24]. Lastly, given the similarities across these datasets, we were able to construct identical indicators across multiple survey waves, allowing for the type of analyses conducted.

Our main outcomes of interest were stunting among children 0-59 months, anemia among children 6-59 months, and anemia among women of reproductive age (15-49 years). Children who were less than two standard deviations below the mean of the growth reference standards on height-for-age z-scores⁶ (HAZ) were considered stunted [25]. For anemia, hemoglobin was adjusted for altitude. Children were classified as anemic if their altitude-adjusted hemoglobin was less than 11.0 grams/deciliter (g/dl). Adult women were considered anemic if their hemoglobin concentration was below 12.0 g/dl for non-

⁶ Recumbent length was measured for children younger than 24 months old.

pregnant women and below 11.0 g/dl for pregnant women [26]. All binary variables used in the analyses were constructed as 0/1, where 1 implies that the condition is true (e.g., the child is stunted), and 0 is otherwise.

The hypothesized predictors of change for each outcome of interest (child stunting, child anemia, and anemia among adult women) were selected based on evidence of their relationships with that outcome and their availability in the DHS data. **Table 2** shows a list of all indicators that were used, explains how they were constructed, and indicates whether they were measured at the child, mother/woman, household, village, or provincial-level. We also indicate for each of these variables, with footnotes, whether they were used in the analyses of child stunting, child anemia, and/or women's anemia. At the child level, we constructed variables for gender (0= male and 1=female), age, being born at a health facility, being born less than 24 months after the mother's last child was born (short birth intervals), insurance coverage, if the child had fever or diarrhea in the past 2 weeks, if the child slept under a treated bednet, and weight-for-height z score (WHZ). All variables with the exception of age and WHZ were binary variables.

At the mother level, we constructed variables for age, years of education, if she attended four or more antenatal care (ANC) visits during her last pregnancy, number of children born to her, mother's age at time of birth of each of her children under 5 years of age, if she gave birth in past year, if she was currently pregnant, if she currently used a hormonal contraceptive, if she slept under a treated bednet, and her height. The variable for four or more ANC visits is based on the WHO and Rwanda MINISANTE recommendations at the time when data was collected [27]. Because ANC information was only asked for the woman's most recent pregnancy, it was aggregated at the mother level for mothers with multiple children in the sample. Maternal height (cm) was measured directly.

Household level factors included an asset score, access to an improved water source, access to improved toilets and partner's education. To construct an asset score, we selected household assets for which data was available for all three survey waves: ownership of radio, TV, refrigerator, bicycle, motorbike, and car, improved floor material (defined as finished material: polished wood, vinyl, ceramic tiles, cement, or carpet, compared to earth, wood planks, or bamboo), and access to electricity. We then used principal component analysis to derive weights for each of these assets and calculated a wealth index score based on these weights. Finally, we scaled the wealth index score from 0-10, whereby 0 represented the households with the lowest level of asset ownership. Access to an improved water source was coded as 1 for piped water, public taps, tube wells, boreholes, protected springs, and rainwater collection and was coded as 0 for unprotected wells or springs, tanker trucks or rivers/ponds/lakes/dams. Access to an improved toilet was coded 1 for flush to piped sewer system or septic tank or a pit latrine, a ventilated improved pit latrine[28] and coded 0 for open pit, composting toilet, no facility, or a hanging toilet. Finally, we used the number of years of education of the mother's husband (or partner in an informal unions). For women that did not have partners at the time of data collection, this variable was coded as 0 to reduce bias in the estimates.

We constructed several village-level indicators that were aggregates of individual-level data: vaccination coverage, health facility births, ANC Quality, child fever in the past two weeks and open defecation. In the case of health-service data it was necessary to construct village-level aggregates, because the

questions were only asked for children in a particular age range (vaccination coverage) or with regard to the mother's most recent birth (health facility births and ANC quality). The village-level vaccination coverage variable was the percentage of children 11-59 months old that received all of the following recommended vaccinations: one dose of Bacille Calmette Guerin, one dose of measles, three doses of pentavalent, and one dose of polio. Vaccinations that were added to the national vaccination schedule after 2005 (e.g., rotavirus) could not be included. For the women's anemia analysis, we constructed a village-level aggregate for the proportion of children who experienced a fever in the past two weeks as a proxy for the general level of fever-inducing infections present in the village. In addition, an aggregate of births in a health facility was also constructed as a proxy for healthcare access for the women. The village-level ANC quality score was the village-level mean of the number of ANC services received by women during the most recent pregnancy. In the case of open-defecation, all households were asked about this, and we used the village aggregate as a proxy for the village-level sanitation environment [29] which takes into account the negative externalities of open defecation in which effects are experienced by those who live nearby [22]. The specific analyses that these village-level aggregates were used in is noted in Table 2.

For other village-level characteristics, we constructed a binary indicator for whether the household was in a rural or urban area (rural=1, urban=0) and whether the center of the village was above 1,600 meters to account for lower malaria transmission as higher altitudes. Lastly, at the provincial level, we merged data from the Malaria Atlas Project on the prevalence of malaria prevalence among children 2-9 years of age for each survey wave.

Table 2: Predictor variables used in the study

	Definition
Child level	
Gender ^{1,2}	Child is female = 1 and male = 0
Age (months) ^{1,2}	Age of child
Born in a health facility ^{1,2}	Child was born in a health facility
Birth interval <24 mo ^{1,2}	Child born less than 24 months after the mother's last child was born
Insurance coverage ^{1,2}	Child covered under health insurance in past 6 months
Fever ²	Child had fever in the last 2 weeks
Diarrhea ²	Child had diarrhea in the last 2 weeks
Weight-for-height z-score ²	Weight-for-height z-scores
Slept under treated bednet ²	Child slept under a treated bednet the previous night
Woman/mother level	
Education (y) ^{1,2,3}	Number of years of schooling
Age (y) ³	Age in years
Age at birth of child ^{1,2}	Two dummy variables: maternal age at time of birth of child < 20 years and maternal age at time of birth of child > 39 years
Attended 4+ ANC visits ^{1,2}	Attended 4 or more antenatal care (ANC) visits during her most recent pregnancy.
Number of children ever born ^{1,2,3}	Number of live births
Gave birth in past year ³	Gave birth in the past year
Currently pregnant ³	Pregnant at the time of the survey
Uses hormonal contraceptive ³	Currently use a hormonal contraceptive
Slept under treated bednet ³	Slept under a treated bednet the previous night
Height (cm) ¹	Height
Household	
Asset score (0-10) ^{1,2,3}	Asset index based on principal components analysis across the pooled three rounds of data and scaled to 10. Included: radio, TV, refrigerator, bicycle, motorbike, car, floor material, access to flush toilet, access to piped water, access to electricity.
For mothers, partner's education (y) ^{1,2}	Number of years of schooling for mother's partner or husband
Improved water source ^{1,2,3}	Access to an improved drinking water source according to WHO definition
Improved toilet ^{1,2,3}	Access to an improved toilet according to WHO definition
Village	
ANC quality (0-5) ¹	Sum of 5 indicators for basic ANC services reportedly received during most recent pregnancy: blood sample taken, blood pressure taken, urine sample given, received information about pregnancy complications, and received iron supplements.
Vaccination coverage (0-1) ¹	Proportion of children that received 8 basic vaccinations
Open defecation (0-1) ^{1,2,3}	Proportion of households that practice open defecation
Child fever (0-1) ³	Proportion of children that had fever in past 2 weeks
Health facility births (0-1) ³	Proportion of children born in a health facility
Rural ^{1,2,3}	Household is in a rural area
High altitude ^{2,3}	Altitude is greater than 1600m
Province	
Malaria prevalence ^{2,3}	Malaria prevalence of the province during survey year

¹ Variables that we tested to include in the models for stunting, ² Variables that we tested to include in the models for child anemia, ³ Variables that we tested to include in the models for anemia of adult women

There were several other indicators that we would have liked to include in our analyses however, were unable to do so, either because they weren't available in one or more waves of DHS data or there were problems with large amounts of missing data. These include data on women's dietary intake (not collected), children's dietary intake and IYCF practices (large amounts of missing data), use of deworming treatment by children, and women's participation in nutrition counseling (both available only for 2010 and 2015).

Data analysis

Descriptive analysis of nutritional status

We began our analyses with a descriptive analysis of each of the three outcomes of interest. We calculated weighted means of child stunting, child anemia, and women's anemia at the national level, for each of the 5 provinces in Rwanda (Kigali, North, South, East, West), and at the rural/urban level for each wave of the survey (2005, 2010, and 2015). We also calculated the overall change between 2005 and 2015 to facilitate comparisons in the overall trends across geographical areas.

We then examined the distributions of the continuous variables (child HAZ, child hemoglobin concentration, and women's hemoglobin concentration) that underlie each of the primary outcomes of interest by survey wave to examine how these distributions changed across time. To do so we used kernel density plots, which measure the probability that the outcome variable falls within a specific range of values. Based on the observed sample, kernel density plots allow us to visually make an inference about how the outcome variable is distributed in the population. We produced these plots for each outcome and survey year. For the child-level outcomes, we plotted the mean of the continuous variable (HAZ and hemoglobin concentration) by child age (in months) by running a linear regression model to examine the age-related patterns of undernutrition and compared these patterns across the three waves of data [30].

Descriptive analysis of the hypothesized determinants of nutritional status

We then examined descriptive statistics for the hypothesized drivers of nutritional change. We calculated the mean of each of these variables for each wave of data and examined whether there were improvements or declines in each of these factors. We then plotted each of the hypothesized determinants against HAZ and hemoglobin concentrations to examine the patterns of associations. This informed whether to use linear specifications to describe each of these relationships, or alternative specifications. In the interest of space, these plots are not shown.

Regression analysis

We used multivariate linear regression to estimate the relationships between the hypothesized determinants of nutritional status and each of the outcomes of interest (child stunting, child anemia, and anemia among women of reproductive age). We estimated a model that pooled all three waves of data as well as separate models for each wave of data, which also included fixed effects for survey year. These estimates can be described with the following equation:

$$(1) N_{it} = \beta X_{ik} + \mu_i + T + \varepsilon_{it}$$

In this equation, (N) is the nutritional outcome of interest for individual i at time t . β is a vector of estimates of the hypothesized drivers and control variables. Provincial fixed effects are represented by μ_i , dummy variables for survey year by T , and an error term by ϵ . k represents whether the variable was constructed at the individual, mother, or village level. We examined the size and significance of the estimates for each of these hypothesized drivers. We also tested whether the coefficients for each factor were similar across the three survey waves [31]. The limited differences in the size of the coefficients across survey waves allowed us to assume that the pooled regression model was appropriate for describing the relationship at all three survey waves.

Decomposition analysis

We then decomposed the hypothesized drivers of change. In our case, where the estimated effects of the hypothesized drivers do not vary substantially across the three waves of data, the relative contribution of each hypothesized driver is the product of its coefficient for the pooled regression and the difference in its mean value, as described in the following equation:

$$(2) \Delta N_t = \beta \Delta X_k$$

The difference between the total change and the sum of the changes that all the hypothesized factors contribute is considered unexplained by the model.

In the case of child stunting, we decompose the drivers of nutritional change for the overall period (2005 to 2015) and for each of intermediate time intervals between survey waves (2005 to 2010 and 2010 to 2015). For child anemia, improvements in the outcome indicator and the hypothesized determinants between 2010 and 2015 were negligible. As a result, we excluded the 2015 data from further analysis and only analyzed the drivers of change in child anemia between 2005 and 2010. Finally, for anemia among women, which did not improve between 2010 and 2015, we only conducted the decomposition analysis between 2005 and 2010.

Qualitative component

The qualitative component of this study was intended to complement the quantitative analyses and to provide more in-depth information about what may have contributed to the observed changes in stunting and anemia, understanding the policy environment in Rwanda, and what could be done to further accelerate progress in eliminating nutrition-related problems in the country. Our approach to the qualitative component of this study aimed to capture this information from the perspectives of a diverse set of stakeholders from the national to the community level. These stakeholders included individuals at the national level involved in policy development, policy and program implementation, nutrition funding, and advocacy. At the district level, we interviewed district leaders involved in the implementation of nutrition and nutrition-related policies and programs. Lastly, we also sought the perspectives of stakeholders at the community level, which included in-depth interviews with FLWs (community health workers (CHW) and agriculture extension workers) and FGD with community members.

Interview instruments were developed for each type of respondent, but all instruments concentrated on the topics of nutrition and changes in nutrition over the last 25 years, changes in other sectors affecting nutrition, the policy environment and changes in the policy environment, coordination, nutrition and

nutrition-related programs, facilitators and barriers, budget, and interactions between different actors in nutrition. A separate guide was developed for FGD; this guide focused on nutrition and changes in nutrition, well-being and the different levels of well-being, and maternal and child health and nutrition. On average, interviews at the national and district level lasted about 1.5 hours. FGDs averaged 2.5 hours. Consent was sought prior to each interview and FGD for both participation and audio recording. If more than one person participated in an interview, each person signed a consent form. For FGDs, consent was sought verbally from the group and one person was selected to sign a group consent form.

The study received IRB approval from the University of South Carolina, the International Food Policy Research Institute, and the Rwanda National Ethics Committee. Data collection was conducted between June and November of 2017.

Data collection at national level

We conducted a total of 32 key informant in-depth interviews at the national level. We purposively sampled for stakeholders who represented government actors, donors, IOs and NGOs involved in the implementation of nutrition and nutrition-related programs, and CSOs (**Table 3**). For government actors, we aimed to interview both ministry leaders (n=2) and technical staff (n=6) such as the nutrition focal persons from the key ministries involved in nutrition, per the national nutrition policy. These ministries included the MINISANTE, MINAGRI, MINALOC, MINEDUC, MIGEPROF, and the Ministry of Infrastructure (MININFRA). We were not able to interview a government actor from the Ministry of Infrastructure, however, and were only able to interview ministry leaders from two of the mentioned ministries (MINEDUC and MIGEPROF). These respondents will be referred to as government national level respondents.

For donors and program implementers, SNV-Rwanda, the NGO we partnered with for this study, identified the most active donors (n=3), IOs (n=4), NGOs (n=7), and CSOs (n=10) working in nutrition. The organizations were contacted via email or phone and asked if they would participate in the study. The organizations themselves chose who they thought was best to participate in the study given the topic of the study and the selection criteria that respondents must have spent at least 2 years working in Rwanda. Interview participants ranged from one to five individuals per organization. Some of the study respondents at the national level were also identified through snowball sampling, as study participants gave recommendations of people they thought would be important to talk to, given the study's goals. These respondents will be referred to as non-government national level respondents (**Table 3**).

Table 3: Number of study respondents by category at the national level

Administrative Level	National N=32
Government national level respondents	
Ministry leaders	2
Ministry technical staff	6
Non-government national level respondents	
International organizations and donors	7
Non-government organizations	7
Civil society organizations	10

Data collection at district level

Given this study's aim to understand how changes occurred in nutrition over the last 25 years in Rwanda and given the variability in stunting reduction among the 30 districts, we purposively selected study districts from the five provinces that make up Rwanda. In each of the provinces, we selected one district in which stunting was reduced (reduced district) and one in which stunting increased or was stagnant (non-reduced district) between 2010 and 2015 for a total of 10 study districts (**Table 4**).

Table 4: Changes in stunting prevalence in reduced and non-reduced stunting study districts

Province	Reduced districts			Non-reduced districts		
	District name	2015 prevalence	2010-2015 change (pp)	District name	2015 prevalence	2010-2015 change (pp)
Northern ¹	Gakenke	46%	-17.6	Musanze	38%	-7.5
Eastern	Kirehe	29%	-21.3	Bugesera	39%	+1.4
Western	Rutsiro	46%	-14.5	Nyabihu	59%	+7.5
Southern	Gisagara	38%	-10.1	Ruhango	41%	+20.4
Kigali	Gasabo	22%	-1.5	Nyarugenge	29%	+0.4

¹ In the northern province stunting decreased in all districts between 2010 and 2015 with a range of -7.5 to -17.6 pp change. Thus, for the northern province we selected the two districts on the extremes but in this case all districts experienced a decline in stunting.

In Rwanda, the implementation of the food and nutrition policies is decentralized and led at the district level through the District Plans to Eliminate Malnutrition (DPEM) and their committees. Therefore, we conducted key-informant interviews with the district leaders involved in the implementation of DPEMs. In each study district, we interviewed the vice mayor of social affairs (n=8), director of health (n=9), director of agriculture (n=10), and district nutritionist (n=11) for a total of 38 interviews (**Table 5**). Due to scheduling issues, we were not able to interview 2 vice mayors and one director of health. One of the Kigali City districts did not have a district nutritionist. For this district, we interviewed two nutritionists, one from a rural health center and one from a city health center. These respondents will be referred to as district leader respondents.

Table 5: Total district and community level sample

Administrative Level	Reduced		Non-Reduced	
	District	Community	District	Community
District leader interviews				
Vice Mayor of Social Affair	4	-	4	-
Director of health	5	-	4	-
Director of agriculture	5	-	5	-
District nutritionist	6 ¹	-	5	-
Frontline worker interviews				
Agricultural extension workers	-	5	-	5
Community health workers	-	5	-	5
Focus group discussions				
Male focus group discussions	-	10	-	10
Female focus group discussions	-	10	-	10

¹ One district did not have a district nutritionist at its district hospital. We instead interviewed a nutritionist in an urban setting and one in a rural setting within the same district.

Data collection at community level

Within each of the 10 study districts, we selected two sectors (an administrative sub-level) with low and mid-low socio-economic indicators (n=20) based on the type of roof, wall, and energy used for lighting in that district using Rwanda's Fourth Population Housing Census [4]. In each of the sectors, one FLW (either a CHW or an agriculture extension worker), was selected to participate in an in-depth interview. In total, we interviewed 10 CHWs and 10 agriculture extension workers. Furthermore, we conducted two FGDs in each sector, one with only male participants and one with only female participants, for a total of 40 FGDs. Each FGD consisted of about 10 males or 10 females between the ages of 35 to 65 whose main work was in agriculture. By design, at least three of the 10 participants also had children between the ages of 0 to 59 months.

Data analysis

Qualitative data analysis was grounded in the SoC "5 C's framework". This framework examines the changes and challenges in three guiding categories: commitment, coherence, and community. The commitment category consists of political, institutional, and financial commitment; it assesses how political attention and pledges are translated into changes in decision and actions. Coherence consists three sub-categories: institutional, horizontal, and vertical coherence. Overall, it examines how commitment becomes embedded and reflected in institutional structures and processes in a mutually reinforcing manner. Lastly, the category of community examines the perceptions of study respondents regarding the state of nutrition and what they believe has contributed to any observed changes in nutrition in their local communities.

To analyze the data, separate a priori coding lists were developed for interviews and FGDs based on their instruments and the three guiding categories. Emergent codes were also identified to capture context specific information. Codes were stratified into five strata that represented national level stakeholders, district leaders and FLWs from districts with reduced stunting, and district leaders and FLWs from districts with non-reduced stunting. Data from FGDs was stratified by gender and by study district. Emergent themes in each stratum were identified and compared across the different strata to identify differences and/or similarities. The codes for this analysis were stratified into four strata that represented male and female FGDs in the two types of study districts.

3. Changes in nutrition over the last 10 years and drivers of those changes

Trends in stunting

Overall, between 2005 and 2015, Rwanda experienced large reductions in child stunting, falling 13.7 percentage points (pp) over this time at the national level (**Table 6**). Across the five provinces, the North had the highest prevalence of stunting in 2005 but also had the largest reduction in stunting (17.9 pp). Large reductions in stunting were also seen in the South, Kigali City and in the East (12.1 pp, 12.1 pp and 11.6 pp, respectively). The Western Province had the smallest reduction in stunting (9.0 pp) and remained the province with the highest prevalence of stunting in 2015 (44%). Although rural areas had a higher prevalence of stunting as compared to urban areas, the difference in the change in stunting between rural and urban areas was small (12.7 pp vs. 15.8 pp, respectively).

Table 6: Trends in the prevalence of stunting (children 0-59 months) for 5 provinces, rural and urban areas, and all Rwanda

	2005 %	2010 %	2015 %	Change pp
City of Kigali	34.4	22.2	22.3	-12.1
North	55.8	50.7	37.9	-17.9
South	53.8	41.0	41.7	-12.1
East	47.6	45.1	36.0	-11.6
West	52.9	49.7	44.0	-8.9
Rural Rwanda	53.6	46.7	40.9	-12.6
Urban Rwanda	38.4	25.0	22.6	-15.8
All Rwanda	51.6	44.3	37.9	-13.7

Source: Authors' calculations from Rwanda DHS.

From 2005 to 2010 there was a rightward shift of the whole HAZ distribution, suggesting that HAZ improved across the distribution (**Figure 1**). When compared to the HAZ < -2 cut-off line, we can determine first that fewer children were stunted in 2010 and 2015, compared to 2005. Second, we observe that between 2005 and 2010, a large share of the population was concentrated between -2.0 and -0.5 SD. From 2010 to 2015, we again see a rightward shift of the distribution curve, albeit of smaller magnitude; however, a larger share of children was between -1.0 and 1.0 on the distribution. From this, we can infer a steady improvement in HAZ and reductions in stunting.

The HAZ patterns across the three waves reveal changes in the age-related patterns. For example, between 2005 and 2010 there were marked improvements in birth size (approximately ¼ of a standard deviation), and these were maintained from 2010 to 2015. This trend suggests that improvements between 2005 and 2010 are due, at least in part, to improvements in prenatal conditions, such as maternal diet or care. Across all three waves, the pattern of growth faltering that is typical in this context occurred at a similar rate (i.e., parallel lines) from the postpartum period until about 18 months. The low points, however, reached in these declines was higher in each subsequent wave of data. The

split in the trajectories of the 2010 and 2015 curves, which were relatively similar until age 18 months, suggests that conditions affecting outcomes during this part of the lifecycle may have contributed to improvements between 2010 and 2015 (**Figure 2**).

Figure 1: Changes in the distribution of height-for-age Z-scores, 2005 and 2015

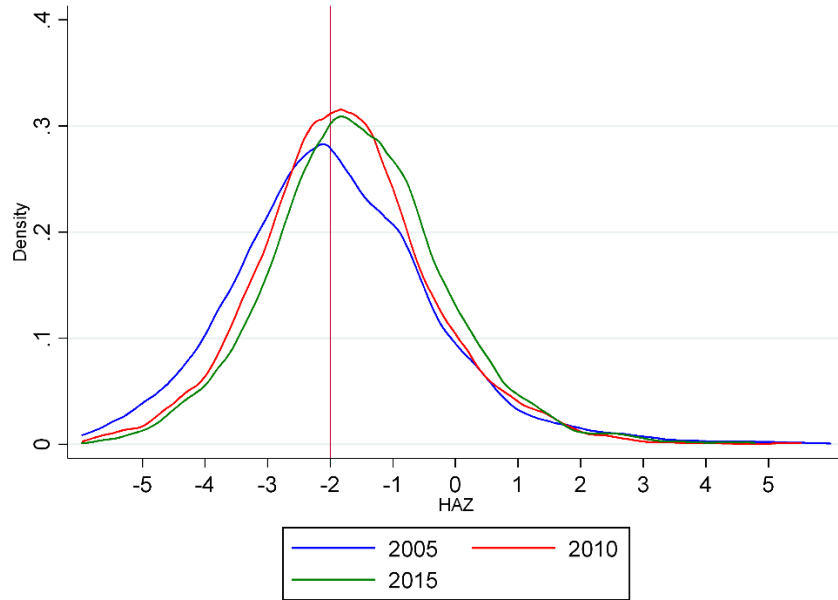
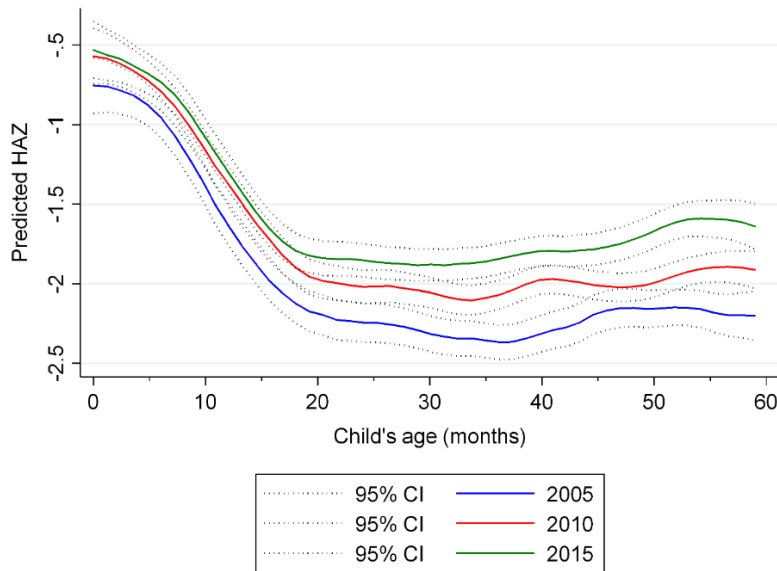


Figure 2: Height-for-age Z-score as a regression-based function of child age, 2005 - 2015



Trends in hypothesized determinants of stunting

Between 2005 and 2015 there were notable improvements in several of the predictors for stunting considered in our analyses, such as those related to healthcare and socioeconomic status (**Table 7**). The utilization of health services saw the greatest improvements between 2005-2015 overall. The three most notable increases in service utilization were in health facility births, full vaccination coverage for

children and compliance with the recommended four ANC visits. The use of these services increased by 64.5 pp, 19.4 and 16.8 pp, respectively. In addition to increases in the utilization of health services, there were improvements in indicators related to the quality of the care provided. For example, of the five ANC services reported in the DHS data, the number of services reportedly offered at ANC visits increased from 1.3 to 4.0. Between 2005 and 2015 there were also changes in fertility related factors, such as mothers having children at least 2 years apart and having less children. Lastly, access to health services was facilitated by increased insurance coverage for children. Between 2005-2015, the percentage of children covered by health insurance in the past 6 months increased by 13.6 pp.

The average asset score (0-10), increased slightly from 0.4 in 2005 to 0.9 in 2015. Mother's education increased by 0.7 years of schooling while their partner's education increased by 0.4 years. The proportion of households that had access to an improved water source decreased by 4 pp between 2005 and 2015, remaining low at 37.2% in 2015. Access to improved toilets on the other hand was high, averaging 97% across the 10 years and open defecation was nearly non-existent.

Table 7: Changes in underlying determinants of stunting, 2005-2015

<i>N</i> = 9,907	2005	2010	2015	Change 2005-2015
Child				
Born in health facility	27.6%	70.8%	92.1%	64.5 pp
Birth interval <24 mo	18.7%	16.1%	10.7%	-7.9 pp
Insurance coverage	46.3%	66.7%	65.7%	19.4 pp
Mother				
Education (y)	3.8	3.8	4.5	0.7
Attended 4+ ANC visits	21.4%	34.0%	38.2%	16.8 pp
Number of children ever born	4.5	3.9	3.4	-1.1
Height (cm)	157.4	156.8	157.1	-0.4
Age at birth of child < 20 years	3.8%	4.2%	4.8%	1.0 pp
Age at birth of child > 39 years	9.1%	6.7%	5.2%	-3.9 pp
Household				
Asset score (0-10)	0.4	0.5	0.9	0.5
Partner's education (y)	4.3	4.2	4.7	0.4
Improved water source	41.5%	33.8%	37.2%	-4.3 pp
Improved toilet	97.0%	98.3%	95.8%	-1.2 pp
Village				
ANC quality (0-5)	1.3	3.5	4.0	2.6
Vaccination coverage (0-1)	79%	89%	92%	13.6 pp
Open defecation (0-1)	3.4%	1.3%	3.4%	0.0 pp

Source: Authors' calculations from Rwanda DHS

Regression results – stunting

Children born in a health facility and those that were covered by insurance were significantly less likely to be stunted compared to children born outside a health facility and not covered by health insurance (**Table 8**). However, being fully vaccinated was not associated with stunting. At the mother level - having

attended the recommended 4 ANC visits was not significantly associated with stunting. However, quality of ANC was strongly associated with a lower probability of stunting. Fertility-related factors showed mixed results. While shorter birth intervals were not significantly associated with stunting, the total number of births was significantly associated; having one more child increased the chances of stunting. Maternal characteristics, such as height and age were also significantly associated with stunting. For height, a 1 cm increase was associated with a decreased chance of stunting ($\beta = -0.01$). Related to age, mothers younger than 20 years old were more likely to have a stunted child than those 20-39 y of age.

In terms of socioeconomic status variables, both paternal education and household assets were significantly associated with stunting. An increase of one year in father's education significantly lowered the probability of a child being stunted, but the magnitude of this relationship was small. An increase in asset ownership was associated with a lower probability of stunting. Lastly, access to improved toilets was associated with a decreased probability of stunting. However, neither open defecation nor access to an improved water source were significantly associated with stunting.

While we found significant factors associated with stunting, the R-squared of the regression model was 0.16. This indicates that much of the variance in stunting was unexplained by this model and that there are likely additional factors that contributed to the observed changes in stunting between 2005 and 2015.

Table 8: Regression estimates predicting stunting for children 0-59 months

	(1)	(2)	(3)	(4)
Child stunted (0/1)	Pooled b (se)	Year 2005 b (se)	Year 2010 b (se)	Year 2015 b (se)
Child				
Gender	-0.07** (0.01)	-0.04* (0.02)	-0.08** (0.02)	-0.08** (0.02)
Born in health facility (0/1)	-0.04** (0.01)	-0.06** (0.02)	-0.03 (0.02)	-0.03 (0.03)
Birth interval <24 mo	0.02 (0.01)	0.03 (0.02)	0.01 (0.02)	0.02 (0.03)
Insurance coverage	-0.03** (0.01)	-0.02 (0.02)	-0.02 (0.02)	-0.04* (0.02)
Mother				
Education (y)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Attended 4+ ANC visits	-0.01 (0.01)	0.05* (0.03)	-0.01 (0.02)	-0.06** (0.02)
Number of children ever born	0.01** (0.00)	0.01* (0.00)	0.01** (0.00)	0.01* (0.01)
Height (cm)	-0.01** (0.00)	-0.01** (0.00)	-0.02** (0.00)	-0.01** (0.00)

Reference group: Age at birth of child (20 - 39 years)

Table 8: Regression estimates predicting stunting for children 0-59 months

	(1)	(2)	(3)	(4)
Child stunted (0/1)	Pooled b (se)	Year 2005 b (se)	Year 2010 b (se)	Year 2015 b (se)
Age at birth of child < 20 years	0.08** (0.02)	0.06 (0.04)	0.10* (0.04)	0.08* (0.04)
Age at birth of child > 39 years	-0.06** (0.02)	-0.12** (0.03)	-0.01 (0.04)	-0.03 (0.04)
Household				
Asset score (0-10)	-0.02** (0.00)	-0.05** (0.01)	-0.01 (0.01)	-0.02* (0.01)
Partner's education (y)	-0.00+ (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Improved water source	-0.02 (0.01)	-0.02 (0.02)	-0.02 (0.02)	-0.02 (0.02)
Improved toilet	-0.07* (0.03)	-(0.05) (0.05)	(0.01) (0.07)	-0.12** (0.05)
Village				
ANC quality (0-5)	-0.03** (0.01)	-0.03 (0.02)	-0.02 (0.02)	-0.03+ (0.02)
Open defecation (0-1)	0.06 (0.10)	0.14 (0.15)	0.14 (0.27)	-0.14 (0.15)
Vaccination coverage (0-1)	-0.01 (0.03)	0.05 (0.04)	-0.07 (0.06)	-0.04 (0.06)
Rural	0.05** (0.02)	0.04 (0.03)	0.07+ (0.04)	0.05* (0.03)
Provincial fixed effects?	Yes	Yes	Yes	Yes
Child's age-in-month effects?	Yes	Yes	Yes	Yes
Constant	2.65** (0.14)	2.55** (0.25)	2.68** (0.26)	2.72** (0.23)
R-squared	0.16	0.18	0.16	0.16
Number of Observations (N)	9,907	3,274	3,524	3,109

Notes: +, * and ** refer to the 1%, 5%, and 10% respectively. See table 2 for definitions of variables. Column (1) represents the pooled model that combines all 3 rounds of data (2005, 2010, 2015) while columns (2), (3), and (4) are individual regressions for each survey wave. All regression models include controls for provincial fixed effects, year fixed effects, and month-specific categorical variables for child age.

Decomposition results – potential drivers of stunting

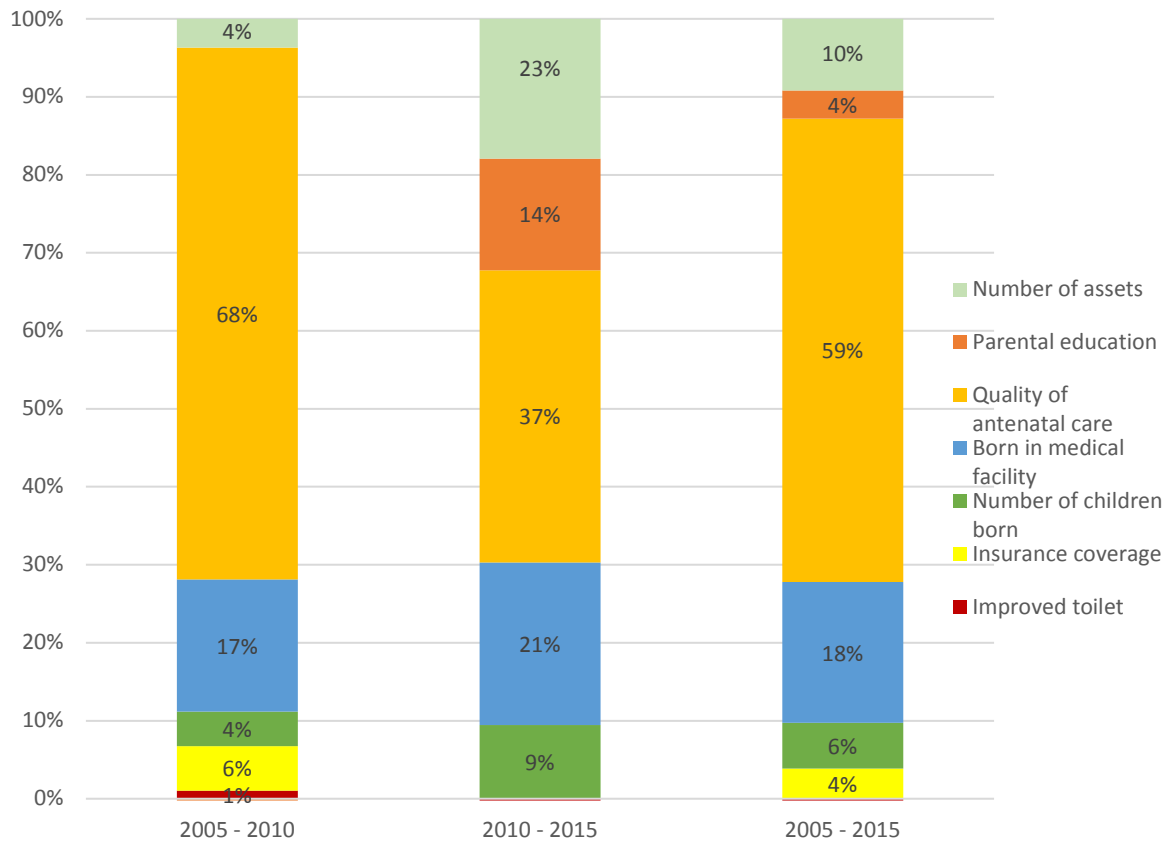
Changes in healthcare utilization were the largest predictors in the change in stunting overall with changes in ANC quality accounting for the largest share (59% between 2005 and 2015) (**Figure 3**).

However, the relative contribution across the two 5-year time periods varied. Between 2005 and 2010,

improvements to the quality of ANC explained 68% of the observed reductions in stunting whereas, between 2010-2015, it only accounted for 37%. The second largest share was explained by the increase in the proportion of births that occurred in a health facility, which accounted for 18% of the change between 2005 and 2015. Smaller contributions were made by fewer total number of births for a mother, increased percentage of children with health insurance, having access to an improved toilet, higher number of assets and years of parental education (Figure 3). Improvements in parental education contributed 4% to the overall reduction between 2005 and 2015, but this factor only contributed to improvements between 2010 and 2015, and not between 2005 and 2010.

As a robustness check, we conducted these same analyses with HAZ as the dependent variable (instead of stunting) (**Appendix 1**). In general, these analyses yielded similar results. Improvements in ANC quality accounted for the largest share in explaining improvements in HAZ scores (54%) between 2005 and 2015. This was followed by an increase in the proportion of births that occurred in a health facility (17% of the explained change), and a greater number of assets (13% of explained change). However, there were also two additional factors that contributed to the change in HAZ but not of stunting: having attended at least 4 ANC visits and having more than two years between births contributed to 3% and 1% of the change in HAZ, respectively.

Figure 3: Predicted drivers of stunting improvements



Note: The model predicted a 16 pp change in stunting from 2005 – 2015 compared to an actual 13 pp change. Between 2005 – 2010, the model predicted a 11 pp change compared to a 7 pp actual change and from 2010 – 2015, the model predicted a 5 pp change compared to an actual 6 pp change. Each section of the stacked bar estimates the contributions of the explanatory variables to the predicted change in stunting for each time-period.

Trends in child anemia

Child anemia fell from 50.3% in 2005 to 38.3% in 2010, a reduction of 12 pp (**Table 9**). However, there were minimal improvements in the prevalence of anemia in the following period with anemia improvements stagnating at 36.4% in 2015. In 2005, a larger proportion of children in rural areas were anemic compared to urban areas (51% vs. 44.5%, respectively), however changes between 2005 and 2015 were negligible between the two areas (14.9 pp vs. 13.5 pp, respectively). In terms of provincial differences, Kigali City had the highest prevalence of anemia in 2005 (56.9%), and this area also experienced the greatest improvement by 2015 (24.8 pp). This was followed by progress in the West which experienced a 21.3 pp decline in anemia, and the East which had a 13.9 pp reduction. The North and South Provinces had comparatively lower prevalence of anemia in 2005 (41.9% and 47.5% respectively) and experienced the smallest reductions in anemia (8.3 pp and 9.6 pp, respectively).

Table 9: Trends in the prevalence of anemia (children 6-59 months) for five provinces, rural and urban areas, and all Rwanda

	2005 %	2010 %	2015 %	Change pp
City of Kigali	56.9	38.1	32.1	-24.8
North	41.9	29.8	33.6	-8.3
South	47.5	37.3	37.8	-9.6
East	53.9	44.1	40.0	-13.9
West	55.9	38.8	34.6	-21.3
Rural Rwanda	51.1	38.5	37.7	-13.5
Urban Rwanda	44.5	36.6	29.7	-14.9
All Rwanda	50.3	38.3	36.4	-13.9

Source: Authors' calculations from Rwanda DHS

From 2005-2010, there was a substantial rightward shift of the hemoglobin distribution, suggesting that hemoglobin concentration of children increased across the whole distribution (**Figure 4**). When compared to the vertical cut-off line (Hb<11 g/dL), we observed that fewer children were anemic in 2010 and 2015, compared to 2005. From 2010 to 2015, we again saw a rightward shift of the distribution curve, but the magnitude of the shift was smaller than what occurred between 2010 and 2015. **Figure 5** shows the relationship between predicted blood hemoglobin concentration and child's age for each of the survey waves. Across all three waves, a developmental trend typical of this context is depicted, whereby hemoglobin concentration increases between 6 and 60 months of age. We also see that, based on age-related trends, the differences between years were similar across the full age range.

Figure 4: Changes in the distribution of blood hemoglobin concentrations, 2005 and 2015

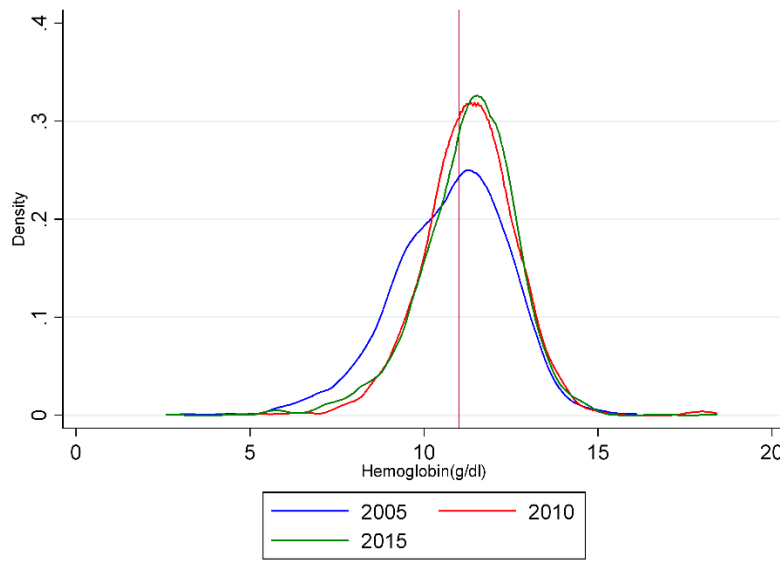
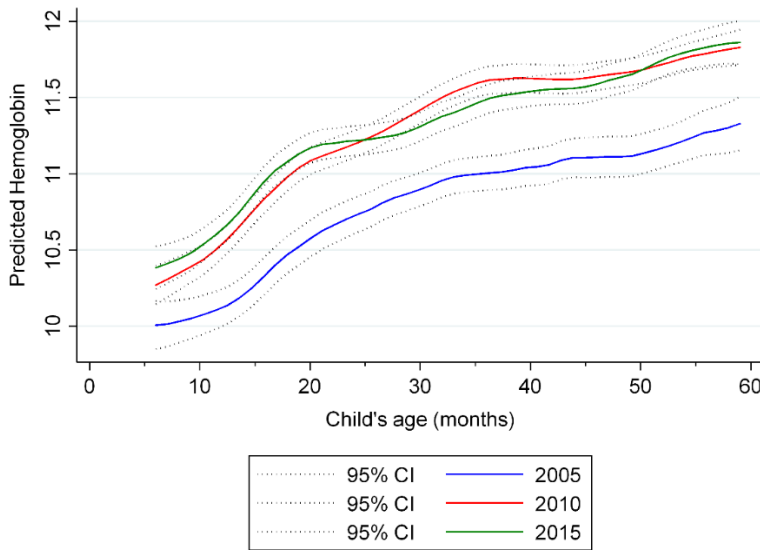


Figure 5: Hemoglobin concentration as a regression-based function of child age, 2005 – 2015



Trends in the hypothesized determinants of child anemia

For the determinants that were the same between the stunting and anemia analyses the changes between 2005-2015 were similar even though the two analyses reflect slightly different populations (0-59 months old vs. 6-59 months old, respectively) (**Table 10**). Additional significant determinants of child anemia included the proportion of children who had fever and/or diarrhea, WHZ and whether the child slept under a treated bednet the previous night. Between 2005-2015 the percentage of children who had fever and/or diarrhea decreased by 6 pp and 2 pp, respectively. In the case of fever, there was a large decrease between 2005-2010, but a subsequent smaller increase between 2010-2015. Lastly, the proportion of children that slept under a treated bednet the previous night increased from 16% in 2005 to 79% in 2010 and declined slightly between 2010-2015 (3 pp).

Table 10: Changes in underlying determinants of child anemia, 2005-2015

N= 6,103	2005	2010	2015	Change 2005-2015
Child				
Born in health facility	27.6%	69.3%	92.0%	64.4 pp
Birth interval < 24 mo	18.9%	16.6%	10.7%	-8.2 pp
Insurance coverage	46.0%	68.6%	67.2%	21.2 pp
Fever	25.7%	15.9%	19.9%	-5.7 pp
Diarrhea	14.9%	13.3%	13.2%	-1.8 pp
Weight-for-height z-score	0.2	0.3	0.5	0.2
Slept under treated bednet	15.8%	79.5%	76.1%	60.3 pp
Mother				
Education (y)	3.8	3.8	4.4	0.6
Attended 4+ ANC visits	21.3%	33.9%	38.1%	16.8 pp
Number of children ever born	4.5	4.0	3.4	-1.1
Age at birth of child < 20 years	4.1%	4.2%	5.2%	1.1 pp
Age at birth of child > 39 years	9.4%	6.6%	5.0%	-4.4 pp
Household				
Asset score (0-10)	0.4	0.5	0.9	0.5
Partner's education (y)	4.3	4.2	4.6	0.4
Improved water source	41.6%	34.0%	36.9%	-4.8 pp
Improved toilet	97.0%	98.3%	95.8%	-1.2 pp
Village				
Open defecation (0-1)	3.4%	1.3%	3.3%	0.0 pp

Source: Authors' calculations from Rwanda DHS

Regression results – child anemia

At the child level, female children and those covered by health insurance were less likely to be anemic compared to male children and those not covered by health insurance, respectively, while those with a fever were more likely to be anemic (**Table 11**). We also found a small but significant association between maternal education and a child being anemic, such that children born to mothers with more education were less likely to be anemic. Lastly, children that lived at high altitudes were significantly less likely to be anemic ($\beta = -0.05$). The R-squared of the regression model was low (0.10), suggesting that other factors also contributed to the decline in anemia observed.

Table 11: Regression estimates predicting anemia for children 6-59 months

	(1)	(2)	(3)
Child anemic (0/1)	Pooled b(se)	Year 2005 b(se)	Year 2010 b(se)
Child			
Gender	-0.02+ (0.01)	0.00 (0.02)	-0.05** (0.02)
Born in health facility	-0.01 (0.02)	-0.02 (0.02)	-0.02 (0.02)
Birth interval < 24 mo	0.00 (0.02)	0.00 (0.02)	0.00 (0.02)
Insurance coverage	-0.02+ (0.01)	-0.03 (0.02)	-0.01 (0.02)
Fever	0.06** (0.02)	0.09** (0.02)	0.04 (0.02)
Diarrhea	0.02 (0.02)	0.02 (0.03)	0.01 (0.03)
Weight-for-height z-score	-0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)
Slept under treated bednet	-0.02 (0.02)	-0.02 (0.03)	-0.01 (0.02)
Mother			
Education (y)	-0.00+ (0.00)	0.00 (0.00)	-0.01 (0.00)
Attended 4+ ANC visits	0.00 (0.02)	0.01 (0.03)	-0.01 (0.02)
Number of children ever born	0.00 (0.00)	0.00 (0.01)	0.01 (0.00)
<i>Reference group: Age at birth of child (20 - 39 years)</i>			
Age at birth of child < 20 years	-0.01 (0.03)	-0.01 (0.05)	0.00 (0.05)
Age at birth of child > 39 years	-0.03 (0.03)	-0.02 (0.04)	-0.04 (0.04)
Household			
Asset score (0-10)	-0.01 (0.01)	-0.03** (0.01)	0.01 (0.01)
Partner's education (y)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Improved water source	0.00 (0.01)	0.00 (0.02)	0.01 (0.02)
Improved toilet	0.02 (0.04)	0.02 (0.05)	0.02 (0.08)
Village			
Open defecation (0-1)	0.05 (0.15)	0.11 (0.18)	0.00 (0.28)
Household is rural (0/1)	0.03 (0.03)	0.03 (0.03)	0.01 (0.04)
High altitude (0/1)	-0.05** (0.02)	-0.05+ (0.03)	-0.05+ (0.03)
Province			
Malaria prevalence at survey year	-2.39 (3.03)	0.00 (0.00)	0.00 (0.00)

	(1)	(2)	(3)
Child anemic (0/1)	Pooled b(se)	Year 2005 b(se)	Year 2010 b(se)
Provincial fixed effects?	Yes	Yes	Yes
Child's age-in-month effects?	Yes	Yes	Yes
Constant	0.50** (0.08)	0.58** (0.09)	0.56** (0.10)
R-squared	0.10	0.08	0.11
Number of Observations (<i>N</i>)	6103	2891	3212

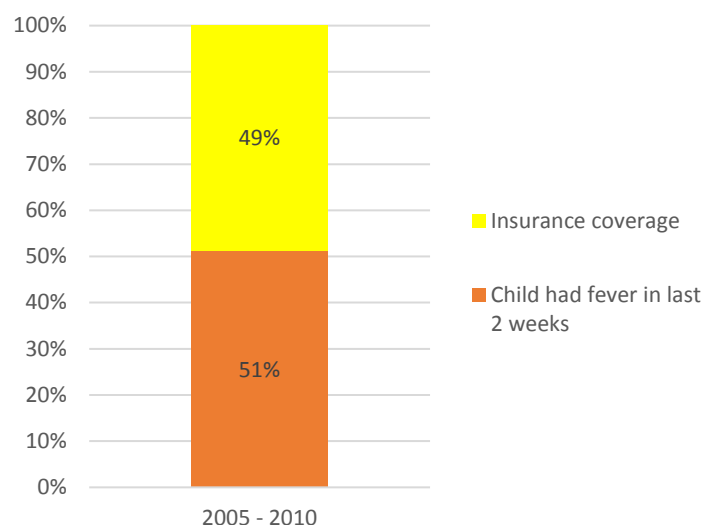
Notes: +, * and ** refer to the 1%, 5%, and 10% respectively. See table 2 for definitions of variables. Column (1) represents the pooled model that combines both rounds of data (2005 and 2010) while columns (2) and (3) are individual regressions for each survey wave. All regression models include controls for provincial fixed effects, year fixed effects, and month-specific categorical variables for child age.

Decomposition results – potential drivers of child anemia

The main drivers of child anemia between 2005-2010, based on the available data, were the reduction in the prevalence of fever and the increase in the percentage of children who had health insurance (**Figure 6**). Each of these accounted for about half of the reduction in child anemia. There were likely other factors that contributed to the change in child anemia for which we did not have appropriate data to include in the analysis.

We ran a similar decomposition analysis using altitude adjusted child hemoglobin concentration as the outcome variable (**Appendix 2**). We found that that the reduction in fever prevalence made the largest contribution at 49% followed by an increase in child insurance coverage at 44%. Additionally, an improvement in child WHZ scores accounted for a 7% reduction in child anemia.

Figure 6: Predicted drivers of improvements in child anemia, 2005 - 2010



Note: The model predicted a 1 pp change in child anemia compared to an actual change of 12 pp. Each section of the stacked bar estimates the contributions of the explanatory variables to the predicted change in child anemia.

Trends in women's anemia

The prevalence of anemia among women decreased from 24.9% in 2005 to 17.1% in 2010 and increased again to 19.2% in 2015 (**Table 12**). Similar patterns were observed in urban and rural areas, with declines between 2005-2015 amounting to 5.5 pp and 6.2 pp, respectively.

We also found considerable provincial variability in the prevalence of women's anemia. While all provinces experienced an overall decline from 2005 to 2015, the North, South, and West experienced an increase in the prevalence of anemia between 2010 and 2015, and the overall improvement in anemia was less than 5 pp in these provinces. The Eastern and Kigali City Provinces experienced the largest improvements in the prevalence of anemia among women declining by 10.1 pp and 10.8 pp, respectively. The Eastern Province (along with the Southern) had the highest prevalence of anemia in 2015, while Kigali City had the lowest.

Table 12: Trends in anemia prevalence for women 15 – 49 years in Rwanda

	2005 %	2010 %	2015 %	Change pp
City of Kigali	25.3	17.8	14.6	-10.8
North	17.1	11.4	15.2	-1.9
South	27.2	17.1	23.0	-4.2
East	32.1	22.4	22.0	-10.1
West	22.2	15.4	17.8	-4.4
Rural Rwanda	25.4	17.3	19.9	-5.5
Urban Rwanda	22.4	15.7	16.2	-6.2
All Rwanda	24.9	17.1	19.2	-5.7

Source: Authors' calculations from Rwanda DHS.

Trends in hypothesized determinants of women's anemia

Between 2005-2015 education levels improved among women, with the number of years completed increasing from 3.8 to 5.2 years (**Table 13**). Household assets increased by 0.5 points, and the use of bednets by women improved by a large magnitude from 11% in 2005 to 68% in 2015. However, access to an improved water source and improved toilets declined slightly (2.7 pp and 0.6 pp, respectively). There was no change measured for open defecation. Finally, the prevalence of fever at the village level decreased by 8 pp, having experienced a small increase from 2010 to 2015. There were some changes to fertility related factors. The percentage of women pregnant at the time of the survey did not change, but the total number of births per women decreased. Additionally, the proportion of women using hormonal contraceptives increased by 21 pp. Finally, the village-level aggregate of health facility births increased dramatically from 30% in 2005 to 93% in 2015.

Table 13: Changes in the underlying determinants of anemia among women 15 - 49 years of age, 2005-2015

<i>N</i> = 12,072	2005	2010	2015	Change 2005-2015
Woman				
Education (y)	3.8	4.4	5.2	1.4
Number of children ever born	2.7	2.4	2.3	-0.4
Age (y)	28.5	28.3	28.8	0.3
Gave birth in past year	17.3%	12.6%	13.1%	-4.3 pp
Currently pregnant	7.7%	7.1%	7.4%	-0.4 pp
Hormonal contraceptive	3.9%	22.7%	24.5%	20.6 pp
Treated bednet	10.7%	63.1%	67.6%	56.9 pp
Household				
Asset score (0-10)	0.5	0.8	1.1	0.5
Improved water source	43.1%	35.7%	40.4%	-2.7 pp
Improved toilet	96.9%	98.7%	96.3%	-0.6 pp
Village				
Open defecation	3.4%	1.0%	3.0%	-0.4 pp
Child fever	27.0%	16.1%	18.9%	-8.0 pp
Health facility births	30.4%	71.8%	93.0%	62.6 pp
High altitude	59.6%	58.4%	51.2%	-2.7 pp

Source: Authors' calculations from Rwanda DHS

Regression results – women's anemia

At the woman level, we found that women who used hormonal contraceptives were significantly less likely to be anemic (**Table 14**). At the household level, we found significant associations between asset scores, access to improved water sources and access to improved toilets. Wealthier women and those with access to improved water sources or toilets were less likely to be anemic than poorer women and those without access to improved water sources or toilets. Lastly, the village level aggregate of fever in children, which we used as a proxy for village-level fever-inducing infections, was associated with women being more likely to be anemic.

In terms of other infection-related measures, the prevalence of malaria was not significantly associated with anemia among women, nor was bednet use. To further tease out the dynamics of malaria and anemia, we ran several versions of these regression models using interactions between malaria prevalence and bednet use, but none of these variables were statistically significant.

Like the previous regression model for child anemia, the R squared observed was low, suggesting that additional factors also contributed to the reductions in anemia observed.

Table 14: Regression estimates predicting anemia for women 15-49 years

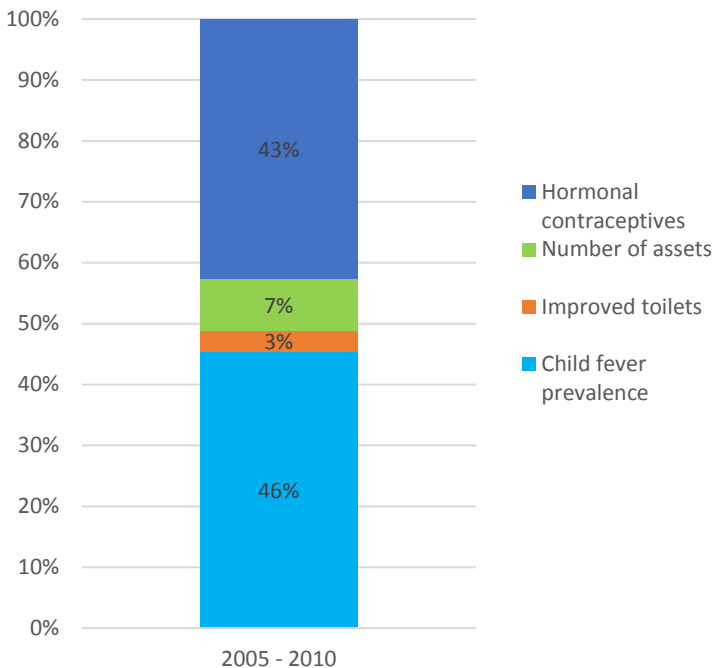
	(1)	(2)	(3)
Woman anemic (0/1)	Pooled	Year 2005	Year 2010
	b (se)	b (se)	b (se)
Woman			
Education (years)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Number of children ever born	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Age (years)	0.00** (0.00)	0.00+ (0.00)	0.00* (0.00)
Gave birth in past year	0.02 (0.01)	0.01 (0.02)	0.03* (0.02)
Currently pregnant	0.00 (0.01)	0.00 (0.02)	-0.00 (0.02)
Use hormonal contraceptive	-0.09** (0.01)	-0.10** (0.03)	-0.09** (0.01)
Treated bednet	-0.00 (0.01)	-0.04* (0.02)	0.01 (0.01)
Household			
Asset score (0-10)	-0.01* (0.00)	-0.01 (0.01)	-0.01 (0.00)
Improved water	-0.03** (0.01)	-0.03* (0.01)	-0.02+ (0.01)
Improved toilet	-0.07* (0.03)	-0.08* (0.04)	-0.03 (0.04)
Village			
Open defecation	-0.08 (0.11)	-0.14 (0.15)	0.04 (0.15)
Child fever	0.14** (0.04)	0.17** (0.05)	0.09+ (0.05)
Health facility births	-0.02 (0.02)	-0.05 (0.04)	0.00 (0.03)
Household is rural	0.01 (0.02)	-0.00 (0.02)	0.03 (0.02)
High altitude	-0.06** (0.01)	-0.08** (0.02)	-0.03* (0.02)
Province			
Malaria prevalence	-2.59 (2.02)	0.00 (0.00)	0.00 (0.00)
Provincial fixed effects?	Yes	Yes	Yes
Survey month effects?	Yes	Yes	Yes
Constant	0.33** (0.05)	0.33** (0.06)	0.17** (0.06)
R-squared	0.04	0.03	0.03
Number of Observations (<i>N</i>)	12,072	5,486	6,586

Notes: +, * and ** refer to the 1%, 5%, and 10% respectively. See table 2.1 for definitions of variables. Column (1) represents the pooled model that combines 2 rounds of data (2005 and 2010) while columns (2) and (3) are individual regressions for each survey wave. All regressions controlled for provincial and seasonal variations by dummy variables for each province and for each month that the DHS survey was administered.

Decomposition results – potential drivers of women’s anemia

Between 2005 and 2010, a reduction in the village-level aggregate for child fever accounted for the largest share of the observed reduction in women’s anemia (46%) (**Figure 7**). This was followed closely by use of hormonal contraceptives (43%). An increase in the number of assets owned by the household explained 7% of the reduction in women’s anemia, while access to improved toilets accounted for only 3% of the reduction. Lastly, we observed that while access to improved water sources was significantly associated with women’s anemia, it was not related to improvement in women’s anemia. This could be because access to an improved water source declined over this time.

Figure 7: Predicted drivers of improvements in women’s anemia, 2005 - 2010



Note: The model predicted a 3% reduction in anemia compared to an actual change of 8 pp. Each section of the stacked bar estimates the contributions of the explanatory variables to the predicted change in women’s anemia for each time-period.

When comparing the decomposition results for changes in women’s anemia compared to altitude adjusted hemoglobin levels, we find slightly different results (**Appendix 3**). An increased proportion of health facility births, a proxy for healthcare access, was the largest contributor to a change in hemoglobin concentrations at 38%. This was followed by an increased use of hormonal contraceptives at 30% and child fever prevalence at 24%. Smaller contributions were made by an increased number of assets (4%), a reduction in the number of children born to each woman (2%) and improved toilets (1%).

4. Changes in nutrition over the last 25 years as perceived by study respondents

Nutrition in the past

According to study participants, in the past, the nutrition situation in Rwanda was characterized by severe nutrition problems, especially among children and pregnant and lactating women (PLW). Some respondents mentioned nutrition problems for adults, but a few (n=11/108) specifically stated that malnutrition did not and could not affect adult men and non-PLW. Among those who mentioned nutrition problems for adults in the past, the emphasis was on problems among PLW such as anemia and blindness due to nutrient deficiencies. A few respondents (n=3/26) from non-reduced districts believed that there were also more underweight adults in the past compared to the present.

When describing the nutritional status of children in the past, many respondents mentioned that severe acute malnutrition was more common, they described this by saying that children had oedema, kwashiorkor, or marasmus, or were wasted. Study participants also described high levels of stunting and micronutrient deficiencies in children. Children also faced high mortality and morbidity rates, which study participants explained were thought to be caused by parasitic infections and diarrheal diseases due to poor hygiene. In addition to describing these different nutrition problems, respondents at the district level mentioned that in the past there were visible signs of slow development in children such as the delayed attainment of motor skills. The picture painted by the various respondents was consistent across administrative levels and across the two types of study districts indicating that these issues were pervasive in Rwanda in the past. However, some respondents noted that there were stark differences in children's nutritional status between rural and urban areas, with children from rural areas being more likely to suffer from malnutrition and to have more severe cases of malnutrition.

Respondents described multiple causes of these problems. Among the most commonly mentioned causes were the political environment, with an emphasis on the problems caused by the 1994 genocide against the Tutsi, poverty, lack of prioritization of nutrition, and suboptimal knowledge of best practices. Respondents explained that low economic development along with the high levels of poverty limited government capacity and budgets to address the nutrition problems in the country. The civil war and the genocide led to instability in the country and to what study respondents referred to as high numbers of destroyed families including orphans and refugees. According to respondents, these factors led to low food availability and poor nutrition outcomes in the country.

Respondents also believed that nutrition was not a priority in the past. A few people stated that it was undervalued and not well-understood. For example, one non-governmental national level respondent highlighted that during those years *"nutritionists were frustrated because people did not understand the importance of nutrition and viewed nutritionists as cooks."* A few respondents explained that the country leaders did not fully understand what the nutrition problems were, what caused them and how they could affect people's well-being or the country's development and thus, did not prioritize working on nutrition problems. Furthermore, respondents stated that the country lacked good systems to track nutritional status indicators.

Respondents believed that the lack of prioritization of nutrition coupled with the political environment and weak economy led to a lack of nutrition-related services and programs. Study respondents

explained that the services that did exist focused only on the treatment of acute malnutrition and not on the prevention of malnutrition. At the community level, FLWs in both types of districts recalled that in the past, the health system was weak, and it did not sensitize the population on nutrition as it currently does. Instead, it concentrated on distributing milk products to severely malnourished children. Respondents recalled seeing long lines at health centers where malnourished children received food products. *“I would see, when I was in primary school, long lines of people at health centers going “to take milk”. They called it to “take milk”. In that time, there was no mobilization of sending people to the health centers, where the trained professionals were, to teach them about nutrition. And many people died from malnutrition”*, said a district leader. To further highlight the focus on treatment rather than prevention of malnutrition in the past, respondents from districts with reduced stunting stated that the government placed all nutrition responsibilities on hospitals, doctors or nurses, and parents instead of addressing the different determinants of malnutrition. One nutritionist stated, *“before, when there was a case of malnutrition, they would ask us what is the hospital doing to solve this problem? It was on us! The person would come to the hospital, we would treat him, and he would recover from malnutrition. After one or 2 months, he would come back suffering from malnutrition again... the problem was where the person lives, there is no hygiene...there is a problem with the conditions in which the person lives with, but no one looked at this.”* These respondents felt that the country did not provide sufficient services or programs to prevent malnutrition in the past. Some national level respondents also highlighted issues with the quality of services, such as those related to prenatal and family planning services, that they believed further contributed to the low utilization of the health and nutrition services that did exist.

Lack of knowledge in nutrition and “poor mindsets” or behaviors, especially around dietary and feeding practices, were thought to have contributed to suboptimal nutrition in the past. These types of responses were mentioned by all types of respondents. They discussed that in the past, there was a lack of knowledge on what constituted a proper diet for both children and adults. For children, parents lacked knowledge on the age-specific diet needs and food preparation for children less than 5 years old, older children, and adults according to all groups of respondents except FLWs. For example, as one nutritionist put it: *“When you asked parents how they feed their children, they would tell us that the kids eat what they [the parents] eat. And it doesn’t matter their age. So, you see that if a child is just beginning to eat and he’s getting sweet potatoes and beans, the child cannot digest that food. For an adult it’s okay. But for a child, people should know that they should reheat the food and smash it up, so it is soft.”* Respondents also highlighted that in the past, there was poor knowledge of balanced diets marked by limited dietary diversity which affected nutrient intake. Food intake at that time concentrated on the quantity of food consumed rather than the quality of the diet. Other misconceptions or lack of knowledge in nutrition mentioned by many respondents included thinking that symptoms of malnutrition were caused by poison which deterred people from seeking care from health practitioners.

Changes in nutrition

Overall, respondents believed that there have been positive changes in nutrition over the last 25 years. They believed that one of Rwanda’s biggest achievement was decreasing acute malnutrition (**Table 15**). Study respondents also mentioned that stunting decreased in the country over the last 25 years. While less likely to be mentioned than acute malnutrition or stunting, respondents also discussed decreased

maternal and child mortality rates as signs of improved nutrition. Lastly, some respondents also thought that children were now healthier at birth.

Although most responses pointed to positive changes in nutrition over the past 25 years a little more than 10% of respondents felt that malnutrition had increased over this time. Respondents from non-reduced districts were more than twice as likely as those from reduced districts to think this. The differences in responses between the two types of districts was especially apparent at the community level. The concern about the increase in malnutrition was raised in 11 out of 32 FGDs and of those, three were from reduced districts, whereas eight were from non-reduced districts. While interviewees from the national and district level believed that there were still nutrition problems in the country, none of these respondents mentioned a deterioration in nutrition over the last 25 years.

Improvements in the nutritional status of PLW

When asked specifically about PLW, all groups of study respondents believed there were fewer malnourished PLW compared to the last 25 years. Study respondents most commonly mentioned a decrease in maternal mortality and women delivering healthier babies as evidence of the improved nutritional status of PLW. About 10% of respondents mentioned the decrease of acute malnutrition (e.g., kwashiorkor) as a sign that nutrition among PLW had improved. A few respondents also mentioned that maternal morbidity and anemia had decreased (n=5/108 and n=4/108, respectively) and that women now had more energy and strength (n=5/108) and looked healthier (n=3/108).

Improvements in the nutritional status of children 0-2 years of age

Overall, interviewees and FGD participants agreed that the nutrition of children 0-2 years old improved over the last 25 years. Nearly half of the respondents mentioned the decrease in severe acute malnutrition as a sign that nutrition had improved for children 0-2 years of age, although this was much more commonly mentioned by respondents from reduced districts than those from non-reduced districts (52% vs. 33% of respondents, respectively). Study respondents explained that while in the past it was common to see children suffering from kwashiorkor, marasmus, and wasting it was rarer to see such illnesses today. Reductions in stunting were also mentioned by a little less than a quarter of respondents as evidence of improved nutritional status of children 0-2 years of age, however, this response was more likely to come from national level respondents than from those at the district and community levels. Respondents also highlighted that children are healthier at birth, which might indicate better nutrition in-utero, a response that mirrors the mention of improved nutrition in PLW. Community members who participated in FGDs further highlighted that compared to the past, less children died at birth or in their early days of life, therefore leading to decreased mortality rates in children 0-2 years of age (n=7/40 FGDs), something highlighted by just two district leaders and one FLW. A few other indicators of improved nutrition for this age group that were mentioned by less than 5% of respondents included decreased morbidity and improvements in energy and strength.

Improvements in the nutritional status of children 2-5 years of age

Changes in the nutritional status of children 2-5 years of age were similar to those of children 0-2 years of age over the last 25 years. Most of the study respondents believed that children ages 2-5 years had improvements in their nutritional status, and most commonly explained that this was evidenced by decreases in severe acute malnutrition and stunting. Similar to the children 0-2 years of age, district and community level respondents were more likely to mention changes in acute malnutrition while national level respondents tended to focus on reductions in stunting. About 10% of study respondents also

mentioned reductions in underweight among children 2-5 years of age, but these responses were more likely to come from national level respondents (n=7/22) and from those from reduced compared to non-reduced districts (9% vs. 2% of study respondents from the two types of districts, respectively).

Decreased child mortality and child morbidity were also mentioned as indicators of positive nutrition changes for children in this age group by district leaders, FLWs, and FGD participants. For this age group, however, decreased child mortality was more commonly mentioned in non-reduced compared to reduced districts (12% vs. 5%). A couple of national level respondents (n=2/22) discussed improvements in anemia for children 2-5 years of age, a condition that was not often brought up in other interviews.

Improvements in the nutritional status of adult men and women

Study respondents were less at ease discussing the nutritional status or change in nutritional status of adult women (excluding PLW) and men. Respondents mentioned changes that occurred for both men and women that may lead to improvements in their nutrition. But they rarely discussed changes in actual nutrition status. Overall, nutrition was mostly seen as an issue that affects children and mothers. For example, at the district level, two respondents, one from each type of study district, believed that non-PLW could not get malnourished. Similarly, nine respondents also at the district level (n=4/20 from reduced and n=5/16 from non-reduced districts), stated that men could not become malnourished, unless they have an underlying condition such as a chronic disease (*data not shown*).

Very few respondents mentioned specific improvements in the nutritional status of adult women (aside from PLW). The most commonly mentioned improvement was a decrease in anemia, but this was only mentioned by a few district-level respondents and one FLW from a reduced district (n=4/28). At the community level, FGD participants from reduced districts mentioned that there are now less women with kwashiorkor or acute malnutrition, who are underweight and who are sick. Two of the sixteen FGDs from districts with reduced stunting also discussed a decrease in alcoholism as a sign of improved nutritional status for women.

When it comes to men, respondents admitted that it was not often that people considered men's nutritional status. Some respondents at the national (n=3/22) and district levels (n=4/36) went on to further highlight that there is a lack of data collected and presented on men's nutrition. They attributed this lack of information on men's nutrition to them not being a vulnerable group. A few respondents, however, mentioned that men had experienced specific improvements in their nutritional status as shown by their longer life expectancies and better physical appearance such as healthier skin and less premature aging. Some district and community level respondents (n=9/54) also related improvements in men's nutritional status to improvements observed in PLW. For these respondents, since women's nutrition had improved through programs and improved dietary practices, then these effects must have also affected men's nutritional status. Although most responses regarding changes in men's nutrition were either neutral or positive, some respondents mentioned that men's dietary intake is worse now. This response was more common in non-reduced compared to reduced districts (12% vs. 7%, respectively).

Deterioration of nutritional status

While study respondents mainly characterized changes in nutrition over the last 25 years as improvements, there were some respondents who believed malnutrition had increased over this time period. These respondents were mostly community members participating in FGDs, especially those in districts with non-reduced stunting or female FGDs. Of the 11 FGDs that mentioned that malnutrition

had increased over the last 25 years, eight were from non-reduced districts. According to these respondents, the deterioration in nutrition outcomes occurred for all population groups: PLW, children 0-2 and 2-5 years of age, and both adult women and men. The most commonly reported problem that applied to multiple groups was decreased dietary intake (quantity, diversity, and quality, especially for children 2-5 years of age and men). A couple of people also mentioned increases in overweight and obesity (children 2-5 years of age, PLW and men) as an emerging problem. Within each population group there were also a few unique problems identified by study respondents for PLW and similar problems for children 0-2 and 2-5 years of age.

For PLW, participants in FGDs from reduced and non-reduced districts described the worsening in PLW's nutrition as observed through giving birth to low birthweight children, PLWs being underweight and having nutrient deficiencies (n=2/16 and n=2/16, respectively). One government national level respondent also agreed that PLW's nutrition had worsened because of increased micronutrient deficiencies.

Respondents believed that children in both age groups (0-2 and 2-5 years of age) had experienced similar deteriorations in their nutritional status. These conditions included low birthweight for children 0-2 years of age, inadequate dietary intake and poor growth. Poor growth was more likely to be mentioned for children 0-2 years of age than for older children. In both types of study districts, this response was mostly mentioned by FGDs (n=4/16 in each type of study district). Inadequate dietary intake was a key concern and sign of worsening nutrition for all the different population groups, but especially for children ages 2-5 years old whose food diversity was said to have decreased. Participants in female FGDs mentioned inadequate dietary intake more often than other respondents because they perceived that within their households there was less food available and less diverse food as compared to the past.

Table 15: Changes in nutrition over the last 25 years^{1,2}

Theme	National	Reduced districts			Non-reduced districts				
		District	FLWs	Male FGDs	Female FGDs	District	FLWs	Male FGDs	Female FGDs
N=	22	20	8	8	8	16	10	8	8
General									
Positive									
Malnutrition decreased	17	12	6	5	4	12	8	5	6
Negative									
Malnutrition increased	1	2	1	2	2	1	-	3	5
Pregnant and lactating women									
Positive									
Decreased acute malnutrition (e.g., kwashiorkor)	-	2	-	1	3	2	-	1	1
Decreased mortality rates	2	4	5	-	-	6	4	-	-
Decreased morbidity	-	3	-	-	-	-	2	-	-
Birthing healthier children	-	6	1	2	2	5	5	1	3
Increased energy or strength	-	1	2	-	-	2	-	-	-
Improvements in anemia	3	1	-	-	-	-	-	-	-
Improved physical appearance	2	-	1	-	-	-	-	-	-
Negative									
More underweight women	-	-	-	-	2	-	-	1	1
Children 0-2 years old									
Positive									
Decreased acute malnutrition	10	9	4	5	5	6	3	2	3
Decreased stunting	13	1	2	1	1	2	-	1	2
Children healthier at birth	2	1	2	-	-	3	2	-	-
Decreased mortality	-	1	-	2	2	1	1	2	1
Decreased morbidity	-	1	2	-	-	2	1	-	-
Negative									
Poor growth	-	-	1	2	2	1	-	1	3

Theme	National	Reduced districts			Non-reduced districts				
		District	FLWs	Male FGDs	Female FGDs	District	FLWs	Male FGDs	Female FGDs
N=	22	20	8	8	8	16	10	8	8
Inadequate dietary intake	-	1	-	2	1	-	-	1	2
Children 2-5 years old									
Positive									
Decreased acute malnutrition	6	6	2	3	2	6	2	2	6
Decreased stunting	13	2	3	-	1	3	1	1	1
Decrease in underweight	7	3	1	-	-	-	1	-	-
Decreased mortality	-	-	-	1	1	2	3	2	-
Decreased morbidity	-	2	-	2	-	2	1	-	2
Negative									
Inadequate dietary intake	1	2	1	1	1	-	-	3	2

¹ A dash (-) represents a category for which there were no responses, ²Acronyms used: FGD, focus group discussion; FLW, frontline worker

5. Key events in nutrition

To better understand how the changes in nutrition occurred in Rwanda over the last 25 years, it is important to discuss the environment in Rwanda during this time period and the key events that may have led to these changes.

The remnants of civil war and the 1994 genocide created a severely impoverished country facing many challenges in various domains, including health and nutrition. Since the end of the civil war, Rwanda has made great efforts to rebuild the country and has gone through major economic and social changes. The country has stabilized its economy and created and strengthened institutions which have contributed to improved development outcomes. Since 2003, Rwanda's gross domestic product (GDP) has had an annual growth of six to eight percent[32], [33]. The government has also reduced poverty, improved access to education, infrastructure, and agricultural productivity[32], [33]. In addition, between 1990 and 2014, the country decreased the number of undernourished people from 56% to 32%⁷[32], [34].

Post-civil war, the country has achieved important milestones related to nutrition. Over the last thirteen years the Rwandan government has adopted nutrition policies and initiated nutrition and nutrition-related programs. In addition, over the past two decades Rwanda has adopted overarching policies to improve multiple development outcomes through decentralization and through policies designed to reduce poverty and improve education. At the global level, nutrition has been brought to the forefront over this same time period through the establishment of overarching development goals and a global platform for nutrition coordination as well as the publication of seminal papers on nutrition. Some of these key moments were described throughout our interviews as moments and signs that the country was taking great steps to improve nutrition in the country. We use three main categories to describe these events. The first are contextual events, these are governance and policy developments that occurred within Rwanda and shaped the country's development. The second type are nutrition events that refer primarily to the adoption of nutrition policies, initiation of nutrition and nutrition-related programs and conduct of nationally representative nutrition-related surveys. The last category are international events which include the establishment of global goals and nutrition and nutrition-related platforms and the publication of seminal nutrition papers.

The first key contextual event that occurred in the year 2000 was the adoption of Rwanda's decentralization policy which aimed to improve local development and service delivery through the promotion of good governance, accountability, and fostering partnerships between communities, local, and national government [35] (**Table 16**). According to respondents, decentralization played a major role in improving relationships between communities and the country's leadership and in improving the provision of services. Following this in 2001, Rwanda adopted Vision 2020, a long-term strategy for Rwanda's development that consisted of different goals to be achieved by the year 2020 including improvements in health and agriculture [36]. In 2007 and again in 2013, the government adopted the Economic Development and Poverty Reduction Strategy (EDPRS) I and II, respectively, the country's medium-term strategies for achieving the long-term goals outlined in Vision 2020 [35]. In 2009, the Government of Rwanda adopted the Nine-Year Basic Education Policy which provided access to six years of primary education and three years of secondary education for free to Rwandan children. This policy was believed to have contributed to increased enrolment, retention, and completion of primary and lower secondary school levels, thereby increasing the population's education levels [37].

⁷ FAO defines undernourishment as the inability of a person to meet minimum daily dietary energy requirements over the course of one year. Hunger is chronic undernourishment.

There were several key nutrition events that occurred in Rwanda from 2004 onwards that included the adoption of health and nutrition policies, the initiation of nutrition and nutrition-related programs, leadership commitments, nutrition summits, and the release of survey findings. In 2005, the country developed its first national nutrition policy which was later adopted in 2007 (**Table 16**). Many of the other key moments for nutrition in Rwanda concentrated around 2009 after the adoption of this first national nutrition policy, which was also supported during study interviews. Respondents at both the national and district levels highlighted a 2009 visit to a health center in Kirehe district by the President of Rwanda. During this visit, the President was shocked at the number of malnourished children and women who were at this health center. After this event, the President made a commitment to fight malnutrition in the country to which a few study respondents attributed an increased interest in nutrition at the national level. During this same year, Rwanda organized its first national nutrition summit to highlight the importance of nutrition for achieving the Millennium Development Goals (MDGs), another key moment for nutrition according to respondents. For these respondents, the summit along with the country's leadership's acknowledgment of the importance of nutrition helped to increase the country's commitment to nutrition. A second national nutrition summit was also organized in 2011 which helped to increase discussions in the country on how to solve the issue. Following this summit, Rwanda joined the Scaling Up Nutrition (SUN) movement and established platforms to address nutrition at the national and district levels through JAPEM and DPEM, respectively. The country introduced its new national policy on nutrition which specifically highlighted the country's multisectoral approach to nutrition in 2013 and created the NFNCS to help coordinate its implementation in 2016. Other key nutrition events that were mentioned revolved around the development and initiation of national programs designed to prevent malnutrition such as the One Cow per Family Program, the 1,000 Days in the Land of a Thousand Hills Program, the Shisha Kibondo Fortified Blended Food (FBF) Program, the Ongera Micronutrient Program, Mutuelle de Santé National Insurance Plan, kitchen gardens, the Crop Intensification Program (CIP), and others. Lastly, study respondents explained that findings from studies such as the 2010 and 2015 DHS [8], [9] and the Cost of Hunger Report [38] helped to highlight the severity of the nutrition situation in Rwanda and the implications of malnutrition for the country's development. They believed that this attention raising led to increased efforts to finding solutions.

Key moments for nutrition in Rwanda also included key international events and developments that shaped global attention for nutrition. These events included the establishment of the MDGs in 2000 which were developed to eradicate poverty in its different forms, including health, and the adoption of the African Union's Comprehensive Africa Agriculture Development Program (CAADP) framework which sought to increase investments and productivity of the agricultural sector in 2008. Rwanda committed to both these agreements. Other important international developments that occurred over the last 25 years include the 2008 and 2013 Lancet Series on undernutrition which increased global attention and momentum for addressing malnutrition which helped lead to the launch of the SUN movement in 2010. The aim of this movement, which Rwanda signed onto in 2011, was to bring together different stakeholders in nutrition to increase political commitment and accountability to decrease malnutrition [39].

Table 16: Timeline of key events related to nutrition

Year	Contextual events	National nutrition events	International nutrition events
2000	<ul style="list-style-type: none"> • Rwanda adopts decentralization policy 		<ul style="list-style-type: none"> • Millennium Development Goals established
2001	<ul style="list-style-type: none"> • Vision 2020 adopted 		
2002			
2003	<ul style="list-style-type: none"> • First post-genocide elections held 		
2004		<ul style="list-style-type: none"> • Mutuelle de Santé established as a national policy 	
2005		<ul style="list-style-type: none"> • First national nutrition policy developed 	
2006		<ul style="list-style-type: none"> • One Cow per Family Program initiated 	
2007	<ul style="list-style-type: none"> • Economic Development and Poverty Reduction Strategy I adopted 	<ul style="list-style-type: none"> • First national nutrition policy adopted 	<ul style="list-style-type: none"> • Rwanda signs onto the Comprehensive Africa Agriculture Development Program
2008		<ul style="list-style-type: none"> • Crop Intensification Program (CIP) initiated 	<ul style="list-style-type: none"> • 2008 Copenhagen Consensus held • First Lancet series on undernutrition published
2009	<ul style="list-style-type: none"> • 9-Years Basic Education Policy adopted 	<ul style="list-style-type: none"> • President's trip to Kirehe • First national nutrition summit held 	
2010		<ul style="list-style-type: none"> • Demographic Health Survey 2010 conducted 	<ul style="list-style-type: none"> • Scaling Up Nutrition (SUN) established
2011		<ul style="list-style-type: none"> • Second national nutrition summit held • Rwanda joins SUN • District Plans to Eliminate Malnutrition (DPEM) established 	
2012		<ul style="list-style-type: none"> • Joint Action Plan to Eliminate Malnutrition (JAPEM) established 	
2013	<ul style="list-style-type: none"> • Economic Development and Poverty Reduction Strategy II adopted 	<ul style="list-style-type: none"> • Cost of Hunger Report released • National Food and Nutrition Policy 2013-2018 adopted • One-Thousand Days in the Land of One-Thousand Hills Program 	<ul style="list-style-type: none"> • Second Lancet series on undernutrition published
2014		<ul style="list-style-type: none"> • Ongera Micronutrient Fortification Program rolled out 	
2015		<ul style="list-style-type: none"> • Demographic Health Survey 2015 conducted 	<ul style="list-style-type: none"> • Sustainable Development Goals established
2016		<ul style="list-style-type: none"> • The National Food and Nutrition Coordination Secretariat established • Shisha Kibondo Fortified Food Blend Program initiated 	

6. How did Commitment Contribute to Changes in Nutrition?

The political priority given to an initiative can help to determine how much “commitment” the initiative will receive and its success or failure [18]. Commitment exists in various forms and at varying levels, which can either prohibit or increase action. In this study, we assess the influence of three different forms of commitment on nutrition in Rwanda: political commitment which consists of both the stated intent and the reflection of said intent in policy, system or institutional commitment which refers to changes in institutional procedures, incentives, and actions, and financial commitment (Gillespie & van den Bold, 2017). We focus on these three forms of commitment based on previous findings that showed the importance of mobilizing political commitment, developing systematic capacity to implement action in order to sustain commitment to nutrition and establishing funding [41], [42]. In this section, we use data from the national and district level stakeholder interviews to address the following key questions:

1. What does commitment to nutrition mean to the different stakeholders involved in nutrition in Rwanda?
2. What changes in political, institutional and financial commitment has the Government of Rwanda made to facilitate improvements in nutrition?
3. What are the perceived current and future challenges in commitment?

Defining commitment

To understand commitment to nutrition in the Rwandan context, we first sought to understand respondents’ perceptions of this concept. Respondents defined commitment through six main themes, 1) taking ownership, 2) design and adoption of policies, 3) commitment through action, 4) policy and program evaluation, 5) valuing nutrition, and 6) financial commitment. Many of these themes such as taking ownership, designing and adopting policies, and financial commitment overlap with the forms of commitment defined in previous SoC studies.

Two of the definitions given for commitment by study respondents fall in line with the SoC definition of political commitment, which has two parts – the stated intent to address nutrition and stated intent through policy. The first theme used by study respondents to define commitment was taking ownership (n=21/56). Under this theme, respondents believed that commitment meant engaging everyone to feel implicated in the efforts to eliminate malnutrition. For example, one respondent stated: *“Commitment for nutrition according to me is what I am going to bring or to add to what my neighbor is doing so that we can solve malnutrition problems. It’s what am I agreeing to do. . . It is the contribution of what everyone can do to eradicate malnutrition.”* This engagement was not limited to just one’s line of work but also to his or her daily life and community. It was not just something for policymakers or leaders but also for policy and program implementers, and the population. As one district leader respondent put it: *“commitment for nutrition means that there must be a commitment from authorities and partners but there must also be a commitment from beneficiaries. Our beneficiaries are our citizens, as authorities and partners we are committed to eliminate malnutrition, we want to see that kind of commitment in our citizens as well.”* Other respondents (n=13/56) also defined commitment as the specific design and adoption of policies and strategies – a form of stated intent through policy. For these respondents, policies provided a blueprint of how to turn commitment into actionable plans. While leaders or the government may be committed through speech and discourse or stated intent, true commitment was observed through actions such as establishing policy and the proper implementation of said policy. *“I think commitment to nutrition is first about policy and strategies because any commitment which is not reflected into policy...cannot be implemented.”* Furthermore, commitment through action is another theme that emerged which respondents viewed as the optimal implementation of programs and strategies that should be fostered and sustained until improvements are observed and specific goals are

attained in nutrition. Some of the specific goals mentioned during interviews included increasing the availability and use of nutritious foods, decreasing stunting and ending malnutrition.

A few respondents (n=5/56) from the national level and from districts with non-reduced stunting also mentioned the evaluation of policies and programs as a form of commitment. They believed that by evaluating policies and programs that achievements could be assessed such as what has worked well, what hasn't, and how to make more informed decisions to improve nutrition. One district leader stated: *"commitment is doing follow-ups of those programs and making sure that there is a positive result to beneficiaries knowing where people are starting from and where they have reached."* Examples of the evaluations that respondents mentioned being useful consisted of assessing the management and progress of nutrition programs and policies. This definition of commitment mirrored the SoC definition of institutional commitment, which refers to changes in institutional procedures, incentives, and actions in that respondents wanted to see the government establishing certain procedures and actions to show its commitment to nutrition. One non-government national level respondent defined it as, *"Government's commitment to nutrition means to...support the implementation of nutrition projects, following-up and coordinating nutrition activities, analyzing the results, and making better decisions to improve the nutrition sector."*

Valuing nutrition was the fifth theme that emerged when defining commitment to nutrition (n=7/56). Respondents who answered this way believed that commitment to nutrition consisted of understanding what nutrition is, the diverse factors that influence it, and placing value on these influencers. Some respondents who defined commitment along these lines felt that though nutrition as a field had gained importance over the past years in Rwanda, those who studied nutrition were still not valued. One example given was that there were still too many non-nutritionists such as nurses or sociologists, working as nutritionists in health centers. For some respondents, this practice showed a lack of value for nutritionists and their knowledge, and thus, a lack of commitment to nutrition.

Lastly, similar to the SoC definition, study respondents also defined commitment to nutrition through a financial lens (n=9/56). These respondents highlighted that commitment to nutrition requires government funding and budget allocation to nutrition, sufficient funding for the implementation of programs, and commitment to resources that support the proper delivery and utilization of programs. Such resources included human resources to implement policies and programs, infrastructure to support the delivery and ultimate use of programs, developing markets to increase access to different goods, and ensuring the interconnectivity between different provinces. As explained by one non-government respondent from a CSO, *"It means commitment in terms of resources, committing resources intended to achieve nutritional goals. It means committing human resources that are strictly owning that mandate to deliver nutrition related health interventions. It means putting infrastructure in that enables those people who are affected [by malnutrition] to achieve...some level of accessibility."*

Changes in political commitment

Respondents remarked that there have been many changes in political commitment to nutrition over the last 25 years in Rwanda, which they believed fostered some of the changes observed in nutrition. These changes in political commitment can be generalized into four primary categories –the emergence of nutrition champions, changes in the stated intent to address nutrition, improvements in leadership, including through decentralization, and accountability of those leaders.

Study respondents described that evidence of changes in political will to address nutrition in Rwanda were observed through speech and discourse by various leaders and the presence of nutrition champions such as the President of the Republic and representatives from the Office of the Prime Minister (OPM) who inspired the prioritization of nutrition. As one district leader stated: *“Yes, Rwanda has that commitment for nutrition because when the central government and especially the President of the Republic is committed to nutrition, it means that the whole country is committed to nutrition.”* As explained by study respondents, this increased attention to put the topic on the national agenda led to the development of the first national nutrition policy in Rwanda in 2005 (Ministry of Health, 2005). Over the years, with increased attention and discourse on nutrition, commitment to nutrition was further reinforced through the NFNP [44] (see Appendix 1). Study respondents also explained that with this evolution came an evolution of how nutrition was thought of and addressed as well as in what types of actors were involved. While in the past, nutrition was widely seen as the responsibility of MINISANTE, the NFNP’s multisectoral approach to nutrition helped to shift focus to addressing the multiple determinants of nutrition that necessitated the involvement of other ministries in addition to MINISANTE. Essentially, commitment to nutrition and the policy environment moved away from focusing solely on treating malnutrition to preventing malnutrition through addressing multiple underlying and basic factors, according to respondents.

It is important to note that changes in political commitment and in nutrition overall were reinforced by improvements in leadership, according to study respondents. Leadership emerged as a key theme across all administrative levels and groups of study respondents. Good leadership, according to respondents, prioritized nutrition and put nutrition policy on the agenda, helped to strengthen the different institutions working to address malnutrition, and sought investment in nutrition programs. At the national level, leadership improved and promoted a population-focused leadership style that focused on “building up the population”. The leadership’s promotion of decentralized efforts (*discussed more in the next section – coherence*) also helped to spread the focus on nutrition beyond just the national level to sub-national levels. Decentralization and a population-centered leadership also improved interactions between citizens and leaders and presented opportunities to sensitize the population about nutrition more effectively. Respondents in both types of study districts attributed decentralization to the positive effects observed in nutrition. District leaders and FLWs (n=12/21) highlighted that the leadership in the country, through decentralization, provided more guidance and solutions to help the population solve problems faced in their communities. As one district level respondent from a district with non-reduced stunting said: *“These improvements are seen because there is a good leadership and our leaders address the problems that the population has. If a population is facing a problem and no one helps them to solve that problem, they remain in poor conditions. Thanks to good leaders who have enacted a good policy...a policy that can help to eliminate malnutrition”*. This sentiment was also reflected by community members during FGDs who said the government’s leadership displayed concern for the population’s well-being, increased its presence in communities, and provided guidance through programs and sensitization, all things they believed helped to improve health and nutrition outcomes. As one male FGD participant mentioned, *“Leadership is at the base of all the changes. The leadership remarked that children’s lives were not good at all in the past. In this sense, they provided guidance and counsel which led to improved care, health, and nutrition for these children. And we notice these differences, there’s no longer kwashiorkor, no lice, children are healthy.”*

Lastly, increased political will and commitment helped to improve accountability in the country. In Rwanda, leaders from the national to the local level were said to be held accountable for their responsibilities, including implementing nutrition activities, through performance contracts. Respondents explained that this increased accountability and monitoring of performance helped to

improve the implementation of programs, increased leaders' dedication to their work, and motivation to improve strategies.

Overall, changes in political commitment, as reflected through the emergence of nutrition champions, the adoption of multisectoral approaches and policies, improved leadership, and increased accountability were often mentioned during interviews as key drivers of change in the political environment for nutrition.

Changes in institutional commitment

Changes in institutional commitment reflect changes in institutional procedures, incentives, and actions. One of the key changes that was highlighted by almost all groups of respondents was the establishment of the NFNP [44]. This policy specifically depicted a multisectoral approach to nutrition that moved away from heavily relying on the health sector and assigning key roles to different sectors to improve nutrition. Respondents believed that research findings from the DHS [12], [45], the Cost of Hunger studies (Cost of Hunger in Rwanda, 2013) and policies from other countries helped to convince the country to adopt, and continually promote, a multisectoral approach that relies on more than the health sector to improve outcomes. Respondents believed that these studies were instrumental in helping stakeholders understand the severity of stunting in Rwanda, that malnutrition is influenced by multiple determinants and that it impacts a variety of important outcomes such as people's health, the economy, and ultimately the development of the country.

Rwanda also created different nutrition platforms at both the national and sub-national levels demonstrating commitment through institutional changes, according to respondents. For example, respondents described the creation of DPEMs and their committees to coordinate and improve the implementation of the nutrition policy and programs at the district and sub-district levels. Another institutional change that was often mentioned was the creation of the national nutrition coordination body called the National Food and Nutrition Coordination Secretariat, created to coordinate nutrition nationally. Study respondents believed that these platforms showed that the government was willing to create new institutions and find ways to improve actions across existing institutions to improve nutrition programming. A non-government national level respondent explained it like this: *"There is commitment for nutrition in Rwanda by looking to the policy framework that has been presented, the establishment of the secretariat, and the leadership in the secretariat."*

Lastly, with the participation of more ministries, respondents described the nutrition environment as more participative and inclusive compared to the past. At the district levels especially, respondents highlighted that different sectors now work together to address nutrition explaining that this could be seen by the number of nutrition-related programs like One Cow per Family, kitchen gardens and school feeding, and the joint follow-up visits in communities. These programs were also strengthened by the creation and reinforcement of new positions at different administrative levels, such as social affairs personnel at the sector and cell levels and community health workers (CHW) in communities, who supervise and support the implementation of these programs. Overall, more respondents from districts with reduced stunting compared to those with non-reduced stunting mentioned that it was now well understood that reducing malnutrition is a joint multisectoral effort.

Changes in financial commitment

Over the years, respondents described that there were some positive changes in financial commitment to nutrition but that it remained a key challenge. Some respondents (n=12/66) noted that Rwanda had

increased its financial commitment to nutrition as evidenced by the existence of many different nutrition and nutrition-related programs across the country that did not exist in the past. More people (n=22/69), however, believed that financial commitment to nutrition was insufficient and that the Government of Rwanda did not allocate sufficient government funding to nutrition. Insufficient financial commitment to nutrition was often mentioned when respondents discussed challenges in implementing the NFNP. For these respondents, implementation of the policy was inadequate due to lack of funds for many activities. One non-government national level respondent from a CSO stated: *“I would say that in general, the policies are there but the way they are implemented, that is where the problem is. Because now, there are issues of funding...which come in.”* For example, respondents at the district level mentioned that the multisectoral community follow-ups conducted for families with children identified as malnourished were useful because they helped leaders understand the realities of communities and how programs are intended to help them. Many of the respondents, however, also mentioned a lack of funds for these activities which affected implementation. *“The follow-up that occurs today was not part of the policy in the past...We do face challenges though, doing some of the follow-ups because of lack of transportation”*, said one district leader from a district with non-reduced stunting. Respondents also mentioned that there was a lack of funding for the DPEMs which they believed led to low participation in DEPM meetings and poor implementation of the DPEMs. A few respondents explained that this was more common in districts that did not have many development partners in nutrition. In the end, financial commitment to nutrition was described as a key challenge for the field.

Remaining challenges in commitment: Financial commitment and implementation

Despite the different changes in commitment observed over the last 25 years, study participants also described two primary remaining challenges. These were financial commitment and having enough qualified human resources, which were often linked. Study respondents believed that where one or both things were lacking, problems with the implementation of the NFNP and/or DPEMs existed.

The main challenge to commitment described throughout the study was poor implementation of the NFNP, despite it being a well written and clear policy. According to respondents, insufficient funding affected the implementation of certain activities and the human resources needed to adequately implement the NFNP. For example, respondents mentioned a shortage of staff, including the lack of a nutrition convener at the district level to improve coordination. Instead, they explained that responsibilities in nutrition are given to individuals with already existing responsibilities outside of nutrition which leads to work overload, according to respondents. Study respondents believed that having a nutrition convener would help to mainstream reporting, monitoring and evaluation, and evaluation of progress from all the different sectors involved in nutrition and the DPEMs, according to respondents. Another human resource challenge that emerged was the lack of trained nutritionists at health centers, where non-nutritionists are often employed in the post for nutritionists and making decisions on nutrition. The primary reason given for these challenges was insufficient financial commitment. One national level respondent stated: *“We were talking about it yesterday and saying that there is a strong political commitment here. But you find that the funding for nutrition that comes from the government is very little. They say do whatever possible to eliminate malnutrition. But political commitment goes in hand with funding... If you compare the funding that other sectors receive, nutrition does not get a lot of funding.”* The shortage of funds and human resources led to what respondents identified as a key policy challenge: coordination.

Conclusion on commitment

Overall, Rwanda has increased commitment to nutrition over the last 25 years as evidenced by changes in political, institutional and financial commitment. Study respondents overwhelmingly agreed that these changes in these different aspects of commitment had contributed to the improvements in nutrition observed. The changes in commitment to nutrition were widespread and game-changing over the past 25 years. During this time, the president and other high-level leaders took a keen interest in nutrition, pushing it onto the country's political agenda. This resulted in new policies focused on nutrition being developed and implemented in Rwanda, commitment to worldwide development goals and nutrition platforms, addition of staff and multisectoral nutrition platforms at different levels to facilitate the implementation of the nutrition policies and to increased allocation of resources to nutrition and nutrition-related programs. The development of national nutrition policies, especially the multisectoral NFNP, mapped out how ministries should work together to address nutrition, increased these ministries' participation in addressing nutrition, and led to more nutrition and nutrition-related programs. Furthermore, the country also committed to national and international policies or frameworks related to agriculture, education, health, and economic development which affected different determinants of nutrition. Institutionally, the country also established new platforms to facilitate the implementation of the NFNP and to bring together the different ministries addressing nutrition during planning, implementation, and monitoring and evaluation. The increase in nutrition and nutrition-related programs was a sign of increased financial commitment to nutrition, according to respondents, but they also believed the government could increase this form of commitment in order to increase resources necessary for the optimal implementation of the NFNP and various nutrition and nutrition-related programs offered to the population.

7. How did Coherence Contribute to Changes in Nutrition?

Coherence in nutrition encompasses the clarity and consistency of communication and actions across institutions (institutional coherence), sectors (horizontal coherence), and administrative levels (vertical coherence), and actors working to address nutrition. This section focuses on how these three different types of coherence contributed to changes in nutrition in Rwanda. Institutional coherence examines the clarity and consistency between the different coordination platforms that make up the nutrition policy landscape in Rwanda. These coordination platforms consist of the SCF&NSC, the NF&NTWG, and the NFNCs. Horizontal coherence examines how the different ministries or sectors involved in nutrition, per the NFNP, understand their roles in nutrition and the clarity and consistency of links across these different ministries. While the NFNP assigns roles and responsibilities to the different sectors involved in nutrition, collaboration and coordination across sectors can be challenging. Work in other countries has found that during implementation, proposed collaborations or multisector plans sometimes fail to develop and sustain operational, individual, and institutional mechanisms that push the different participants and sectors to collaborate, given their individual missions [19]. These types of issues can deter action or prevent ministries or sectors from breaking out of their silos even when working to achieve similar goals. Among the challenges that have been identified for implementing multisectoral nutrition policies are differing views on the roles and responsibilities of the sectors involved, institutional defensiveness, and ineffective coordination mechanisms across sectors and administrative levels of government [19], [42]. Lastly, vertical coherence focuses on coordination across different administrative levels, specifically, in this study we will examine how the NFNP is translated from the national level to implementation at the local level.

The key research questions that we will address in this section are:

1. How do different ministries understand their roles in nutrition and how does this align with their stated roles in the NFNP?
2. What were the processes followed to communicate, develop partnerships, and coordinate actions across the involved sectors in addressing nutrition (i.e. how does institutional and horizontal coordination operate in Rwanda)?
3. How is the NFNP translated and implemented at the district and community levels through partnerships with local government staff, national, and international NGOs (i.e. how does vertical coordination operate in Rwanda)?
4. How has monitoring and evaluation been used to inform policy development and program implementation?
5. What are the perceived current and future challenges in coherence?

Taken together the answers to these questions will help to answer the overall question posed in this section which is, how has coherence contributed to changes in nutrition in Rwanda.

How do different ministries understand their roles in nutrition?

Perceived role of the health sector

Respondents from the health sector described having three main roles and responsibilities related to nutrition (**Table 17**). These included conducting mobilization and sensitization activities and working on the prevention and treatment of malnutrition. As described by one respondent, “*I can state our role in nutrition can be divided into three sections: prevention...mobilization with the purpose to improve the behavior and skills of people...and curative...where we help to heal sick people with malnutrition.*” A few

respondents at the district level also mentioned that they had a role in coordinating activities around nutrition, especially with hospitals, health centers, and actors working at the sector and cell levels.

Of the three primary roles described, conducting mobilization and sensitization activities was the most commonly mentioned. Respondents described this role as consisting of sensitizing people and changing mindsets and behaviors on topics such as dietary and feeding practices, hygiene, family planning, delivering at the hospital and signing up for health insurance, among others. They explained that they especially focus on IYCF practices and dietary practices for adults. Study respondents explained that this work falls heavily on the community health workers (CHWs), but they went on to explain that it is also supported by district leaders and hospital and health center staff who see sharing messages and sensitizing the population as part of their duties in nutrition.

Respondents from the health sector also reported that they played an important role in prevention of malnutrition, especially through CHWs who provide services directly to the population. Respondents described the health sector's preventive work as conducting prenatal visits and monthly growth monitoring visits, providing vaccines, implementing preventive programs such as the micronutrient supplementation program (*Ongera*) and conducting the mobilization and sensitization activities mentioned above. Although many respondents focused on their sector's roles in preventing malnutrition, some respondents believed that their biggest role in nutrition was the treatment of malnutrition and illnesses that stem from- or are associated with- malnutrition.

Perceived role of the agriculture sector

According to respondents from the different administrative levels in the agriculture sector, the role of agriculture in nutrition centers around increasing food production, food availability, and food security. Respondents believed that increasing production would contribute to increased food availability, food security, and increasing economic development both at the national and household levels. At the household level, the agriculture sector was also seen as having a role in increasing the consumption of diverse diets through kitchen gardens, according to respondents. Some of the national level respondents, however, tended to see increasing access to food and promoting optimal dietary practices as the responsibility of other actors/sectors. One respondent from this level said, *"agriculture has two functions: economic development and food security. To appraise the food security part, I look at the role I can play; I can make it available and I can make it sustainable. Other areas like accessibility, utilization, others can contribute [to addressing these issues]. Me, if the food is there ...then I can negotiate and lobby others for [improving] accessibility and utilization [of foods]"*.

At the district and community levels, respondents echoed responses from the national level highlighting the importance of increasing food production for food security and income, which they believed could improve nutrition. As one director of agriculture said: *"our role is to encourage farmers to cultivate and have a good harvest so that they get enough food to eat and surplus to sell at the market to get money which they use to buy other food products that they did not cultivate."* Like national level respondents, agriculture actors at sub-national levels thought that increasing production was their main role and that other sectors should address how food is consumed. In one of the districts with non-reduced stunting, one district leader said *"what I do...is to ensure that there is food production. Our role is completed by the health sector that teaches citizens about nutrition. We teach farmers how to cultivate so that they increase their production, we may tell them that they should eat vegetables, but it is not our main role."*

Although there were some similarities in how agriculture actors perceived their role in nutrition across administrative levels, there were also some key differences. The primary difference noted was that more respondents from the district and community levels compared to those at national level mentioned additional roles for the sector in relation to nutrition, such as working with community members to; establish kitchen gardens, improve farming techniques, and promote the cultivation of fruits and vegetables. In addition, some of these respondents mentioned that they work with the health sector to fight malnutrition. One FLW in agriculture stated: *“In our current duty, we don’t only teach people how to cultivate but we also teach them how to fight malnutrition by making a small garden at home where they cultivate vegetables which helps them to reduce malnutrition in their families... And our role is to make sure people know how to plant these vegetables and when to plant these vegetables”* Comparatively, at the national level, one respondent believed that the nutrition sector had failed to clearly communicate and specify what exactly multisectoral nutrition is. The respondent felt that the nutrition policies were broad and did not provide specific frameworks or numbers in their plans on what was expected to change and how it would change. The respondent argued that this lack of information or clarity left sectors outside of nutrition unsure of how their sector would specifically contribute to changes in nutrition.

Perceived role of the local government sector

Respondents from the local government sector described their primary role in nutrition as ensuring national development goals are met, which includes ensuring the well-being and nutrition of the population. To meet these goals, respondents described their roles in two primary activities: planning and coordination and mobilization/sensitization in nutrition. The local government sector actors explained that they develop action plans to implement the DPEMs and monitor programs that aim to improve nutrition. As described by a government national level respondent: *“Our ministry is in charge of coordination and local government...our role is to ensure that proper planning is done at the district level. We have to be not only informed by the central government but also by the local needs and realities. We monitor how different interventions are implemented.”* Furthermore, at the district level, local government workers believed that conducting mobilization and sensitization activities in relation to nutrition was another key role they played to improve the well-being of the population. As one district leader put it: *“There is a lack of knowledge [in the population] and as the Office of Social Affairs, our main role is the mobilization of the population, sensitizing them, and raising awareness about the negative consequences [of poor nutrition] for them and their children.”* This type of response related to changing behaviors and “mindsets” was repeated by many respondents, especially those from the local government sector. Respondents believed that behavior and people’s mindsets played a big role in poor nutrition outcomes and it was the role of the local government to improve poor behaviors.

Perceived roles of the education and gender sectors

Based on the respondents’ interviews, the role of education in nutrition revolves primarily around three roles: 1) school feeding, 2) school kitchen gardens, and 3) nutrition education through curriculum development for children over the age of 5 years old.

The three primary reported roles of the gender sector in nutrition included conducting mobilization and sensitization activities, collaborating with MINISANTE in certain activities and increasing access to early child development (ECD) centers. For mobilization and sensitization activities, a respondent from the gender sector explained that they use communication channels such as radio and television shows and community discussions to inform parents how to eliminate and prevent malnutrition. They also conduct

cooking demonstrations that focus on cooking balanced meals, and the proper use of FBF for those participating in the program. In addition, the gender sector participates in the 1,000 Days Campaign, where it has worked with MINISANTE to make a booklet used to deliver key messages on nutrition for mothers and children in the community. This sector also reported that they address nutrition through increasing access to ECD centers where young children are provided with meals and stimulation while their parents work.

Perceived sectoral roles compared to expected roles according to the NFNP

Many of the roles perceived by the different respondents in each of the sectors aligned with their stated roles in the NFNP (Table 17). However, there were some striking differences especially within the health and agriculture sectors and to some extent in the local government sector that highlight that some roles and responsibilities are still perceived to fall outside their sectoral responsibilities despite what is stated in the NFNP. For example, the NFNP states that the health sector should play a role in school feeding programs and, in the planning, and coordination of nutrition activities. However, these roles were not mentioned by the study respondents from the health sector. While respondents in the agriculture sector highlighted their roles in the kitchen gardens and school feeding programs, they did not mention coordinating nutrition activities as their responsibility, contrary to what is indicated in the NFNP. Respondents from the agriculture sector at the district and community levels mentioned preventing malnutrition, but it was not mentioned at the national level. Responses from local government respondents aligned with the stated roles for this sector in the NFNP, except that they did not mention having a role in school feeding programs. The perceived roles of the gender and education sectors also very much aligned with what is stated in the NFNP. The only exception is that the gender sector also mentioned its role in ECD centers and the role of ECD centers for children's nutrition which is not explicitly mentioned in the NFNP as this role was introduced after the adoption of the NFNP.

Table 17: Sectoral roles in nutrition according to the National food and Nutrition Policy (NFNP) and as perceived by government representatives interviewed for Stories of Change (SoC)¹

Roles	Health		Agriculture		Local Government		Gender		Education	
	NFNP	SoC	NFNP	SoC	NFNP	SoC	NFNP	SoC	NFNP	SoC
Nutrition-related education and awareness	X	X	X	X	X	X	X	X	X	X
Prevention of malnutrition	X	X	X	-	X	X	X	X	-	-
Treatment of malnutrition	X	X	-	-	-	-	-	-	-	-
Economic Development	-	-	X	X	-	-	-	-	-	-
Food security	-	-	X	X	-	-	-	-	-	-
School feeding programs	X	-	X	X	X	-	-	-	X	X
Implementing kitchen gardens	X	X	X	X	-	-	-	-	X	X
Planning and coordination in nutrition	X	X	X	-	X	X	-	-	-	-
Early childhood development	-	-	-	-	-	-	-	X	-	-

¹ Green boxes highlight where roles are mentioned in the NFNP but not during SoC interviews. Pink boxes highlight roles mentioned during the SoC interviews but not in the NFNP

Institutional coherence

During the SoC interviews, we asked respondents about the mechanisms used to coordinate nutrition in Rwanda and facilitate the implementation of the NFNP. The SCF&NSC, NF&NTWG, and the NFNCs were identified as the key platforms used to coordinate the NFNP in Rwanda. These platforms fall under the leadership of the OPM and are described within the NFNP with the exception of the NFNCs which was established post the development of the NFNP and thus, not described in the policy. Under the NFNP, the OPM oversees the SCF&NSC, which is mandated to advise and report on nutrition and household food security to the OPM through the Prime Minister's Inter-Ministerial Coordination Committee (IMCC)⁸. The SCF&NSC is then responsible for the NF&NTWG, a platform designed to assist in coordinating nutrition activities by bringing together all the different stakeholders working in nutrition such as ministries, UN agencies, donors, national and international NGOs, research organizations, CSOs and the private sector [44]. In 2016, Rwanda established the NFNCs to coordinate ministries and development partners addressing nutrition.

Social Cluster Food and Nutrition Steering Committee (SCF&NSC)

NFNP is the responsibility of the Social Cluster Ministries, which consists of MINISANTE, MINAGRI, MINALOC, MIGEPROF, MININFRA, MINEDUC, and the Ministry of Public Services and Labor (NFNP, 2013). The SCF&NSC is the committee within the Social Cluster Ministries that coordinates the implementation and monitoring of the NFNP and the National Food and Nutrition Strategic Plan (NFNP, 2013). This committee is also in charge of JAPEM and it advises and reports on nutrition and household food security to the OPM.

Respondents in the study mostly talked about the SCF&NSC as a coordination body across ministries (**Table 18**). However, it was mostly mentioned by national level respondents; only some respondents from districts with non-reduced stunting (n=4/16) and those with reduced stunting (n=5/16) mentioned this body as a coordination platform that brings together different ministries to make decisions on nutrition.

According to the NFNP, the SCF&NSC is in charge of the NF&NTWG. The SCF&NSC was, however, more likely to be mentioned in relation to the NFNCs. There was some conflicting information about the relationship between the SCF&NSC and the NFNCs. One national level respondent from a CSO believed that the SCF&NSC played an advisory role to the NFNCs. However, according to government national level respondents, the Social Cluster Ministries coordinate nutrition across the different ministries, devise and monitor JAPEM, but report to the NFNCs. *"We also have another group called JAPEM which is coordinated by the secretariat... We normally have quarterly meetings where every ministry has its role and activity to implement and it gives a report regarding its responsibilities. So, each quarter all the ministries have to report what we have done in the nutrition sector"*, said one national government respondent.

National Food and Nutrition Technical Working Group (NF&NTWG)

The NF&NTWG was established in 2013 "to provide technical advice and assist in coordinating and organizing national activities" in nutrition and to provide technical assistance for decentralized activities (NFNP, 2013). The NF&NTWG consists of stakeholders from the SCF&NSC, UN agencies, donors, national and international NGOs, civil society, research organizations, and the private sector (NFNP, 2013).

⁸ The Inter-Ministerial Coordination Committee was not mentioned during interviews and will not be discussed in this section.

Within this larger group exists sub-sector working groups dedicated to health and nutrition, WASH, agriculture, and social protection. These groups are designed to allow stakeholders to participate in the sectoral groups in which they intervene. According to the NFNP, NF&NTWG meetings are organized at the request of the SCF&NSC.

Most national level respondents knew of the NF&NTWG whereas those at the district level did not mention this group as a coordinating body in nutrition. In fact, four respondents from districts with non-reduced stunting and one respondent from a district with reduced stunting specifically stated that they did not know of the NF&NTWG or what it did. At the national level, there was also one respondent who did not know of this coordination platform.

Respondents who discussed about the NF&NTWG described it as facilitator for nutrition coordination nationally (n=15/34). Others primarily saw the platform as a convening body for all stakeholders in nutrition to share and learn about nutrition activities being implemented by different ministries and partners and to discuss technical issues (n=11/34). Both of these descriptions align with the intended purpose of this body as outlined by the NFNP. Respondents further highlighted that this platform provides a space for the stakeholders to propose policy solutions and advise the SCF&NSC on how to improve nutrition-related programs, policies, and coordination: *“what I mean by think tank is that you have this Nutrition Technical Working Group where we meet on regular basis and we discuss issues, policies and we make recommendations.”* About half of the respondents from the national level mentioned that the platform is beneficial for coordination because it allows for the sharing of information on current projects, policies, and trends in nutrition from the different stakeholders. Development partners also mentioned that it was helpful to know on what or where their different counterparts were working.

Although many respondents who knew about the NF&NTWG had favorable views of this group some highlighted challenges with this platform. These challenges primarily revolved around participation and its capacity as a coordinating body. One non-government national level respondent stated: *“the Technical Working Group is just where people meet to exchange ideas, but the Technical Working Group is not an institution. It can’t invite me to submit a report to [it] and I can offer to attend or not.”* This view that the NF&NTWG is just an information sharing platform was also mentioned by respondents who discussed the issue of participation, both in terms of number of people and number of sectors participating. Reasons mentioned for low participation included that not all stakeholders involved in nutrition were known and therefore not invited, lack of accountability to participate in the NF&NTWG, and the multitude of meetings. One government national level respondent stated: *“[our ministry] does not always participate but it participates depending on the agenda and the person who invites the meeting...We participate if what is on the agenda is related [to what we do] or interesting.”* A couple of respondents mentioned that they stopped attending NF&NTWG meetings because of power dynamics; a donor respondent discontinued his attendance so as to not seem like donors were influencing technical decisions while one respondent felt that his or her sector was unempowered during meetings. This respondent stated: *“Usually there are Technical Working Group Meetings, but I haven’t been in the Technical Working Group for a while. I think it was quite open for everyone to be able to speak what they wanted but at the same time I would say that the funders, UN agencies, and NGOs obviously have more power as they are the ones with funds.”*

National Food and Nutrition Coordination Secretariat (NFNCS)

In June of 2016, the SCF&NSC set up the NFNCS to improve synergy among the different actors in nutrition and to oversee all food and nutrition activities in the country and to play an advisory role for the Social Cluster Ministries (Rwanda CSR Report, 2017). The establishment of the NFNCS was a government response to calls for more targeted monitoring and evaluation in nutrition and improvements for coordination mechanisms in nutrition and food security (Rwanda CSR Report, 2017).

At the time of the SoC study, the NFNCS had only been established for one year and was housed within MINALOC. The NFNCS has since been moved and is under new leadership. During our study, most respondents at the national level knew of the NFNCS but a number of district-level respondents did not know about this platform. Three respondents at national level (9%), four respondents in reduced districts (20%), and six respondents in districts with non-reduced stunting (33%) did not know about NFNCS. These respondents had either not heard of the NFNCS or did not know what its role was.

The respondents who knew about the NFNCS explained that it was created because of the importance placed on nutrition in the country and the need for one body to coordinate the different stakeholders involved in nutrition. These respondents stated, in line with the platform's stated objectives, that its role was to coordinate activities and ministries involved in nutrition and to conduct national monitoring and evaluation of the different nutrition interventions. The proportion of respondents who mentioned this information was highest at national level (n=26/32) and about equal in both types of districts (n=8/16 and n=9/16 in reduced and non-reduced districts, respectively). Among these respondents, many welcomed the intention of this body to plan, coordinate, and monitor nutrition activities in the country. These respondents highlighted that Rwanda currently had many interventions and programs in nutrition and it was important to have a platform like NFNCS to coordinate activities. Furthermore, these respondents also mentioned that though ministries involved in nutrition had integrated planning through JAPEM, the NFNCS could help to coordinate their activities better because it isn't another ministry. Respondents from the ministries, CSOs, and NGOs, and a few district respondents from the districts with non-reduced stunting all mentioned that they also report to NFNCS.

Many respondents across the national and district levels discussed that the NFNCS was newly established or still finding its way. Some respondents (almost exclusively from the national level) believed that there are many challenges facing the NFNCS. About one-third of the national level respondents, believed the platform was not yet working up to its capacity for various reasons such as funding issues, lack of clear roles and an established monitoring and evaluation framework. As stated above, some respondents welcomed that the NFNCS was not a ministry, but others mentioned that a challenge was its perceived lack of convening power to coordinate the different stakeholders, especially the Social Cluster Ministries, if the platform was housed in- and reports to- MINALOC. One non-government national respondent stated: *"the Nutrition Secretariat staff is unfortunately MINALOC staff⁹. They should be above MINALOC because they are supposed to be overseeing MINALOC. But they are placed under MINALOC and are reporting to the PS of MINALOC which is also in disagreement with partners. They should be beyond ministries under PM's office or President's Office."*

In addition to their lack of convening power, respondents warned that the NFNCS will need to work towards finding a way to truly integrate nutrition in the different ministries instead of having ministries revert back to their sectoral roles: *"There is awareness of the [nutrition] issues but each ministry usually*

⁹ Since our data was collected, the NFNCS has moved from MINALOC to MIGEPROF.

falls back into its line. Ministry of Health focuses on health and the Ministry of Agriculture falls back to production. But the Secretariat will have a lot to improve on that and get things really integrated.”

Institutional coherence: Clearly defined roles needed

Three main national coordination platforms were mentioned by study respondents for nutrition: the SCF&NSC, NF&NTWG, and the NFNCs. While these bodies may be different, their responsibilities were very similar and not always clearly defined and differentiated, according to respondents. One non-government respondent at the national level stated: *“All actors in food and nutrition plus Social Cluster Ministries need to understand the role and responsibilities of each other in supporting nutrition and their role in coordination. That way, they will understand the role of the Secretariat and how they are going to collaborate. I think that is my view because there have been a lot of conflicts.”*

During our study, it was evident that some stakeholders at the national and district level were not aware of the distinction between these bodies or thought that the roles and responsibilities of these different bodies may need to be reiterated. For example, some respondents said it was hard to distinguish the role of the Social Cluster Ministries in nutrition from that of the NFNCs, as they were both in charge of coordinating nutrition in the country. Some believed that the Social Cluster Ministries coordinated nutrition across government ministries only, but some believed that they oversaw all coordination and made final decisions. Others, still, believed that the NFNSC was the head body in charge for nutrition coordination, that Social Cluster Ministries reported to it, and that it was the platform that communicated directly to the OPM. For example, one government national level respondent stated: *“These [Social Cluster] Ministries plan jointly, and they give the Secretariat reports. [The Secretariat] quarterly gives report to the Prime Minister’s Office to show the progress. And then the food secretariat monitors how the joint planning is implemented.”*

The NF&NTWG was viewed mostly as a forum to discuss technical issues and policies in nutrition and to make recommendations, but a few respondents (n=5/62) saw it as the national body that convenes and coordinates all nutrition stakeholders. Some of the confusion may have been due to the fact that the NFNCs was still new and the distinction between these platforms and their relationship to each other was not yet clear to respondents. It is important to note, though, that two respondents mentioned that there were talks about reforming how the NF&NTWG and its sub-technical working groups will work in relation to the NFNCs.

Table 18: Roles of coordination bodies and reporting lines according to SoC respondents

	Social Cluster Food and Nutrition Steering Committee and Social Cluster Ministries (SCF&NSC)	National Food and Nutrition Coordination Secretariat (NFNCS)	National Food and Nutrition Technical Working Group (NF&NTWG)
Perceived roles of the different groups			
Coordination body in nutrition	X	X	X
National convener in nutrition		X	X
Government or ministry planning	X		
Coordination of ministries involved in nutrition	X	X	
Discussion platform for technical information on nutrition			X
Reporting lines for the different groups according to respondents			
Reports to the NFNCS	X		X
Reports to Social Cluster Ministries		X	X

Horizontal coordination

Horizontal coordination in nutrition involves the joint action of agencies from different sectors at the same governmental level to address nutrition (Garret and Natalicchio 2011). Respondents from both the national and district level believed that Rwanda had established mechanisms to conduct horizontal coordination across the different ministries or sectors involved in nutrition. These mechanisms included joint planning for nutrition across the Social Cluster Ministries in JAPEM, joint implementation of nutrition and nutrition-related programs, and coordination meetings such as those conducted through DPEMs or the Joint Action Development Forum (JADF) (**Table 19**). A couple of respondents (n=2/39) also mentioned the role of the Ministry of Finance and Economic Planning (MINECOFIN) in horizontal coordination.

Table 19: Reported mechanisms for horizontal coordination^{1, 2}

Theme	National	Reduced	Non-Reduced
N =	23	8	8
Joint planning for nutrition through JAPEM	10	2	2
Joint implementation of nutrition programs	9	5	3
Coordination Meetings (e.g., DPEM and JADF)	6	3	4
Joint monitoring	1	4	4
MINECOFIN coordinates funding	1	-	1

¹ A dash (-) represents a category for which there were no responses, ² Acronyms used: DPEM, District Plans to Eliminate Malnutrition; JADF, Joint Action Development Forum; JAPEM, Joint Action Plan to Eliminate Malnutrition; MINECOFIN, Ministry of Finance and Economy

Joint planning through JAPEM

According to respondents, Rwanda facilitated coordination across ministries or sectors through joint planning, specifically through JAPEM. Respondents at the national and district levels mentioned that the plans jointly designed on a yearly basis by the Social Cluster Ministries highlight how each sector contributes to nutrition and specifically to the implementation of the NFNP. According to government national level respondents, the ministries involved in nutrition usually evaluate this plan quarterly and conduct quarterly meetings to validate the reports. Once validated, the ministries send their report to the NFNCs in MINALOC.

The plan allows ministries to evaluate how they are moving forward in the implementation of the NFNP and if they are conducting their nutrition activities as planned. According to respondents, JAPEM contributes to horizontal coordination because it clearly establishes that each sector contributes to nutrition and highlights its responsibilities and activities. Through JAPEM, *“each ministry became aware that it needs to do something to eliminate malnutrition, that they must have nutrition activities”*, said a non-government national level respondent from an IO. District level respondents who mentioned JAPEM as a horizontal coordination mechanism talked about it in a general manner as a sign that the Social Cluster Ministries all work together to plan activities in nutrition and that there is a multisectoral approach at the national level. However, one respondent perceived a shortcoming of JAPEM, especially the evaluation of whether it was working and explained it like this: *“the Social Cluster Ministries supposedly coordinate nutrition through the JAPEM. There is not enough sharing from the government side on how that plan is being developed, monitored and revised. It will be difficult as an outsider to know actually whether it is an effective platform.”*

Joint implementation of nutrition and nutrition-related programs

Respondents also mentioned that the joint implementation of nutrition and nutrition-related programs across ministries or sectors reinforced horizontal coordination in Rwanda. This response was mentioned by some respondents at the national level and in both types of study districts. According to these respondents, some of the nutrition and nutrition-related programs in Rwanda are jointly implemented by multiple ministries. The examples they gave included the following programs: One Cow per Family (Girinka), kitchen gardens (household and school), One Cup per Child, and the ECD program. One non-government national level respondent from an NGO stated: *“The Ministry of Agriculture works with the Ministry of Health to implement the kitchen garden project across the country.... Community health workers and farmer promoters help community members to establish kitchen gardens. This proves that there is a strong coordination and network around nutrition in Rwanda.”*

The joint implementation of programs was also highlighted through collaborations across sectors at the community level, especially between CHWs and agriculture extension workers. For example, FLWs in agriculture mentioned that their work complements the work done by CHWs as seen through the kitchen garden program. While agriculture extension workers help households to establish kitchen gardens to increase access to nutritious foods, the CHWs provide nutrition education through programs such as Parent’s Evenings (Umugoroba w’abavyeyi), cooking demonstrations, and nutrition education sessions that reinforce the importance of kitchen gardens and how they can contribute to improvements in nutrition.

Coordination through DPEMs and District Food and Nutrition Steering Committees (DF&NSC)

DPEMs are plans developed based on the community-based interventions and services outlined in the

NFNP and offered within districts (NFNP, 2013). Once developed, DPEMs lay out the responsibilities and activities of involved ministries. DF&NSC meetings¹⁰, led by MINALOC with participation from key actors from MINISANTE, MINAGRI, MIGEPROF, MININFRA, MINEDUC, civil society, and development partners, are multisectoral meetings that are intended to be used to plan and monitor and evaluate the progress made on DPEMs in each district (NFNP, 2013). The DF&NSCs are supposed to meet quarterly and are tasked with ensuring sector participation in DPEMs (NFNP, 2013).

According to respondents, DPEMs and the associated committee meetings were key signs that horizontal coordination across sectors occurs in Rwanda. DPEMs were described as a beneficial mechanism that helped to facilitate the implementation of nutrition and nutrition-related programs, though this was more likely to be discussed by respondents from reduced stunting districts compared to non-reduced districts (**Table 20**). Respondents mentioned that DPEM committee meetings bring together the different ministries and partners involved in nutrition to plan, implement, share, discuss, and report on the progress of their nutrition-related activities and to assess what additional actions are needed. An important characteristic of DPEMs that study respondents appreciated was that they solely focus on nutrition. The DPEM committee meetings were described as multisectoral, as intended, including participants from the local government, health, sanitation, agriculture and livestock, education and gender sectors, civil society and representatives from the army. Respondents believed that DPEM committee meetings had helped stakeholders, especially those not in the nutrition or health field, to understand how their respective sectors affect nutrition and why their roles in DPEMs are important. As one district leader stated: *“At the district level, we coordinate through DPEM because we discuss what is there and what is needed in nutrition... We will all hear about what is needed to help fight malnutrition and who will be in charge of what... Everyone [each sector] knows his responsibility in implementing the plan... In the past, certain sectors didn’t feel involved in nutrition, but it doesn’t mean that they were not involved. It was just not reflected in the policies. And it’s important to explain things to people and the more people meet, they start to feel that the problem [of nutrition] concerns them too.”*

Study respondents described some key facilitators for the implementation of DPEMs, including support from development partners, having a nutrition convener, leadership, and evaluating DPEMs. Respondents from both national and district level reported that an important facilitator for the implementation of DPEMs was the involvement of development partners because they facilitated implementation of activities and provided technical and budgetary support. A district leader from a reduced stunting district also described the importance of the technical and financial support received from development partners, explaining that: *“in the past, we had a DPEM partner, [NGO], that helped to organize the DPEM meetings and evaluate what was in the action plan, and see what is done, what is not done yet. We would meet and discuss with them the challenges and why malnutrition was decreasing in certain areas but not in others? Now, if the funding you have for these activities is gone, the committee falls apart.”* The importance of leadership for the implementation of DPEMs was also mentioned by a few people at the national level (n=3/18). Good leadership, according to these respondents, consisted of leaders who tried to better understand nutrition which helped to increase the likelihood of optimal DPEM implementation. Having a nutrition convener was also mentioned as a key facilitator for the optimal implementation of DPEMs. This response was mentioned more often at the national level, but respondents from districts also highlighted that having a nutrition convener decreased the workload of district leaders in charge of DPEMs and could improve the monitoring of nutrition activities. Other facilitators to the optimal implementation of DPEMs mentioned by study

¹⁰ We will refer to District Food and Nutrition Steering Committees (DF&NSC) as DPEM committee meetings for the rest of the report

respondents included continual evaluations of DPEMs to track progress, the involvement of local government in nutrition, and having regularly scheduled DPEM committee meetings.

Coordination meetings through JADF

JADF coordination meetings were mentioned by a few respondents as a mechanism to coordinate nutrition activities at the district level. A total of five respondents discussed JADF as a nutrition coordination mechanism at the district level. Of these five respondents, one was from the national level, and two each were from the two types of study districts. JADF meetings, however, are meetings that bring together all development partners in a district and are not intended to specifically focus on nutrition activities. JADF representatives, were however, mentioned as participants in DPEM committee meetings.

Joint monitoring activities

Horizontal coordination in nutrition was also supported through monitoring mechanisms such as joint monitoring and evaluation activities conducted at the district level and joint performance contracts. At the district level, an equal number of respondents from districts with reduced and non-reduced stunting discussed conducting joint monitoring activities with actors from the different ministries involved in nutrition. According to these respondents, members who participate in DPEM meetings conduct community visits in multisectoral teams to evaluate the conditions in which people live, especially for the households with children who have been identified as malnourished (through mid-upper arm circumference (MUAC) measurements). According to respondents, these multisectoral trips allow DPEM actors to jointly see the multiple causes of malnutrition, the underlying factors that affect households with malnourished children, and if the implementation of DPEM activities reach these households.

At the national level, only government respondents, both leaders and technical staff, mentioned the joint-evaluation of the ministries involved in nutrition through joint performance contracts in nutrition. *“Initially, it was an issue. Even before, if you listen to the President’s speeches, he asked about coordination and working together. In the last 3 years, there have been improvements. We now have joint performance contracts. It is a framework that binds together the ministries whether we like it or not”*, stated one government national level respondent. These joint performance contracts, which are signed with the President of the country, evaluate the implementation of nutrition activities across sectors and allow the different ministries or sectors to be jointly accountable to nutrition and therefore increase collaboration across sectors.

Ministry of Finance and Economic Planning

Two respondents also mentioned MINECOFIN as a body that facilitates horizontal coordination in nutrition. They explained MINECOFIN facilitates coordination through the allocation and coordination of funding for nutrition across ministries.

Table 20: Benefits of DPEMs and associated committees and facilitators for their success¹

Theme N=	National 11	Reduced 15	Non-reduced 10
Benefits			
Sectors collaborate	2	12	6
Helps people to better understand how their sector contributes to nutrition		3	1
Focuses solely on nutrition	1	1	-
Specific to each district	1	1	-
Facilitators			
Good leadership	3	-	-
Having development partners	8	4	4
Meeting regularly	1	2	1
Involvement of local government	2	2	-
Evaluating DPEMs	2	2	1
Having a nutrition convener	3	1	1

¹A dash (-) represents a category for which there were no responses

Remaining challenges in horizontal coherence: JAPEMs, coordination and DPEMs and suggestions for improvements

Although Rwanda established JAPEMs and DPEMs to foster increased collaboration across ministries or sectors working in nutrition, respondents believed there remained much room for improvement. These respondents highlighted three main areas for improvement related to the scope of the JAPEM meetings, coordination across ministries to implement policies and programs and the implementation of DPEMS.

The first area of improvement revolved around the scope of JAPEM meetings. Some respondents argued that they did not think that the quarterly JAPEM meetings are used to holistically evaluate progress in nutrition. Instead, they believed that JAPEM focused more on reporting and information sharing but not for ensuring clear coordination of activities across sectors. Additionally, a few study respondents thought that results from JAPEM meetings could be more widely shared. These respondents believed that the results from these meetings were not shared outside of the Social Cluster Ministries which they thought limited the country's ability to evaluate the effectiveness of the plans and to identify where improvements or revisions to the plan might be needed. *"The Social Cluster Ministries...coordinate nutrition through the JAPEM. There is not enough sharing from the government side on how that plan is being developed, monitored and revised. It will be difficult as an outsider to know actually if it is an effective platform."*

The second area of improvement mentioned was around coordination. Overall, there was a consensus that the mission and roles of the different sectors or ministries involved in the nutrition policy were clear, but some believed that there was a lack of clarity on the actions needed to achieve those missions. For example, one of the roles of the education sector is to provide nutrition curriculum in primary and secondary schools but as one national level respondent from a different sector put it, there were no clear steps on how this policy would be implemented. One government national level respondent explained: *"So, each ministry has its role relevant to its ministry mission. The problem comes when we discuss implementation, that is where clarity is missing. For example, if we say MINEDUC does school feeding and nutrition curriculum, are the district and health center nutritionists involved in this?"*

What does their curriculum actually cover? What are they actually teaching? Those are the things that we do not access or get to know. But the mission of each ministry is clear.” This lack of coordination led ministries or sectors to work in silos, implementing their own sector policies but not necessarily working together, according to respondents. This lack of coordination also had implications for DPEMs and DPEM committee meetings. While DPEM committees provided a space for the different sectors to convene together to work on nutrition at the district level, some felt like they were not always well implemented, and that it was an environment to share what was being done but not to integrate the work that addresses nutrition.

In addition to the challenges related to coordination for DPEMs described above, two other challenges to the optimal implementation of DPEMs were mentioned by study respondents. The first was funding and the second was the need for a nutrition convener.

According to respondents, the lack of funds allocated to DPEMs interfered with participating in DPEM meetings and in some cases, led to the suboptimal implementation of activities. Regarding meeting participation, respondents stated that certain people who should be part of the DPEM meetings, especially those at the sub district levels (e.g., sector or cell levels), did not always participate in meetings due to a lack of transportation. Other respondents discussed the implications of limited funding on the implementation of different activities outlined in the DPEMs which they believed resulted in lower quality implementation of DPEMs. For example, the joint community monitoring trips mentioned above were not always conducted due to lack of funds. These sentiments were expressed by a district leader who stated: *“DPEMs are well functioning and the support is enough but sometimes we face challenges in implementation because it requests funds that the district doesn’t have. You find that the partner has limited funds, we don’t carry out all DPEM activities like we had planned to. Sometimes, we face the challenge of lack of funds.”* This respondent went on to say: *“The committee in charge of eliminating malnutrition doesn’t work well and I think that the cause is that we set a budget, but we were unable to get it. As you know training people requires a budget and activities are carried out at the village level. Therefore, it requires the hospital, the district or members of that committee to have means so that we can go to supervise those activities, advise them, see where problems are and what is missing for things to work out. So, when you don’t have financial resources, you cannot do all those things. We need financial resources.”*

Although the lack of funding was raised by a few study respondents, one national level government respondent had another view in regard to funding for DPEMs which highlights a potential issue in coordination rather than funding itself. This respondent stated: *“If you go to a district, they will tell you that DPEMs are there but there are no funds allocated to DPEMs. They’ll say that the reason that DPEMs were not implemented well is because they had no funds to implement it. But it’s not true. The DPEMs are made up of different ministries and sectors and the different ministries have small budgets in the districts. MINISANTE receives a small budget; MINAGRI has a small budget to buy small livestock and seeds etc. MIGEPROF probably has some sort of small budget that goes to the district. And if you put all this money together, it should be a lot of money. But the issue is that each sector does its activities with the little they have. But if you allocated money together to the DPEMs and the funds are well coordinated, it’s a decent amount of money. But if you separate it, then it will be like the DPEMs have no money.”*

The last key challenge related to the DPEMs, mentioned by study respondents, was the lack of a nutrition convener at the district and sub-district levels. Respondents believed that this was due to a shortage of human resources and believed that not having a nutrition convener added responsibilities

for individuals already in charge of other things, such as Directors of Health and Vice Mayors of Social Affairs at the district level and the Social Protection Officers at the sector and cell levels. Some respondents felt that these added responsibilities overburdened those responsible for the DPEMs and limited their ability to effectively coordinate and evaluate nutrition activities in the district.

Study respondents had a few suggestions related to improving coordination. The first revolved around the formation of the next nutrition policy. Respondents asked for the new policy to reinforce the integration of nutrition in all sectors and to clearly define through action plans how nutrition would be integrated within those sectors. For example, one district leader explained one aspect of this request: *“The new thing that should appear in next policy is to reinforce the link between social affairs and the agriculture/economic domain in districts. They should be linked, and the policy should clearly state how the link should be implemented, how often we meet, and what we should discuss together.”* It was also suggested that DPEMs be reinforced at the different sub-district levels (e.g., sector, cell, village) and receive increased staff support such as a focal person to make sure the plan is operationalized and monitored well. *“The new policy... should make sure that they [DPEMs] are operational by recruiting District Plan to Eliminate Malnutrition staff coordinators because that committee at district level is made of vice mayors, agronomists, veterinarians, gender officers of the district. Those people already have other commitments; we should have at least one who is on daily basis working on coordination role.”* In addition, six interviewees suggested that the new policy address livelihoods by discussing jobs, employment, access to savings and loans groups, and how to decrease poverty. Lastly, two interviewees suggested that the new policy consider creating more nutrition programs at the bachelor level and creating a master level nutrition program to develop and increase the number of nutrition experts in the country.

Respondents also suggested that Rwanda develop a clear coordination framework that differentiates the roles of the different coordination bodies that exist and how they should work together. As one non-government national level respondent expressed: *“The new nutrition policy should address the coordination framework especially in relation to leadership, stakeholder engagement, monitoring and evaluation, nutrition indicators and results frameworks.”*

Vertical coherence

Garrett and Natilicchio described vertical coordination as the joint action of agencies at different government levels (2011). Responses regarding vertical coherence centered on three key topics that represent how this type of coherence was developed and facilitated throughout the years: decentralization, clear specific roles for national and sub-national levels, and relationships between actors. According to respondents, decentralization policies improved leadership, focused on addressing population needs, and improved interactions between leaders and the population. Respondents also believed that the national government’s role in developing policy and the district level role in implementing policy facilitated the joint action of agencies at the different government levels. Lastly, respondents generally believed that there were good relationships between national, district and community government actors, and national and international stakeholders addressing nutrition, although some study respondents believed there was room for improvements in some of these relationships.

Decentralization

A key component of vertical coherence in nutrition, according to study respondents, centered around Rwanda's decision to adopt a decentralization policy in 2001. Study respondents noted that through this policy the country's administration and health infrastructures were decentralized. This in turn led to more leadership at different administrative levels (e.g. sectors, cells and villages). Study respondents explained that this led to government officials that were more accessible to the people they serve and improved the way the population perceived and interacted with authorities and leaders. For example, one FLW stated: *"The development in nutrition is due to good leadership because before in 1992 we didn't have good leaders who love their citizens. [Leadership] now comes to the village but in the past, we used to fear it."* Community members also appreciated the improved interactions facilitated by the decentralized structures and leadership. As explained by one FGD participant: *"what allowed for these changes in nutrition is the decentralization of authorities. The authorities are close to us and if you have any problem, you can go to them."*

Respondents also believed that decentralization had helped facilitate the implementation of nutrition and nutrition-related programs. Unsurprisingly, district level respondents and FLWs especially highlighted this response. Program implementers from NGOs also mentioned that decentralization facilitated the implementation of programs. For example, one non-government national level respondent highlighted that *"as the local administration and health structures are decentralized, it becomes easy for [our organization] to plan nutrition projects together with district leaders and to get the support of the district and community leaders while implementing those nutrition projects in districts. We are very close to them...ownership in nutrition and nutrition practices must exist from the high level to the village."* Community members also echoed this sentiment explaining that having the government closer to the population facilitated the transfer of nutrition information and the importance of implementing certain programs and finding solutions to problems earlier on. One female FGD participant stated: *"today, the administration is present, all the way down to the sector executive who comes to counsel people to develop kitchen gardens, improve the care and hygiene of their children."*

Development and implementation of policies

Study respondents believed that the joint action of agencies at different government levels in nutrition had worked well in Rwanda because of the different roles that each government level has and the relationships between those government levels. Respondents said that the national level sets policy and establishes programs while the district and sub-district levels implement these policies and programs. Despite these specific roles, respondents at the district level, felt involved in designing and providing feedback on the policies and programs that they implement. However, this response was more common from respondents from districts with reduced stunting than those from districts with non-reduced stunting. These respondents talked about invitations to participate in topical meetings with ministries at the national level to share their experiences and thoughts on topical issues.

Relationships between the national level and district and community levels of government (according to national level respondents)

Respondents at the national level generally held favorable views of their relationships with district and community levels of government, although some, especially among the international stakeholders stated that they did not work directly at the local level, but rather through their implementing partners (**Table 21**). Of the national level respondents, the CSOs seemed to be the most connected to the district and local levels. All of the CSOs interviewed thought that they had good working relationships at the local levels. They attributed these good relationships to participating in JADF and DPEM committee

meetings, being community based, having staff at the local level, having regular communication with local authorities and getting buy-in prior to starting new activities. About half of the NGOs interviewed specifically stated that they believed they have good working relationships with the district and local government levels. They also attributed this to participating in JADF, having local staff, and open and regular communication with district authorities. Ministry respondents also believed that the relationship with local government was favorable because of good communication through regular meetings, having ministry representatives at local level, and working together with district and sub-district leaders in program implementation. There were a couple of people from the ministry level (n=2/5) who described irregularities in reporting and monitoring and evaluation and suggested improvements in trainings for monitoring and evaluation to improve reporting and the quality of information within reports.

Relationships between national and district levels of government (according to district level respondents)

The relationship between district and national government levels was described quite differently by respondents from districts with reduced stunting compared to those from districts with non-reduced stunting. Respondents from districts with reduced stunting were more likely to discuss their views on their relationships with the national government and generally had more favorable views. Respondents from these districts, especially vice mayors and those from the agriculture sector, explained that they felt that there were good reciprocal relationships at all levels of government, felt included in joint planning, that their voices were heard, and their concerns were considered. Fewer respondents from districts with non-reduced stunting described their relationships with the national government in any way. Those that did, tended to focus more on the activities that take place and reporting lines, rather than expressing how they felt about those relationships. A couple of respondents from districts with non-reduced stunting mentioned that there was a need for more and better support from the central level. These respondents specifically mentioned wanting more regular visits from the central level and more financial and input support.

Relationships between district and community levels of government and CSOs and NGOs (according to district and community level respondents)

About half of the district level respondents who described their relationships with CSOs and NGOs stated that they had good working relationships with these types of organizations (n=12/23 in reduced districts and n=11/19 in non-reduced districts, respectively). These good working relationships were largely attributed to JADF by respondents from districts with reduced stunting and less so by those from districts with non-reduced stunting (n=7/12 vs. n=2/11, respectively). In districts with non-reduced stunting compared to those with reduced stunting, these good relationships were more commonly attributed to joint work on specific projects (n=5/11 vs. n=1/12, respectively). Good communication was highlighted in both types of study districts as being central to having good relationships. A few FLWs in both types of districts expressed specific positive feelings about working with CSOs and NGOs saying that they are approachable and that they felt their work was appreciated.

Although responses were generally positive, some respondents did highlight negative aspects of their relationships with CSOs and NGOs (n=9/23 in reduced districts and n=8/19 in non-reduced districts, respectively). Among these respondents, many from non-reduced districts (n=6/8) and one-third of those from reduced districts (n=3/10) specified the need for improvements in their relationships with CSOs and NGOs. Respondents from districts with non-reduced stunting expressed concerns about miscommunication and delays in receiving remuneration and highlighted the need for more regular

interaction. The respondents from districts with reduced stunting that thought improvements were needed mentioned that the coverage of programs was low due to not having enough partners and a couple of FLWs mentioned feeling neglected and unsupported by CSOs and/or NGOs. A couple of respondents from both types of districts mentioned that they thought CSOs and/or NGOs focused too much on their own priorities and that they did not follow through on what they said they would do.

Relationships between district levels of government and international stakeholders (according to district level respondents)

Relationships between district level government actors and IOs were similar in some respects between the two types of districts. However, respondents from non-reduced districts had more negative feedback and suggestions for improvements than did those from reduced districts (**Table 22**).

Of respondents who described their relationships with IOs, almost all described their relationships in positive or neutral terms. Two respondents from reduced districts specifically explained that they had good working relationships with IOs and three out of seven explained that they appreciated the supplies and incentives provided by IOs. Only one out of seven respondents from non-reduced districts specifically stated that they had a good working relationship with IOs and none mentioned supplies and incentives as an aspect of their working relationships. One respondent in each type of district said that they worked well with IOs to plan activities and a few people mentioned that some of the programs were beneficial for the people being served (n= 1/7 from reduced districts and n= 2/7 from non-reduced districts).

Respondents from both types of districts expressed concerns regarding their work with IOs. However, there was more negative feedback and suggestions for improvements from respondents in non-reduced districts. Common concerns across the two types of districts largely revolved around the lack of programs, specifically programs that address the needs of the population and those that are large enough to reach and cover the people in need of the programs. A couple of respondents from reduced districts also expressed concerns related to funds for implementing the needed programs and how money for programs was spent and that IOs don't always do what they say they are going to do. Respondents from non-reduced districts, on the other hand, expressed concerns over coordination of actions and programs pointing to problems with the design of DPEMs in some cases, duplication of efforts and communication problems. A couple of respondents from non-reduced districts also explained that sometimes programs were too short. Respondents from both types of districts discussed the need for joint planning and a better understanding of what organizations were doing (n= 2/7 from reduced districts and n= 4/7 from non-reduced districts).

Conclusion on relationships between actors at different levels

Overall, study respondents described their relationships with actors in nutrition at different levels in favorable terms. When concerns were expressed and the need for improvement specified, they were more likely to come from district level respondents, especially from respondents in non-reduced districts.

National level study respondents perceived relationships with district and local levels to be generally positive and attributed these positive relationships to good communication, having staff at local levels, their participation in JADF and DPEMs, and their seeking local buy-in prior to working in communities. From the perspective of district and community respondents, relationships with different national level

stakeholders were also positive though some study respondents mentioned some ways in which these relationships could be improved, especially in non-reduced districts. For example, these respondents from reduced districts described their relationships with national government stakeholders in mostly positive terms which was attributed to their reciprocal relationships and their inclusion in planning and providing feedback. Respondents from non-reduced districts on the other hand, rarely described their relationships with national level stakeholders and those that did described these relationships in very neutral ways mainly discussing reporting lines and planned activities. Respondents from non-reduced districts also requested more support from the national government. The relationship between district and community respondents and CSOs, NGOs, and IOs were also described positively by some of the respondents in both types of study districts. In reduced stunting districts respondents especially appreciated the supplies and incentives provided by the IOs. Some respondents, however, also voiced concerns. These concerns came from respondents in both non-reduced and reduced districts and included the low coverage of implemented programs and lack of programs specific to the population needs. It was also evident from the perspective of the district and community respondents, that improvements in planning and coordination were needed, especially in districts with non-reduced stunting.

Table 21: Relationship with local actors according to national level respondents^{1,2}

Theme	CSOs	NGOs	IOs	Donors	Ministry Technical Staff
N =	8	6	3	2	3
General comments					
Work with local government through NGOs/implementing partners	-	2	1	1	-
Provides funds to district level for program implementation	-	-	-	1	-
Participates in JADF	4	4	-	-	-
Participates in quarterly DPEM meetings/is involved with DPEMs	2	-	-	1	1
Good relationship with local government due to....	8	3	1	1	2
Being a community-based organization	-	2	-	-	-
Having staff/volunteers at district and/or cell level	5	2	-	-	1
Having regular meetings with district authorities/consulting them regarding project plans	3	4	2	-	2
Participating in meetings hosted by local government	1	-	-	-	-
Working closely with local authorities and technicians	1	-	-	-	-
Working at village level to develop community development plans	-	1	-	-	-
Following through on implementing their activities	-	1	-	-	-
Ways in which relationships could be improved	-	-	-	-	-
More regular reporting	-	-	-	-	2
Improved understanding/implementation of monitoring/supervision across levels	-	-	-	-	1

¹ A dash (-) represents a category for which there were no responses, ² Acronyms used: CSO, civil society organization; DPEM, District Plans to Eliminate Malnutrition; IO, international organization; JADF, Joint Action Development Forum

Table 22: Relationship with international stakeholders according to district-level respondents¹

	Reduced District	Non-reduced District
N =	7	7
Positive/Neutral, N =	7	6
Good relationship	2	1
Provide supplies/incentives	3	-
Open communication	-	1
Work well together to implement planned activities	1	3
Some programs implemented by NGOs are very good/beneficial to the population	1	2
Negative, N =	2	4
Some programs do not address the real needs of the population	1	1
Some organizations have good action plans but weak implementation plans	-	1
Coordination of actions/programs is an issue (DPEM and communication)	-	4
Programs are short and leave gaps when they leave	-	2
Only a few programs reach people in the communities and/or are too small	2	1
Duplication of efforts	-	1
Don't have a lot of funds	1	-
Some international NGOs spend money on what are viewed as luxury equipment rather than on the programs (e.g. reaching more beneficiaries)	1	-
Suggestions for improvements		
Mention the desire and need for joint planning	2	4

¹Only district leaders described relationships with international stakeholders

Monitoring and Evaluation

Multisectoral approaches with weak monitoring and evaluation, whether in policy or program, may undermine efforts made to address the multiple determinants of malnutrition and to bring together multiple ministries or sectors. Given the context in Rwanda, where multiple sectors are implementing programs or activities in nutrition, monitoring and evaluation frameworks to track reach, coverage, implementation, utilization of programs, and changes in nutrition outcomes are important. As discussed earlier, JAPEM and DPEMs are the frameworks used to plan and monitor nutrition at the national and district levels, respectively. Some study participants also mentioned the NFNC's intent to develop a national monitoring and evaluation framework in nutrition, but this had not yet occurred at the time of this study. Study respondents described the vertical structure through which data is collected and reported and how data is collected and evaluated across sectors, synthesized, shared and acted upon.

According to respondents, Rwanda has a well-integrated vertical chain of collecting monitoring data across the different administrative levels because each sector (e.g., agriculture, health, education) has clear channels on how data and information is collected and used at each administrative level. For example, in the health sector, CHWs collect and report information from the community level to health centers, who then report to hospitals, who synthesize information for the district. At the district level, there were also monitoring and evaluation officers who helped to synthesize data from different sectors, including nutrition. This chain of sharing information went all the way up to the national level, reinforced by the country's decentralized administrative system. This response was, however, more commonly highlighted by respondents in districts with reduced stunting (n=6/17) and at the national level (n=2/5) than those in districts with non-reduced stunting (n=2/15) (**Table 23**). A few respondents mentioned that CSOs and JADF also supported monitoring and evaluation efforts for nutrition.

About half of the respondents who discussed data collection along sectoral lines stated that monitoring and evaluation for nutrition falls under the health sector, whereas, the other half discussed a more multisectoral approach. Respondents who discussed monitoring and evaluation along health sector lines believed that nutrition monitoring was based on indicators that only came from the health sector such as the number of malnourished children or information coming from health centers and health posts. For example, one district leader from a district with non-reduced stunting explained it like this: *"Monitoring and evaluation for nutrition is integrated in the health sector because it is the one in charge of malnourished children as they are treated at health centers to recover from malnutrition. The health sector does a follow-up on the nutrition status of those children; therefore, it conducts monitoring and evaluation to see if there are nutrition improvements or not."* This trend in focusing on health data for monitoring and evaluating nutrition may have been due to the fact that the health sector has a developed and established monitoring and evaluation system called the Rwandan Health Management Information System (R-HMIS) [47].

Respondents who saw monitoring and evaluation for nutrition as multisectoral explained that although each sector collects its sector-specific nutrition-related data, DPEM committee meetings and SCF&NSC meetings allowed for the collective evaluation of nutrition from the different ministries or sectors involved in nutrition, according to respondents at the national level (n=5/5) and in districts with reduced stunting (n=6/17). The six respondents from districts with reduced stunting highlighted that data from their sector was evaluated along with information from other sectors and that DPEM meetings were used to find solutions on how to make improvements. For example, one district leader in agriculture from a district with reduced stunting stated: *"Yes, as agronomists, all information is important because it helps in our work. If they tell us that there are a lot of people sick with malnutrition in this area, they then ask us did these people get seeds for vegetables, do they have kitchen gardens, and are they built*

well... Sometimes, we find that the areas we destined for kitchen gardens, people are cultivating beans there. So, we have worked to identify areas they can cultivate vegetable, and this was part of the DPEM. Through the DPEM, we saw that there weren't enough vegetables being grown, those who had vegetables were bringing them to the markets, so we took the initiative to make sure that we cultivate a lot of vegetables in the district." Comparatively, none of the respondents from districts with non-reduced stunting mentioned this more holistic evaluation of nutrition. In addition to the difference in the use of a single sector versus multisectoral approach to evaluating the relevant data, the types of data that respondents explained discussing at joint meetings varied across the two types of districts. Respondents from districts with reduced stunting mostly discussed using process and outcome data to assess progress and next steps (n=4/17) such as: number of households that received small animals, had kitchen gardens or latrines, the number of ANC visits attended and the number of women that had a MUAC measure taken. Respondents from districts with non-reduced stunting on the other hand more often discussed using input data (n=7/15) such as: how much food was produced in agriculture, the number of cows distributed, amount of food products distributed (e.g., FBF, oil, milk), number of cooking demonstrations conducted and the number of participants in different activities. These differences indicate that the monitoring and evaluation of DPEMs may have differed across study districts. These differences might also explain why a couple of respondents (n=2/15) in districts with non-reduced stunting requested improvements in monitoring and evaluation.

Table 23: Monitoring and evaluation in nutrition according to government respondents^{1, 2}

Theme N =	National 5	Reduced 17	Non-Reduced 15
Process for data collection and reporting			
Vertical chain	2	6	2
JADF collects information for monitoring and evaluation	-	2	2
Data collection and reporting across sectors			
Each sector has its own monitoring and evaluation data	5	3	3
Nutrition monitoring and evaluation integrated in health sector data	3	2	3
Joint community supervision trips	2	6	4
Data analysis and synthesis			
Data managers or district monitoring and evaluation officers synthesize data	-	3	4
Data from different sectors shared and evaluated during coordination meetings	5	6	-
Data focuses on process or outcome indicators	5	4	1
Data focuses on input indicators	1	2	7
Improvements in monitoring and evaluation needed	2	-	2

¹ A dash (-) represents a category for which there were no responses, ² Acronyms used: JADF, Joint Action Development Forum

Challenges in monitoring and evaluation

Respondents at the national and district level identified four key challenges related to monitoring and evaluation: 1) lack of technical skills in monitoring and evaluation from the local to the national level, 2) collection of insufficient or poor-quality data, 3) the need to establish a national integrated monitoring and evaluation framework for nutrition, and 4) insufficient funding and staff for monitoring and evaluation. Only a few respondents at the community level mentioned challenges related to monitoring and evaluation (**Table 24**).

About half of the respondents who discussed challenges related to monitoring and evaluation discussed the lack of skill in monitoring and evaluation from the community to the national level. This response was mentioned in districts with non-reduced stunting but not in those with reduced stunting. Respondents who called for capacity strengthening in monitoring and evaluation perceived there to be inadequate trainings for those collecting data such as the FLWs who collect data at the community level. One government respondent at the national level believed that an increase in training would improve the accuracy of monitoring data. Both national and district level respondents also suggested that they too, needed increased training in nutrition skills and in the use of existing monitoring tools. For example, a few respondents from districts with non-reduced stunting stated that the lack of expertise and skill in nutrition and monitoring and evaluation led to the poor use and understanding of the available data. Two government national level respondents also called for their own increased training in monitoring and evaluation as illustrated by one of these respondents: *“Up to now we have monthly reports, but we have monitoring tools that could be improved. We could use training on how to use them.”*

Other respondents believed that one of the challenges in monitoring and evaluation was the need to collect better information. This theme was mostly mentioned by respondents at the national level and by a few respondents from districts with non-reduced stunting. For these respondents, the current data collected are insufficient to fully understand what’s happening in nutrition and to be useful for improving programs. For example, at the district level, respondents mentioned that it was important to not only monitor if nutrition messages were shared but also to evaluate if messages are practiced. One respondent from the national level, however, was more hesitant about the collection of more data or more complex data. The respondent was not against collecting new data but acknowledged the complexity of collecting, calculating, and analyzing certain indicators, stating: *“And we need to check what is feasible. I am not saying that we shouldn’t look at potentially introducing new indicators but sometimes, I feel especially at central level and at times at district, there is an idea of putting all these things there but never doing anything with it and the monitoring framework because it is completely unrealistic.”*

Furthermore, respondents, especially at the national level, believed that a big challenge in nutrition was a lack of an integrated monitoring and evaluation framework. Some respondents hoped that with the establishment of the NFCS that joint monitoring and evaluation would be possible. *“Maybe with the Nutrition Secretariat, it will come but joint monitoring would be helpful. We have joint planning and therefore there should be joint monitoring”*, said one government national level respondent. According to respondents, having such an integrated framework would facilitate the use and understanding of already existing data from different ministries or sectors. While the different ministries or sectors collect data and share it during coordination meetings, these respondents believed that there should be more coordination so that results from different sectors could be easily understood in the nutrition context.

Some respondents at the national level and from districts with reduced stunting called for increases in monitoring and evaluation funding and staff and provision of better software and platforms. In addition to the need for increases in funding and other support for monitoring and evaluation, another key suggestion made was the need to evaluate the NFNP to determine its impact. A few study respondents also thought that the newly developed policy should include an evaluation plan including the goals around which the policy should be developed and clear and realistic indicators of what the new policy aims to achieve. Respondents suggested that policies and programs should be evaluated more to determine what worked and didn’t work well and how implementation can be improved. Respondents mentioned that the current NFNP could have benefited from a midterm and/or final evaluation to

inform the development of the new policy. Respondents also believed that community-based studies could be better used to inform policies and programs.

Table 24: Challenges in monitoring and evaluation for nutrition¹

Theme	National	Reduced	Non-reduced
N =	14	4	5
Lack of technical skills	7	-	2
Lack of technical skills in monitoring and evaluation	7	-	-
Lack of expert in nutrition leads to poor use of data	-	-	2
Insufficient or poor quality data collected	4	-	2
Data collected not collected frequently	1	-	1
Data collected is sometimes insufficient to understand situation	2	-	1
Problems with data accuracy or quality	2	-	-
Lack of integrated monitoring and evaluation			
Lack of joint monitoring and evaluation across sectors	8	-	-
Analysis not done with the data collected	2	-	-
Insufficient funding and monitoring and evaluation staff	3	2	1
There is no monitoring and evaluation budget for nutrition	2	2	-
Insufficient funds to access monitoring and evaluation software	3	-	-
Insufficient human resources/work overload	-	2	1

¹ A dash (-) represents a category for which there were no responses

Conclusion on coherence

After Rwanda adopted a multisectoral national food and nutrition policy, it took steps to improve clarity and consistency of communication and actions across institutions, sectors, administrative levels, and actors working to address nutrition. The NFNP brought together multiple ministries and described how each ministry would contribute to nutrition. Based on our findings, we found that the perceived role in nutrition of the different ministries involved in nutrition mostly aligned with their prescribed role in the NFNP, with some minor differences in health and local government, but more pronounced differences in agriculture. In agriculture, actors' perceived roles in nutrition varied by administrative level, with actors at the community level more likely to describe nutrition-related responsibilities in the agriculture sector than compared to national and district level actors, and it also varied by study district. District leaders in agriculture from districts with reduced stunting were also more likely to describe their roles and contributions to nutrition compared to leaders in districts with non-reduced stunting.

The Government of Rwanda also created national and district institutions and platforms to foster coordination across these different ministries or sectors such as the SCFNCS, NF&NTWG and its sub-sectors, the NFNCS, and JAPEM and DPEM committees. These platforms helped to increase nutrition awareness in leaders both at the national and sub-national levels, provided technical assistance to the government, and facilitated planning, implementation, and monitoring and evaluation of nutrition and nutrition-related activities across different sectors. It remains, however, important to clearly delineate the specific role of each of the national level platforms and how they should work together as many respondents were not always sure of these platforms' distinguished responsibilities. At district level, DPEMs and their associated committee meetings helped to clearly establish the nutrition and nutrition-related activities implemented in each district and how to monitor them for district leaders. Challenges though remain in the implementation of DPEMs and their associated committee meetings because of a lack of funding, technical skills in nutrition, and unequal distribution of support to districts from development partners. Vertically, communication and actions across administrative levels also improved due to decentralization, increased leadership roles at district and sub-district levels, and favorable

relationships between actors at different administrative levels. These changes facilitated the implementation of programs and how organizations work with leaders at community levels. A key aspect that we found that still needed improvement in coherence was monitoring and evaluation for nutrition at all administrative levels. The remaining challenges included adequate training to use monitoring and evaluation tools, improving the quality, validity, and relevance of the data collected, and establishing a national integrated monitoring and evaluation system for nutrition.

8. Community: How Did Changes Occur at Community Level

The theme of community was used in this study to understand how the actions taken at the global and national level to influence nutrition reached communities in Rwanda. Essentially, we asked study participants about what they believed had contributed to the perceived changes in nutrition described earlier in the report (Section 4). The main research questions addressed in this section are:

1. What were the perceived contributors to changes in nutrition at the community level?
2. How did the reported contributors to changes in nutrition differ by population group (i.e. children 0-2, children 2-5, PLW)?

Four main themes emerged as to what study participants believed led to the nutritional changes observed in communities. These themes highlighted the importance of leadership and decentralization (both previously described), nutrition awareness at all levels and sectoral changes in the agriculture, health, WASH, education, gender and infrastructure sectors (**Table 25**). In this chapter we focus primarily on the results related to how nutrition awareness and sectoral changes were perceived to have contributed to nutrition over the past 25 years.

Table 25: Contributors to changes observed in community nutrition^{1, 2}

Theme	National	Reduced				Non-reduced			
		District	FLWs	Male FGD	Female FGD	District	FLWs	Male FGD	Female FGD
N =	27	17	10	10	10	17	10	10	10
Leadership	14	5	6	9	10	6	7	7	5
Decentralization	5	3	4	2	5	5	4	3	5
Nutrition awareness	16	4	1	-	-	3	1	-	-
Sectoral changes in . . .									
Agriculture	19	17	10	10	9	17	9	10	10
Health	15	16	9	8	9	17	9	7	9
Education	15	15	9	-	-	14	10	-	-
Social protection	2	3	-	-	-	1	-	-	-
Water, sanitation and hygiene	17	16	10	-	2	16	10	3	3
Gender	11	6	4	-	2	5	3	1	4
Infrastructure	3	2	-	-	-	2	-	-	-

¹ A dash (-) represents a category for which there were no responses, ² Acronyms used: FGD, focus group discussion; FLW, frontline worker

Nutrition awareness

One of the challenges that affected Rwanda in the past, according to respondents, was the strong focus on treating acute malnutrition instead of prevention. About one-quarter of respondents, mostly at the national level, noted that increased nutrition awareness had contributed to improvements in nutrition over the past 25 years. Some of these respondents believed that it wasn't until the publication of studies such as the DHS highlighting the grave nutrition situation that the country began to target stunting and the developmental impact of stunting. Other respondents noted the role that organizations such as CSOs played in increasing awareness; they explained that CSOs had worked diligently to engage leaders and increase their attention on the importance of nutrition. A few other respondents believed that increased awareness of nutrition at the leadership level was especially important because if leadership acknowledged and raised questions on nutrition, then solutions would be sought. As one non-government national level respondent explained, increased awareness at the leadership level meant that *“people paid attention and started to focus also on the root causes of malnutrition; are policies in place? Are people trained? Are modules developed? They focus also on underlying causes like not only focusing on diseases but also they try to find out other related causes if they are social, agriculture, food insecurity and so on.”*

Because of the country's decentralized structure discussed previously, this increased nutrition awareness was also observed at the local leadership level and in communities. A few respondents believed that this awareness was evident through the responsibilities local leaders had related to preventing malnutrition. One such responsibility was the need to share messages about preventing malnutrition and the availability of relevant programs. As one district leader highlighted: *“The sharing of information by different leaders is a strength that makes citizens join different programs which are put in place because the same message that the mayor gave to citizens is also given by the vice mayor, the sector secretary executive, village leaders, priests and pastors in churches. Wherever the citizen goes, he hears the same message.”*

A few respondents also described changes in nutrition awareness at the community level that they thought had contributed to improvements in nutrition. These respondents explained that multiple factors contributed to this change in nutrition awareness such as the local leadership and nutrition or nutrition-related programs. They specifically mentioned the role that media, the CHWs and programs such as the 1,000 Days Campaign, had played in helping to change the views and understanding of nutrition at the community level. In the past, *“people thought that malnutrition was something treated at the health center like malaria or other diseases. They thought that one had to come to the hospital and receive medication. But once we started to teach them that malnutrition is treated with food and things they have, things started to change”*, said one national level respondent.

Sector-specific changes

Changes in the agriculture sector

About 90% of study respondents mentioned that changes in the agriculture sector had played a role in improving nutrition outcomes (n=111/121). The primary change that study respondents highlighted in the agriculture sector was the increase in the availability of agricultural and nutrition-related agricultural programs (n=69/111). A few respondents in each group also highlighted the contribution to nutrition that the increased visibility of agricultural workers such as the agriculture FLWs and district agronomist in communities had made to changes in nutrition. The presence of these workers in communities helped to reach many program participants, improve farming practices, and to address problems such as pests or crop diseases sooner rather than later. Lastly, five out of nineteen national level respondents, two out

of ten FLWs from districts with reduced stunting and two district leaders out of seventeen from districts with non-reduced stunting noted improvements in infrastructure as having contributed to changes in nutrition. The results of the positive changes in the agriculture sector were believed to have led to increased production, income, consumption, and decreased severe acute malnutrition (**Table 26**). Respondents also highlighted some negative changes in agriculture such as the impact of climate change and the overconcentration on production that led to decreased food availability and food diversity.

Changes in the availability of programs and services was the most commonly mentioned change in the agriculture sector. Many of these respondents discussed how the availability of agricultural and nutrition-related agricultural programs such as kitchen gardens, the One Cow per Family Program, the distribution, and raising of small livestock, and the land consolidation program positively impacted nutrition. FGD participants especially highlighted the kitchen garden program more than any other program as a contributor to the changes they observed in nutrition. They commented on how this program led to an increase in the consumption of vegetables since they were now more available and did not need to be purchased. District and community level respondents also highlighted that sensitization and the provision of innovations such as improved seeds, modern livestock, and chemical fertilizers, and improved farming techniques also contributed to change. These respondents believed that these programs had helped to increase food production resulting in increased food consumption and income in some cases and to a decrease in the prevalence of severe acute malnutrition. Community members also discussed how increased production had allowed them to sell the surplus from different crops and not just the foods that would earn them the most money. One male FGD participant described it like this: *“In the past, people relied on selling eggs at the market to earn money for school fees and other needs. For this reason, their children didn’t consume eggs. But, because of increased production in beans, corn, and green bananas which all help to increase income, you can save eggs for children to consume.”* According to FGD participants, income gained through the selling of surplus food was used to purchase things such as clothes, soap, school-related fees, health insurance, or livestock.

Although study respondents overwhelmingly noted how agriculture had contributed to positive changes in nutrition, some described changes in the agriculture sector that they thought had the potential to negatively influence food production, availability and diversity and in turn, nutrition. These changes were climate change (n=45/111) and the over-concentration on production on nutrition (n=12/111). Climate change was a key concern for respondents at the national, district, and at the community level in both types of study districts. Farmers rely on weather conditions for agriculture production as the majority do not use irrigation. Some respondents highlighted that despite improvements in agricultural practices and use of fertilizers and improved seeds over the years, climate change had hindered production and led to less than expected harvests. Other respondents however, noted that improvements in agricultural practices are buffering some of the potentially negative effects of climate change. At the national level, nearly half of the respondents (n=8/19) criticized the over-concentration on production by the agriculture sector. Some of these respondents’ concerns included that increased food production centered on starches which may improve food security but not nutrition outcomes such as stunting. Some respondents also worried that the land consolidation program though it may help to increase production may also have some negative effects. They explained that in some cases that the program contributed to decreased food diversity at the household level compared to the past and ultimately to deteriorations in nutrition and that because of the poor infrastructure in roads, areas that produce different crops are not well connected hindering the exchange of various types of foods. The decrease in food diversity due to the concentration on focusing on fewer crops to increase production was also a concern for a few FGDs in reduced (n=1/19) and non-reduced districts (n=4/20). However, as another non-government national level respondent highlighted, it might not be that the program isn’t

working, but rather that farmers may not fully understand how the land consolidation program is intended to work. The respondent said: *“the way it was done in the past, you would grow food and then the food you are growing is going to be eaten first by your family and then you will maybe sell the excess. Now if they grow rice, it is not enough to sustain the family, so they are selling parts of that rice to the cooperatives. The money that comes in is supposed to be used to buy other things including food. But, in their head they think that they should have enough rice to wait until the next harvest season and in addition to that get some money from the cooperative. They have to start thinking now that they are growing rice primarily for the market and the money that comes in has to be used to buy other food. But for most cereal farmers, they complain because they buy everything from the market but that is the system they are entering into.”*

Table 26: Changes in agriculture the agriculture and outcomes of those changes that contributed to observed changes in nutrition^{1, 2}

Theme	National	Reduced				Non-reduced			
		District	FLWs	Male FGD	Female FGD	District	FLWs	Male FGD	Female FGD
N =	19	17	10	10	9	17	9	10	10
Positive changes in agriculture									
Programs	18	13	4	4	2	15	5	2	6
Increased visibility of agronomists	1	2	1	2	-	2	2	3	1
Improved infrastructure	5	-	2	-	-	2	-	-	-
Negative changes in agriculture									
Climate change	11	6	5	3	3	8	5	1	3
Over-concentration on increasing production ³	8	-	-	1	-	-	-	1	2
Positive outcomes attributed to changes in agriculture									
Increased production	12	13	9	9	7	14	8	9	9
Increased income	-	-	-	7	3	-	-	4	5
Increased consumption	6	2	1	1	6	1	-	1	5
Decreased severe acute malnutrition	-	3	-	5	5	1	2	2	3
Negative outcomes attributed to changes in agriculture									
Decreased food production	-	-	-	1	1	-	-	-	2
Decreased food availability	-	-	-	1	1	-	-	3	2
Decreased food diversity	-	-	-	-	1	-	-	1	3

¹ A dash (-) represents a category for which there were no responses, ² Acronyms used: FGD, focus group discussion; FLW, frontline worker, ⁴ This category included through the land consolidation program

Changes in the health sector

Many study respondents attributed the positive trends in nutrition to improvements in the health sector. These included improvements in health infrastructure with the Government of Rwanda having established more health facilities and more decentralized health facilities over the years. Furthermore, there was an increase in the provision of health services, improvements in the quality of care provided and the introduction of a national health insurance plan; all which study respondents believed led to improved access to- and utilization of- health services (**Table 27**).

Over the last 25 years, through the decentralization process, the Rwandan government increased health infrastructures in the country. The number of health centers at sector level, health posts at the cell level, and CHWs at the community level all increased which brought services in closer proximity to the people they serve, said respondents.

According to respondents, there was also increased provision of health services and programs in Rwanda that contributed to changes in nutrition. Some of the programs mentioned included nutrition counseling and sensitization, the availability of preventive health services, and emergency vehicles in communities. Nutrition counseling and sensitization conducted through health centers, health campaigns, and CHWs was the most commonly mentioned service. Respondents spoke favorably about the provision of messages regarding balanced diets, health and nutrition of PLW and children, sanitation, and family planning, and to the vaccination and deworming campaigns. Many respondents praised CHWs for the preventive health services they provide through GMP and cooking demonstrations. One district leader highlighted that *“CHWs help us a lot to implement the nutrition projects we have.”*

District leaders and FLWs in both types of study districts described improvements in human resource capacity (n=26/99), with a strong focus on CHWs. Respondents explained that in each village, there are supposed to be three CHWs; two CHWs who are in charge of integrated community case management and one who works specifically with PLW and newborns [48]. Some respondents believed that improvements in health and nutrition practices such as increased use of prenatal services and family planning, giving birth in hospitals, and improved feeding practices have all been due in part to the diligent work of the CHWs. A few study participants (n=7/99) also highlighted that compared to the past, Rwanda has better trained health providers (other than CHWs). These respondents discussed the increase in trained nutritionists at hospitals, increase in the number of trained doctors and nurses, and the improvements in trust between health practitioners and communities. As one district leader highlighted: *Training doctors and nurses has helped a lot, to the point that the relationship between doctors and the population is good.* Lastly, seven respondents believed that there was an improvement in the quality of health services provided by the health sector. Interestingly, six of the seven of these respondents were CHWs. According to these respondents, due to the services that they now provide in their villages and their ability to intervene early on, there are less people going to health centers and hospitals. This change in the traffic experienced at health centers and hospitals helps these health facilities to provide better quality care to those who really need their services and expertise.

Some respondents also highlighted the contribution of the national health insurance service program (Mutuelle de Santé) to improved nutrition outcomes.

Taken together these positive changes in the health sector were believed to have led to increased utilization of health services. At all levels, the most mentioned change in utilization of health services

was giving birth at hospitals. According to respondents, the number of women giving birth at home drastically decreased over the years due to sensitizing women to give birth in hospitals. This change led to less women dying while giving birth and a decrease in the infant mortality rate. Another key change in health service utilization was the decrease in delay of seeking care when ill, the most mentioned change by community members participating in FGDs, due to the increased proximity of health services and the low cost of seeking care due to the insurance plan. Respondents explained that people now report illnesses sooner and receive treatment for infectious diseases such as pneumonia, malaria, and diarrhea faster. As one FLW said *“there are no longer people who get sick and stay in their house. We have good health services now.”* One male FGD participant stated when discussing the increase in health facilities, *“I am the oldest in this group and I can tell you that we used to walk multiple kilometers with hunger to transport people to the hospital. Once arrived, there was a long wait before being received. But today, the government built us health centers... If someone falls ill, within in an hour we are at the health center and he’s already received help from the doctor. It’s a remarkable change. The proximity of health posts, as well, is a contributor to the improvements in our nutrition.”* Some respondents also highlighted that there has been an increase in the use of family planning, though others also said that improvements are still needed in this area. Of those that mentioned increased use of family planning, they believed that increased family planning and use of contraceptives contributed to improvements in nutrition because it led to birth spacing, healthier mothers, and less premature weaning of children. Another increase in use of health services was regarding the participation in prenatal services which allowed pregnant women to receive preventive health services such as mosquito nets to prevent malaria and nutrition education during their visits. Lastly, a few respondents also noted that increased access to care also helped to improve access to information which they felt may have contributed to improvements in health practices.

Table 27: Changes in the health sector that contributed to observed changes in nutrition^{1,2}

Theme	National	Reduced				Non-reduced			
		District	FLWs	Male FGDs	Female FGDs	District	FLWs	Male FGDs	Female FGDs
N =	15	16	9	8	9	17	9	7	9
Health infrastructure	5	7	2	4	5	6	3	2	3
Provision of health services programs	6	8	6	6	7	6	6	4	8
Human Resources	3	6	6	-	-	5	6	-	-
Quality of health services	1	-	2	-	-	-	4	-	-
National insurance plan	3	2	3	3	2	2	-	4	2
Utilization of health services	3	4	3	4	7	1	6	3	2

¹ A dash (-) represents a category for which there were no responses, ²Acronyms used: FGD, focus group discussion; FLW, frontline worker

Changes in the education sector

Increased access to education, the inclusion of nutrition in primary and secondary school curriculum and, nutrition-related programs in the education sector are the factors in education that respondents believed helped to contribute to changes in nutrition over the last 25 years (**Table 28**). Community-level respondents were, however, much less likely to mention the contribution of education to nutrition, most likely because discussions centered around children under 5 years of age.

In 2009, Rwanda adopted the “9-Years Basic Education (9YBE)” policy which provided free access to education for children until the 9th grade. Many respondents related this policy to improvements in nutrition because it decreased education costs for families and helped children remain in school, especially young girls who may be at risk for early pregnancies. Respondents also highlighted that schools are now closer to communities compared to the past when students often had to travel long distances or live away from their families to attend school. This proximity also decreased the cost to families to send children to schools and thus, increased enrollment. In a couple FGDs some participants discussed that there had been a decrease in discrimination in the education sector which they believed had led to more access to education for all. Furthermore, respondents said that over the last 25 years, there has been an increase in the number of people with an education, which respondents highlighted is associated with better nutrition outcomes, especially in women.

Study participants at the national, district, and community levels also discussed the inclusion of nutrition, sanitation and hygiene topics in the curriculum of primary and secondary schools. According to study participants, this inclusion of nutrition in the curriculum allowed students to be more aware and knowledgeable about nutrition and it also helped the children to become influencers in their homes. *“The education sector has improved many things in nutrition. In primary schools, they teach them how to have the three meals a day and what type of nutrients are found in certain foods that are important for nutrition. And, when the child gets home, and he doesn’t get those foods, the child will tell people at home that they didn’t eat a good diet”,* stated one district leader.

Lastly, the education sector has also adopted nutrition-related programs. Two of the key programs mentioned by respondents for being beneficial to nutrition were the One Cup of Milk per Child Program at primary schools and school feeding programs, implemented mostly in secondary schools. Both programs aim to provide students with supplementary food and in the case of the One Cup of Milk Program, with animal-source food. However, one non-government national level respondent had a narrower view of the populations for which improving nutrition is important and thought that these types of programs do not contribute to improved nutrition in the country since they do not target children under the age of five. This person stated: *“If you talk to someone, they say that they are doing nutrition because they are giving...milk to someone in primary school. This has nothing to do with nutrition at least the nutrition we are looking into like the first 1000 days. If you are talking about nutrition in any country, you look into the under 5-year-old. But, if you give inyange¹¹ [milk] to someone in primary school, what are you really doing in nutrition today?”* A few respondents also mentioned programs such as school kitchen gardens and raising small livestock which they believed contributed to improved nutrition by providing children with examples of what could be done at their households.

¹¹ Inyange is a company in Rwanda that makes fruit-related and dairy products, including milk products.

Table 28: Changes in the education sector that contributed to observed changes in nutrition¹

Theme	National	Reduced		Non-reduced	
		District	FLWs	District	FLWs
N =	15	15	9	14	10
Increased access to education	6	13	9	8	9
Inclusion of nutrition curriculum	7	4	1	7	4
Programs	14	13	3	14	4

¹Acronyms used: FLW, frontline workers

Changes in water, sanitation, and hygiene (WASH) sector

Nearly two-thirds of study respondents (64%) believed that changes in the WASH sector had contributed to improvements in nutrition. They most commonly discussed improvements related to hygiene followed by water and finally, sanitation. Despite the generally favorable responses regarding improvements in this sector and how they had contributed to improvements in nutrition, some study respondents cautioned that improvements in this sector were still needed. It is important to note that changes in access to water, sanitation, and hygiene were seldom mentioned during FGDs; the few FGDs that discussed these topics mostly discussed changes in hygiene practices (**Table 29**).

Changes in hygiene was the most common theme with the WASH mentioned by study respondents has having contributed to improvements in nutrition. Changes in hygiene were more commonly mentioned as having contributed to improvements in nutrition by respondents in districts with reduced stunting compared to those from districts with non-reduced stunting (86% and 59%, respectively). At the community level, all FGDs who mentioned changes in WASH described changes in hygiene practices. Respondents highlighted the increased promotion of hygiene in the country at the personal, household, and public levels. Participants mentioned improvements in personal hygiene through increased bathing, including after finishing farming activities, wearing clean clothes, wearing shoes, and using clean cooking utensils and pots. Participants from all FGDs that mentioned WASH as a contributing factor to improvements in nutrition echoed some of these responses discussing changes in personal hygienic behaviors such as wearing shoes and clean clothes. A few study respondents also believed that handwashing practices had improved through the promotion of tippy taps and the community mobilization conducted by CHWs and hygiene committees. They mentioned changes in handwashing practices before preparing meals, before eating, and after using the toilet. A few people also noted that there have been specific efforts made by village health leaders to help their communities improve their household hygiene through sensitization and home visits.

Along with improvements in hygiene, increased access to water was the second most commonly mentioned change in WASH but this differed by type of study district. Nearly 80% of respondents from districts with reduced stunting mentioned improvements in water access whereas only 41% of respondents from districts with non-reduced stunting thought that this had contributed to improvements in nutrition. Study participants highlighted that in the past, access to clean water sources was limited. Over the years, however, the number of people with access to improved clean water sources such as taps and pumps had increased and thus those using river water had decreased. Respondents believed that this had contributed to a decrease in infections and other illnesses. Respondents also noted that the time needed to get water had decreased. A few people mentioned that this had freed up time to spend on child care. One district leader noted that *“I think that currently, over 70% of the population has access to water while it used to be about 20%. This access also helped to*

improve nutrition because it decreased the amount of time parents are away from their young kids and improved care. In the past, they spent a lot of time going to fetch water and on top of that, they brought home dirty water.”

About one-quarter of the study respondents who mentioned changes in WASH, specifically mentioned how changes in sanitation had contributed to improvements in nutrition. These respondents explained that over the years, the number of households with latrines increased while open defecation decreased. They also stated that in addition to the increase in the number of people with latrines there were also efforts to build improved latrines with roofs and to build them away from where people cook. Taken together, respondents believed that these changes had contributed to decreasing infectious diseases such as diarrhea. Interviewees also highlighted that sanitation has improved through cleaner environments at home. They explained that one way in which this has improved is that fewer homes now have thatched roofs.

Despite these improvements in WASH, about 13% of respondents who discussed changes in the WASH sector (n=10/77) cautioned that there are still many improvements needed in WASH in the country especially related to water and hygiene. For example, some respondents highlighted that though access to clean water sources had increased for many, it was not always available, and one respondent mentioned issues related to safe storage of water. This respondent stated: *“Access to water has improved for example in our district 85% of our citizens have access to water. Having access to water is one thing and consuming clean water is another thing. We need to teach them to put water in a hygienic container and cover it, this goes hand in hand with hygiene in general.”* Others highlighted that they still lacked access to clean water. For example, one FLW stated that he/she had not seen improvements in access to water over the years: *“I would say that there hasn’t been much change. We don’t have access to water in my village, so they teach us to boil the water but not everyone understands this.”* Lastly, some respondents noted that the use of optimal handwashing practices were still quite low in the country and that studies had found that there was a lack of WASH interventions implemented in the country.

Table 29: Changes in WASH that contributed to observed changes in nutrition and remaining issues^{1, 2}

Theme	National	Reduced				Non-reduced			
		District	FLWs	Male FGDs	Female FGDs	District	FLWs	Male FGDs	Female FGDs
N =	17	16	10	0	2	16	10	3	3
Improvements in hygiene	8	11	9	-	2	8	5	3	3
Increased access to water	8	12	10	-	-	7	6	-	-
Improved sanitation	6	3	4	-	-	5	1	1	-
WASH-related issues remaining	5	1	1	-	-	2	1	-	-
Water-related issues	3	-	1	-	-	1	1	-	-
Hygiene-related issues	2	1	-	-	-	1	-	-	-

¹ A dash (-) represents a category for which there were no responses, ² Acronyms used: WASH, water, sanitation and hygiene

Changes in the gender sector

Changes in the gender sector were mentioned as contributors to improvements in nutrition by several respondents (n=36/121). Overall, the main changes described consisted of improvements in women's empowerment, an increase in men's awareness in nutrition, decreased family conflict, and MIGEPROF's increased role in nutrition issues. Respondents believed that these changes had contributed to increased decision-making by women, access to loans, improvements in food purchases and nutritional decisions, and a decline in gender-based violence against women, among other things. Between district level respondents from reduced and non-reduced districts, changes related to gender were mentioned about equally, though the reasons varied by study district. For example, respondents from non-reduced districts were more likely to mention women's empowerment (77% vs 42% in non-reduced and reduced districts, respectively) as a key change in the gender sector whereas respondents from reduced districts were more likely to mention men's increased awareness in nutrition (50% vs 0% in reduced and non-reduced districts, respectively). Participants in seven out of the twenty FGDs mentioned the contribution of gender-related changes to nutrition. This came up almost exclusively in female FGDs (n=6/7), four of which were in districts with non-reduced stunting.

Changes in women's empowerment was the most commonly mentioned gender-related change that respondents thought had contributed to changes in nutrition. According to these respondents, women's empowerment in Rwanda has increased over the last 25 years as seen by women being more involved in society. This involvement was described in terms of their roles in different institutions and their involvement in providing nutrition education as well as by women's increased access to loans and banking, and by their increased contribution in decision-making at the institution and household level. One non-government national level respondent highlighted that *"now things have changed; [women] are more empowered. They are also the ones teaching, if you look at CHWs, a lot of them are women."* At community level, too, female FGD participants said that *"the unified government emancipated the woman"*. According to these women, *"before, women stayed at home but today [they participate] in different activities...we know the different crops that we need to cultivate, and we learned from the different programs provided by the government. All this allowed for our development."* At the community level, a few FLWs and female FGD participants also discussed that women's increased ability to participate in cooperatives and access credit is a characteristic of women's empowerment that helped to contribute to improvements in nutrition through increased income and in turn the purchase of better food and other nutrition-related inputs. Lastly, at the household level, study participants mentioned that men and women are making household decisions together more than in past. Whereas in the past, men made the decisions on the use of harvests and income, there is now more discussion between a man and a woman on how to generate and use household income. A non-government national level respondent involved in program implementation stated: *"[In the past], men were the ones to make the decision about what quantity to sell and what quantity to maintain for family consumption. But now when you look at things, mindsets are changing. There is a discussion between a man and a woman on what to maintain for family consumption and what to sell or where the income they are getting from the sale is going to be used. It has also helped in terms of improving the nutrition status."*

Some respondents, especially in districts with reduced stunting, noted that men's awareness about nutrition generally, and PLW's vulnerability to malnutrition, specifically, had increased due to community sensitization activities. According to these respondents, this increased awareness contributed to some positive behavior changes in regard to the care of PLW at home, use of family planning, and birth spacing. In one of the districts with reduced a stunting, a district respondent highlighted that men provide more care to pregnant women than in the past. For example, men provide more support so that responsibilities are shared, they are more aware that there is work pregnant

women should no longer do, that they require a nutritious diet during pregnancy, and should not consume alcohol during pregnancy. These changes contributed to improvements in nutrition because pregnant women are better cared for during pregnancy. This response was, however, not mentioned in districts with non-reduced stunting. A few respondents and female FGD participants (n=8/36) also discussed a decrease in conflict and gender-based violence. Respondents suggested that for Rwanda to continue on its projection of reducing malnutrition, improvements related to gender issues need to be further reinforced, especially through efforts to increase men's role and inclusion in nutrition.

Lastly, a few respondents (n=4/36) highlighted that MIGEPROF is playing a growing role in the implementation of nutrition and nutrition-related programs. One program they highlighted that also includes a focus on gender relations, was the Parent's Evening Program. This program provides parents with training on nutrition topics and includes discussions about gender relations, gender-based violence, and decreasing familial conflict.

Changes in the infrastructure sector

In infrastructure, a few study participants at the different levels described how changes in road construction, provision of electricity, and improvements in the housing sector contributed to changes in nutrition. They explained that the increases in paved roads improved the ease of travel and trade between different provinces, increased market access, and helped farmers sell their goods. They believe that this had resulted in changes in income that respondents believed contributed to changes in nutrition. Respondents also believed that the increased availability of electricity in communities had helped to improve nutrition. They explained that having electricity allowed individuals to create new jobs, work outside the agriculture sector, and increased the amount of time people could spend working all of which could increase income. Lastly, a couple of respondents at the national level mentioned that improvements in the housing sector helped to improve the environments in which people live, especially sanitation, which may have impacted nutrition.

Table 30: Types of changes mentioned by those who thought changes in the gender sector had contributed to improvements in nutrition^{1,2}

Theme	National	Reduced				Non-reduced			
		District	FLWs	Male FGDs	Female FGDs	District	FLWs	Male FGDs	Female FGDs
<i>N =</i>	11	6	4	0	2	5	3	1	4
Women's empowerment	6	1	2	-	2	3	2	1	4
Increased nutrition awareness among men	2	3	2	-	1	-	-	-	-
Less conflict	2	1	1	-	2	-	1	-	1
Increased involvement of MIGEPROF in nutrition	3	1	-	-	-	-	-	-	-

¹ A dash (-) represents a category for which there were no responses; ²Acronyms used: FGD, focus group discussion; FLW, frontline worker; MIGEPROF, Ministry of Gender and Family Promotion

Contributors to change by population group

In addition to describing the contributors to changes in nutrition overall, we asked study respondents what they believed contributed to changes in nutrition by population group (PLW, children under two and those two to five years of age, and adult men and women). There were many similarities across population groups and results show that again, program and services were key, according to respondents.

Across the population groups, study respondents noted the contribution of health services, increased knowledge and improvements in diets to the positive changes seen in nutrition. However, there were also several differences noted across the population groups. One striking difference was that when asked specifically about what contributed to changes in nutrition in a specific group, respondents were less likely to mention contributions from agriculture, though these were often mentioned overall. In these cases, improvements in agriculture were more likely to be described when discussing improvements in nutrition for adult men and women and were not mentioned for the other more vulnerable population groups. Improvements in women's empowerment were also associated with improvements in the nutrition of adult men and women as opposed to other groups, whereas when study respondents discussed gender relations more generally a few mentioned how improvements in gender relations contributed to improvements in the nutrition of PLW and young children. When discussing what contributed to deteriorations in nutritional status outcomes, study respondents generally focused on inadequate dietary intake and the effects of climate change on food production and food availability as primary contributors to negative changes in nutrition across the population groups. For children 0-2 years of age study participants also noted that suboptimal IYCF practices and leaving children's care to domestic workers likely played a role in some negative changes in nutrition.

Table 31: Contributors to changes in nutritional status by population group

	Pregnant and lactating women	Children 0-2 years old	Children 2-5 years old	Adult men and women
Contributors to positive changes in nutrition				
Programs	X	X	X	X
Health services	X	X	X	X
Availability	X	X	X	
Utilization	X	X	X	X
Increased knowledge	X	X	X	X
Improved food consumption	X	X	X	X
Improved care	X	X	X	
Improved hygiene		X		X
Women's empowerment				X
Improvements in agriculture				X
Contributor to worsening of nutritional status				
Inadequate dietary intake	X	X	X	X
Suboptimal infant and young child feeding practices		X		
Leaving care to domestic workers		X		
Effects of climate change	X	X	X	X

Suggestions for improvements at the community level

Study respondents made several suggestions for improvements at the community level. These suggestions largely revolved around continuing and reinforcing existing nutrition programs, continuing to make improvements in the health sector, improving food security, in part, through addressing issues related to climate change and making agriculture more nutrition-sensitive. Other suggestions that were less commonly mentioned included those related to targeting of programs, using social protection programs to address nutrition, improving infrastructure and increasing funding for nutrition.

Continuing and reinforcing existing nutrition programs was one of the most commonly made suggestions to sustain nutrition improvements made to date and to continue the positive trajectory. Study respondents explained that this was important because these programs have contributed to the improvements observed in nutrition over the years. Reinforcement of these programs included improving the design of programs to ensure they focus on the needs of participants, explicitly describing the operationalization of these programs at the community level and evaluating those programs. Given the country's strong focus on nutrition sensitization and mobilization, respondents often talked about reinforcing BCC programs, the 1,000 Days Campaign, kitchen gardens, and preventive programs such as the FBF program. Respondents also highlighted that the government should invest in programs that address overweight and obesity, WASH, and micronutrient deficiencies in the country, as some respondents did not think these issues have been adequately addressed to date.

There were also many suggestions on improvements needed in the agriculture sector. Some people believed that the improvements made in nutrition over the years were due primarily to the health sector and that the agriculture sector needed to increase its efforts in nutrition. Respondents especially called for policies and programs designed to improve food security as it has been shown that many children do not have good diets and that households are especially vulnerable to food insecurity due to climate change and droughts. One respondent highlighted, that the next policy should address food access and affordability and not just production. This respondent stated: *"There needs to be a focus on access and affordability of food because if you look at the current policy, it talks more about increasing productivity and availability of food. So, there can be more focus on accessibility of food."* Study participants also called for the agriculture sector to be more nutrition-sensitive and to increase its use of innovation and technology through machines and irrigation systems to mitigate the effects of climate change.

Study respondents also called for continued improvements in the health sector, this was especially the case for respondents from reduced stunting districts 62% compared to those from non-reduced districts (19%) or from the national level (19%). Suggestions regarding the health sector centered on CHWs. Respondents believed that CHWs were integral to the changes observed in nutrition due to their presence in communities, their ability to provide certain health services at community level, and their ability to sensitize and reach many women. As they work as volunteers, some respondents believed that they should also be shown more appreciation. One respondent also cautioned that the work of CHWs is moving more towards care providers and less towards focusing on preventive health and that this trend should be monitored. Other suggestions for the health sector were increasing the use of family planning (n=7/80) and increasing the number of health posts (n=3/80).

Study participants also made suggestions regarding social protection (n=10/80), infrastructure (n=5/80) and funding (n=9/80). Regarding social protection, interviewees suggested that nutrition and nutrition-

related programs target beyond the socio-economic class. They explained that many households with children at risk for malnutrition are missed since programs tend to focus only on Ubudehe 1, and sometimes Ubudehe 2 while there are malnourished children in all socioeconomic classes. Respondents also discussed the potential of using nutrition-sensitive cash transfer programs to help bring about more change in nutrition. Furthermore, a few respondents advocated that households in Ubudehe 1 and 2 should receive higher subsidies for agricultural inputs instead of paying the same prices as people from the higher socioeconomic groups. Regarding infrastructure, study participants discussed the importance of improving the country's infrastructure in roads, water, and energy in order to impact food trade and access, sanitation and hygiene. Lastly, respondents from the national level and in districts with increased stunting suggested that policymakers consider increasing funding sources both from the government and from development partners for nutrition and increasing funding for nutrition at the decentralized levels to improve the implementation of programs.

Conclusion for community

Overall, respondents believed that the primary contributors to improvements in nutrition aside from decentralization and improved leadership were increased nutrition awareness at all levels, and increased availability of nutrition and nutrition-related programs. They especially highlighted the role that changes in the health and agriculture sectors had played in improving nutrition, but also mentioned the contributions from other sectors such as education, WASH, infrastructure and gender. In addition to the increased availability of programs, study respondents also discussed how improvements in human resource capacity, both in terms of numbers and expertise, had contributed to improvements in nutrition especially through the role FLWs had played in helping people change various practices that contribute to improvements in health and nutrition. These practices included giving birth in hospitals, attending ANC visits, seeking care when ill, personal and household hygiene, the use of latrines and improved dietary and feeding practices. Study respondents also noted, that increased awareness of nutrition and related issues had contributed to changing long-standing practices and dispelling misconceptions related to nutrition. Within communities, gender relations also improved and were believed to have contributed to changes in nutrition because of women's increased participation in society and decision-making in institutions and at the household level. Men's awareness and involvement in nutrition also increased and contributed to changes in nutrition due to changes in the care they provided to PLW.

While, most respondents had positive things to say about how nutrition had improved over the years, some highlighted that there were still some challenges that they believed were contributing to a worsening of the nutrition situation or hindering further progress in improving nutrition in some areas, especially in the agriculture and WASH sectors. In the agriculture sector issues related to sub-optimal infrastructure hindering exchange of food across provinces and climate change were noted. Some study respondents believed that these issues had contributed to decreased agricultural production which in turn, had negatively affected people's access to food and quality of their diets. In the WASH sector, a few study respondents noted remaining issues related to access to improved water sources, safe storage of water and hygiene practices. For children < 2 years of age specifically, sub-optimal IYCF practices and leaving their care to domestic workers were also believed to have contributed to negative changes in their nutrition. To address these issues, study respondents suggested that existing nutrition and nutrition-related programs be reinforced and expanded where possible, that improvements in the health sector continue, and that climate change be addressed and food security improved, in part by making agriculture programs, initiatives and policies more nutrition-sensitive.

9. Observed differences across study districts

Given the differential prevalence and changes in prevalence of stunting across districts in Rwanda, our study was designed to assess differences across study districts that may explain the differential changes in stunting. Understanding what may have positively contributed to the changes in stunting and other nutrition outcomes observed and what may be hindering progress in certain districts could inform and refine future program and policy decisions for nutrition in Rwanda.

In our study we observed differences in the perceived state of nutrition between the districts with reduced stunting and those with non-reduced stunting. In addition, we found differences across the three main themes of the qualitative study, commitment, coherence and community. The primary differences between the two types of study districts revolved around differences in coherence and those found at the community level, with few differences noted related to commitment.

Differences in the perceived changes in nutrition over the past 25 years

Although there were many similarities in the perceptions of how nutrition has changed over the past 25 years between districts with reduced and non-reduced stunting, there were also several differences. While some respondents noted deteriorations in nutrition, the majority discussed how nutrition has improved, especially focusing on how it has improved for PLW, children 0-2 and children 2-5 years of age. The most striking difference on how nutrition has changed over the past 25 years between the two types of study districts was that respondents from districts with non-reduced stunting were more than twice as likely than those from reduced districts to say that malnutrition has increased (19% versus 7%, respectively). Within population groups there were a few differences in how respondents described the improvements in nutrition. For PLW, respondents from districts with non-reduced stunting were more likely to highlight that PLW are now having healthier children (33% and 25%, respectively) as an indicator of improved nutrition. A similar trend was seen for children 0-2 years of age, with respondents from non-reduced districts compared to reduced districts being more likely to say that children were now born healthier (12% and 5%, respectively). However, respondents from reduced districts were much more likely to explain the improvements in the nutritional status of children 0-2 years of age by highlighting the reduction in severe acute malnutrition (52% and 33%, respectively). For children 2-5 years of age, the decrease in severe acute malnutrition was also the most commonly mentioned indicator of improvements in nutritional status, but in this case respondents from districts with non-reduced stunting were more likely to mention this specific indicator (38% and 30%, respectively) as well as a decrease in mortality (12% and 5%, respectively). Whereas respondents from reduced districts were more likely to discuss a decrease in the prevalence of underweight as a sign of improved nutrition for children 2-5 years of age compared to those from non-reduced districts (9% and 2%, respectively).

Differences in commitment

Very few differences were noted regarding commitment between the two types of study districts. The two main differences that did emerge related to how respondents defined commitment. Respondents from reduced districts were more likely than those from non-reduced districts to discuss the proper implementation of policies as an important component of commitment. Respondents from districts with non-reduced stunting, on the other hand, were more likely than those with reduced stunting to discuss the need for increases in funding for nutrition.

Differences in coherence

Several differences between the two types of study districts were noted in relation to coherence. These differences primarily revolved around perceptions of roles, horizontal and vertical coherence and monitoring and evaluation. We noted differences in how respondents from the two types of study districts described the integration of agriculture and nutrition (both in terms of perceptions of agriculture's role in nutrition (described above) and in the implementation of DPEMs), participation in DPEM meetings and implementation of the DPEMs, relationships between actors and in monitoring and evaluation.

Perceived role of agriculture in nutrition

We previously observed that respondents in the agriculture sector perceived their role in nutrition to be centered on four main roles: 1) food production and availability, 2) economic development, 3) consumption of diverse diets, and 4) working with the health sector. We also observed differences across administrative levels in how these actors perceived their roles in nutrition, with respondents at the community level (e.g., FLWs) being the most likely to discuss the role of the agriculture sector in promoting or helping the consumption of diverse diets and those at the national level, least likely to mention this role. When we looked at this response by study district, we also observed differences in the perception of this role by district leaders. Whereas, all agriculture FLWs in both study districts mentioned that their sector had a role in promoting the consumption of diverse diets twice as many district leaders from reduced stunting districts mentioned this role compared to those from non-reduced districts (80% and 40%, respectively). This difference highlights that there might be a need to reinforce the role of agriculture in nutrition at the district level.

Horizontal coherence

Several differences between the two types of study districts were noted in relation to horizontal coherence. These differences primarily revolved around participation in DPEM meetings, implementation of the DPEMs and perceived benefits of DPEMs.

The first difference observed between districts with reduced and non-reduced stunting was participation in DPEM meetings. Respondents in districts with increased stunting mentioned low participation in DPEMs. This low participation was primarily attributed to meetings being ad hoc at times and being health sector focused and thus, not perceived as relevant by people working in other sectors in some cases. Study respondents who noted the ad hoc nature of some of the meetings stated that this made it difficult to participate. Others explained that DPEM meetings were health-sector focused and were used to evaluate health data on malnourished children. They believed that this type of activity belonged to the social affairs department. Furthermore, some of the district leaders, specifically in the agriculture sector, from districts with non-reduced stunting stated that they did not often participate in DPEM meetings. This response was not observed among agricultural district leaders in districts with reduced stunting. It was evident that the integration and active participation of different sectors in the DPEM meetings needed improvement in the districts with non-reduced stunting.

Furthermore, differences were observed in how respondents described the function and implementation of the DPEMS. Respondents from districts with reduced stunting compared to those with non-reduced stunting were more likely to mention that each ministry or sector involved in the DPEM has a responsibility to report on their nutrition related activities (n=6/20 vs. n=1/14) and that

DPEM meetings were used to specifically evaluate the plans and the actions being implemented and the changes occurring or failing to occur in nutrition (n=9/20 vs. n=0/14). For example, one district leader from a reduced stunting district stated: *“We meet in these [DPEM] committees and evaluate what we had committed to do, who was supposed to do it, or why hasn’t he done it? We put in place a program to achieve a nutrition objective. If it was achieved, we evaluate at which level it was achieved...They can ask me if there was enough fertilizers that were distributed, if the crop that we decided to grow is beneficial to people in terms of food nutrients, or why there weren’t enough fruit seeds that were planted and what caused these shortcomings. The fact that there are those committees that actually work well is a good thing...DPEM committees, and people in charge of monitoring and evaluation, all this is very helpful.”* Respondents from these districts were also more likely to discuss the joint monitoring trips to communities conducted by DPEM committee participants. Another key difference in the implementation of DPEM and DPEM committees between the study districts was the unequal distribution of development partners working in nutrition across districts. Respondents from districts with reduced stunting were more likely to report having a development partner helping them to implement their DPEMs. In contrast, respondents from non-reduced districts discussed that the imbalance in the number of development partners supporting certain districts was a challenge for DPEM committees. This concern was also supported by a few respondents at national level, as well. These respondents believed that DPEMs were implemented well in districts that had a development partner supporting the process.

Lastly, there was a key difference in the perceived benefits of DPEMs between the two types of study districts. Three respondents out of fifteen (20%) from districts with reduced stunting believed DPEMs were beneficial because they help people from different sectors understand how their sectors can contribute to nutrition, but this was only mentioned by one person (10%) in districts with non-reduced stunting.

Relationships between actors

Overall, relationships between actors were positive but respondents from districts with non-reduced stunting were more likely to describe relationships with actors at other levels in neutral terms, discussing activities and reporting lines, and to call for improvements in some of the relationships. For example, regarding the relationships between national and district level actors, respondents from districts with non-reduced stunting said that they could benefit from increased financial support and more visits from the central level. On the other hand, respondents from reduced stunting districts described more positive and reciprocal relationships with the national level actors. When it came to the relationships between districts and NGOs and CSOs, respondents from non-reduced districts were more likely to call for improvements in their relationships. Specifically, some actors, such as district nutritionists, asked for more interaction with program implementers working in their districts so that they could exchange more on nutrition activities and observations regarding nutrition being made in their districts. They also reported that program implementers could increase the coverage of their programs, in part by reducing redundancies in programming. While most IOs do not directly implement programs in communities, respondents from non-reduced districts also called for more joint planning of programs and for improvements in the duration and quality of programs funded by IOs.

Monitoring and evaluation

Respondents from districts with reduced stunting compared to those with non-reduced stunting were more likely to discuss using a multisectoral approach to monitoring and evaluation for nutrition and using process and outcome indicators rather than input indicators in their assessments of what was working in nutrition and what wasn't. For example, respondents from districts with reduced stunting were more likely to mention a multisectoral approach to evaluating nutrition in their district by integrating data from the different ministries or sectors to understand the nutritional situation in their district. One district leader from a reduced stunting district explained: *"All information is important because it helps in our work. If they tell us that there are a lot of people sick with malnutrition in this area, they then ask us did these people get seeds for vegetables, do they have kitchen gardens, and are they built well... Sometimes, we find that the areas we destined for kitchen gardens, people are cultivating beans there. So, we have worked to identify areas they can cultivate vegetables, and this was part of the DPEM. Through the DPEM, we saw that there weren't enough vegetables being grown, those who had vegetables were bringing them to the markets, so we took the initiative to make sure that we cultivate a lot of vegetables in the district."* When asked to describe what was discussed in DPEM meetings, respondents from reduced stunting districts discussed using process and outcome indicators (e.g. number of households with established kitchen gardens or latrines, number of ANC visits women attended, etc.) to assess progress in nutrition. Comparatively, respondents from non-reduced stunting districts discussed using input indicators (e.g. amount of food products distributed, number of cooking demonstrations conducted and the number of participants, etc.) to assess progress.

Some of the respondents in non-reduced stunting districts specifically called for improvements in monitoring and evaluation, stating that they were themselves asking for support in this domain. They asked for more training in both nutrition and monitoring and evaluation tools because the lack of these skills led to the poor use of data already available to them. Furthermore, a few respondents suggested that better indicators be used to evaluate nutrition. Comparatively, none of the respondents from reduced districts specifically stated that improvements in monitoring and evaluation were needed.

Community

Differences at the community level in perceived contributors to changes in nutrition

In addition to the differences between districts in the perceptions of how nutrition has changed in the past 25 years, there were also some differences in what respondents believed had contributed to those changes. Regarding the deterioration in nutrition, the most commonly mentioned contributor mentioned was a decrease in food availability and this was more commonly expressed by participants in FGDs in districts with non-reduced compared to reduced stunting (35% and 10%, respectively). Regarding improvements in nutrition respondents from districts with reduced stunting were more likely to attribute these changes to improvements in leadership, the availability of health programs and services in the health sector, increased access to water, and to improvements in knowledge than were those from non-reduced districts. Respondents from non-reduced districts compared to those from reduced districts, on the other hand, were more likely to discuss changes in the agriculture sector describing increased availability of programs and services (61% and 50%, respectively) and increased visibility of agronomists (17% and 11%, respectively). Although a similar proportion of respondents attributed changes in the nutrition to changes in the education sector, the aspects of education to which they attributed improvements differed. Respondents from reduced compared to non-reduced districts

were more likely to emphasize the role of increased access to education as having played a role in improving nutrition (92% and 71%, respectively). Whereas, those in non-reduced compared to reduced districts were more likely to attribute positive changes in nutrition to the nutrition-related programs delivered through the education sector (75% and 67%, respectively) and to the nutrition-related curriculum provided through schools (46% and 21%, respectively). A similar proportion of respondents from the two study districts also mentioned changes in gender as contributors to change but respondents differed on which aspects they highlighted. For example, respondents from districts with reduced stunting compared to non-reduced districts mentioned men's increased awareness in nutrition as a contributor to change (50% vs. 0%, respectively). Whereas, respondents from non-reduced districts, mentioned improvements in women's empowerment more often than those from reduced districts (77% vs 42%, respectively).

The perceived contributors to improvements within population groups also differed by the two types of districts. For PLW, respondents from reduced stunting districts were much more likely to discuss the role of health services in the improvements in PLW nutrition than were those from non-reduced districts. Specifically, they were more likely to discuss the increase in the availability of health services, the increase in CHWs and the increased utilization of health services as contributing to improvements in PLW nutrition. For children 0-2 years of age, respondents from reduced districts compared to non-reduced districts were more likely to attribute the improvements in nutrition to health services (50% and 22%, respectively), improved practices (40% and 0%, respectively) and specifically improved IYCF practices (32% and 24%, respectively). On the other hand, respondents from non-reduced districts were more likely to attribute improvements in the nutrition of children 0-2 years of age to programs compared to those from reduced districts (67% and 20%, respectively).

Conclusion

In summary, there were several differences worth noting between the two types of study districts that could point to areas for changes in programs and policies in Rwanda. These differences spanned the three primary themes covered in the qualitative study, commitment, coherence and community with a heavy concentration in the areas of coherence and community.

Within coherence the main aspects that differed between the two types of study districts were the multisectoral approach to the DPEMs and monitoring and evaluation, the integration of agriculture and nutrition, relationships between actors, implementation of DPEMs and the quality, scope, purpose and use of monitoring and evaluation. In reduced stunting districts study respondents highlighted the importance of using a multisectoral approach related to participation and implementation of the DPEMs as well as to monitoring and evaluation activities. This was not the case in non-reduced districts where things seemed to have remained more focused along sectoral lines to an extent. This was especially apparent in the integration of the agriculture sector in nutrition. In non-reduced districts, agriculture leaders were less likely to mention agriculture's role in improving consumption of nutritious diets and a few noted a reluctance to participate in multisectoral activities, such as the DPEM meetings. At the community level, study respondents also seemed to focus narrowly on how agriculture had improved nutrition and less likely to discuss inputs from other sectors such as health. Relationships between actors at different levels also appeared to be somewhat better in reduced compared to non-reduced districts. This seemed to carry-over into the support for the DPEMs and implementation of the associated activities. Respondents in non-reduced districts also noted a need for improvements in

monitoring and evaluation which included the need for more training and better indicators. It may also be prudent to consider moving towards the use of more process and outcome indicators in these districts to assess progress in nutrition. Lastly, respondents from non-reduced districts were also more likely to call for increases in funding for nutrition-related staff, programs and to facilitate the implementation of the DPEMs.

At the community level, study respondents from reduced districts were more likely to note the role of health services and improvements in behaviors and practices and specifically in improvements in IYCF practices as contributing to improvements in nutrition. Although health services were improved throughout the country, there may have been differences in the accessibility or quality of services available that differed between the reduced and non-reduced districts and thus, to peoples' perceived role of health services to improvements in nutrition. It is also possible, that together with the improvements in knowledge and practices noted in reduced districts that respondents from these districts were more aware of the role that different inputs can play in nutrition which may reflect more general shifts in behaviors that are favorable for nutrition. Lastly, study respondents in non-reduced districts were more likely than those from reduced districts to note a decrease in food availability as contributing to what they perceived as deteriorations in nutrition.

10. Discussion

Rwanda has undergone significant changes in the last 25 years which have led to substantial improvements in nutrition (e.g. severe acute malnutrition, stunting and anemia), especially among young children. Although progress has been steady in reducing stunting, improvements have not been uniform across the country. In this study, we sought to understand what drove changes in nutrition (with a focus on stunting and anemia) using both quantitative and qualitative data following the SoC format that has been used to assess similar changes in other countries such as Ethiopia, Senegal and India [3], [4], [7]. The SoC studies used a regression-decomposition approach to assess the drivers of change in nutrition using quantitative data and then used qualitative data to further elucidate what had led to changes in nutrition using the “5 C’s framework”. This framework examines the changes and challenges in three guiding categories: commitment, coherence, and community. One difference between this and those previously conducted, is that this study was specifically designed to delve into the differential changes in stunting prevalence across districts in Rwanda.

The results from the regression-decomposition analysis revealed several driving factors for the reduction in stunting and a few for anemia. It should be noted that we were limited in these analyses to the data available, which was somewhat limited for all outcomes, but especially for anemia. Most notably missing from the datasets were high quality data on IYCF practices, household food security, women’s diets, incidence of illness (e.g. malaria, fever, diarrhea, helminth infections, etc.) and participation in the multitude of agriculture, nutrition and nutrition-related programs available in Rwanda. Despite this, our analyses revealed key driving factors in improving nutrition that were in-line with some of the larger changes that were made in Rwanda over the past 25 years such as changes in the health and education sectors.

Between 2005 and 2015, stunting decreased from 51% to 38% in Rwanda. Based on the data available, the decomposition analysis revealed that maternal health factors were the largest contributors to improvements in stunting. These factors included the quality of ANC visits received (59%), the proportion of women who had given birth at a health facility (18%), and fertility factors such as the total number of children a woman had (6%). At the household level, household wealth and parental education were associated with changes in stunting. Household wealth accounted for about 10% of the decline in stunting while parental education accounted for 4% of the change. Among the child-level factors, only insurance coverage was related to the decline in stunting.

Based on the limited available data relevant for anemia, the decomposition of changes in child anemia between 2005 and 2010 revealed very few driving factors. The prevalence of child fever was the largest driving factor (51%) followed by insurance coverage (49%). Finally, the decomposition of women’s anemia between 2005 and 2010 showed that fever prevalence at the village level was the largest factor explaining a predicted change in women’s anemia (46%). This was followed by use of hormonal contraceptives (43%). Other smaller contributions were made by an increase in household assets (4%) and increased access to improved toilets (3%).

Contextually, over the last 25 years, Rwanda was rebuilding itself post-conflict and saw increased peace, security, stability, and commitment. During this period, Rwanda increased its commitment to nutrition as evidenced by changes in political, institutional and financial commitment. Study respondents overwhelmingly agreed that these changes in these different aspects of commitment had contributed to improvements in nutrition. The changes in commitment to nutrition were widespread and game-

changing over the past 25 years. During this time, the president and other high-level leaders took a keen interest in nutrition, pushing it onto the country's political agenda. This resulted in new policies focused on nutrition being developed and implemented in Rwanda, commitment to worldwide development goals and nutrition platforms, addition of staff and multisectoral nutrition platforms at different levels to facilitate the implementation of the nutrition policies and to increased allocation of resources to nutrition and nutrition-related programs. The development of national nutrition policies, especially the multisectoral NFNP, mapped out how ministries should work together to address nutrition, increased these ministries' participation in addressing nutrition, and led to more nutrition and nutrition-related programs. Furthermore, the country also committed to national and international policies or frameworks in agriculture, education, health, and economic development which affected different determinants of nutrition. Institutionally, the country also established new platforms to facilitate the implementation of the NFNP and to bring together the different ministries addressing nutrition during planning, implementation, and monitoring and evaluation. The increase in nutrition and nutrition-related programs was also sign of increased financial commitment to nutrition, according to respondents, but they also believed the government could increase this form of commitment in order to increase resources necessary for the optimal implementation of the NFNP and various nutrition and nutrition-related programs offered to the population.

Rwanda also saw improvements in coherence in nutrition, including improvements in institutional, horizontal, and vertical coherence. Rwanda created different institutions and platforms to foster coordination and interaction between the different stakeholders involved in nutrition and the NFNP. Platforms such as the SCF&NSC, NFNTWG, and NFNCs were created at the national level to bring together various stakeholders in nutrition to coordinate or discuss and make recommendations on nutrition. The country also created platforms such as JAPEM and DPEMs to foster collaborations in planning and monitoring across the different ministries or sectors involved in the implementation of the NFNP at national and district levels. These plans, and the committees associated with DPEMs, helped to increase nutrition awareness, especially in the ministries or sectors that did not traditionally see themselves as involved in nutrition. Challenges still exist, however, both at national and district levels. For example, though coordination bodies and platforms were established, responsibilities and the relationship between these platforms were not clearly distinguishable to study respondents. At the district level, and especially in districts with non-reduced stunting, we found that some sectors involved in nutrition were not yet well integrated in DPEM committees. Paradoxically, collaborations between sectors at community level appeared to be more integrated.

Vertical coherence in the policy environment was strengthened by decentralization efforts. Relationships between government and non-government actors at the national level to the district and community level where implementation of programs occurs was viewed favorably or in a neutral manner due to good communication channels. District level respondents, however, saw room for improvement in how programs are implemented, their coverage, and how they answer the needs of the Rwandan population.

At community level, the changes observed in nutrition over the last 25 years were mostly improvements, though there were districts that reported a deterioration in nutritional status. These districts were mostly districts with non-reduced stunting. Nutrition and nutrition-related programs and the availability and use of health services were described as key contributors to the nutritional changes observed at the community level, a finding also highlighted in other SoC studies. Programs helped to

increase the nutritional knowledge and awareness of community members. Such programs were complemented with the increased availability of health services through an increased number of health facilities in closer proximity to populations, CHWs, and the national health insurance plan. CHWs at the community level played a key role in the changes that occurred in nutrition because they helped reinforce the utilization of health services, especially in antenatal care, giving birth in health facilities, and seeking care early when ill, which were also found to be some of the main drivers of change in the quantitative analysis.

The country also invested in agriculture and provided different programs and services that contributed to changes in nutrition such as kitchen gardens, One Cow per Family, biofortification, and the land consolidation program. The establishment of agriculture FLWs complemented the work of community health workers, increased the visibility of agricultural workers in communities, and helped to provide information and trainings on modern and improved farming techniques to the population. These programs and services in agriculture were credited with helping increase food production and income, decrease famine and acute malnutrition and improving consumption of healthier foods such as vegetables and eggs.

While malnutrition decreased in Rwanda, change has not been uniform across the country. We did not find major differences in commitment between the two study district groups. Districts with non-reduced stunting, however, had weaker coherence, both horizontally and vertically. Implementation of DPEMs and collaborations across ministries or sectors in non-reduced districts were characterized by less participation, less integration of sectors outside of the health sector such as the agriculture sector, and less support from development partners. These things affected were believed to have affected the quality of DPEM implementation. Respondents from non-reduced districts were also more likely to request improvements in their relationships with different types of actors. The relationship between these districts and the national government was more neutral compared to districts with reduced stunting; respondents from districts with reduced stunting characterized their relationships with national government stakeholders more favorably.

Differences between the study districts were also observed in monitoring and evaluation. Specifically, respondents from districts with reduced stunting discussed looking at process and outcome indicators to evaluate their plans and progress in nutrition, while respondents from non-reduced districts were more likely to discuss the use of input indicators for these activities. Respondents from non-reduced districts were also more likely to discuss reporting on activities, but less likely to mention the analysis of integrated data from the different sectors involved in nutrition when evaluating progress in nutrition indicators. A few district leaders in districts with non-reduced stunting were also more likely to request training in monitoring and evaluation and nutrition in order to better utilize monitoring tools. Lastly, we found that study respondents believed that information systems in nutrition needed to be improved through the collection of accurate data, improved integration of data from the different ministries or sectors involved in nutrition, and evaluations of the nutrition programs and policies that exist in the country. Furthermore, some respondents called for increasing the use of context-specific data to inform policies in the country and to develop services that address the needs of the Rwandan population.

Lastly, we found that FGD participants from the non-reduced districts were more likely to mention that their districts faced a deterioration in nutrition status indicators over the last 25 years. Respondents from these districts also reported climate change and drought-related challenges more often than respondents from districts with reduced stunting. They believed that these climate-related challenges

had negatively impacted food production and subsequently food security, especially for households in the lower socioeconomic classes who they said rely on their work in the agriculture sector to provide for themselves and their families.

Overall, we found, similarly to what other SoC case studies have found, that political commitment to nutrition, through awareness, increased prioritization, champions, and increased accountability from leaders, was very instrumental in creating an enabling environment for changes in nutrition [40]. It is important, however, to ensure that increased accountability for nutrition is directed to the leaders who are able to adequately assess nutrition and its progress. It was evident, both at national and district levels, that some respondents with responsibilities in nutrition needed, and also requested, further technical training in nutrition and monitoring and evaluating. Trainings in these topics could further help the optimal implementation of the NFNP and lead to more changes in nutrition.

Prior studies in nutrition policy have shown that countries at times struggle with translating political commitment into institutional and financial commitment. In Rwanda, we found that institutional commitment had developed but improvements are still needed for financial commitment. Inadequate funding for nutrition not only had implications for the optimal implementation of programs and services but it also affected resources such as human resources and infrastructure that are necessary for adequately addressing nutrition. For example, respondents argued that districts did not find sufficient funding to implement activities within DPEMs. Though mentioned by one respondent, there was a call to evaluate if districts were optimizing the coordination of nutrition funding across ministries or sectors, rather than implementing activities in silos. Other respondents suggested that districts should receive sufficient funding to hire nutrition conveners to lead and monitor DPEMs rather than placing this workload on Vice Mayors of Social Affairs, who already have other responsibilities. Because insufficient resources were related to work overload and the inadequate implementation of policies, a discussion on the coordination of funding for the implementation of the NFNP may be warranted.

When it comes to coherence, other SoC case studies have also observed that challenges exist in establishing clarity in roles and responsibilities, nutrition's institutional home, and the authority of coordinating mechanisms [40]. It was evident that though Rwanda has established national coordination platforms, each platform's specific role and responsibility was not evident to respondents. While the NFCS was also established to coordinate and monitor nutrition nationally, some respondents questioned if it could exert sufficient authority on the different ministries involved in nutrition. Such lack of clarity in roles, responsibilities, and leadership could negatively affect the implementation of the NFNP. It was not surprising, then, to find that most of the differences qualitatively observed between study districts were related to coherence. These differences included implementation of DPEMs, monitoring and evaluation, and relationships between actors. In the agriculture sector, we also observed that community level respondents perceived having stronger cross-sector collaborations in nutrition than national and district level respondents, a finding also found in countries such as Senegal and Ethiopia [19], [49].

One limitation of this study was the lack of available data for the quantitative analysis on several known predictors of nutrition such as dietary data and data on IYCF practices. Another limitation was that we were only able to assess the drivers of change using the quantitative data over the past 10 years. However, there were important changes in nutrition predating the last 10 years. We aimed to compliment the available quantitative data through the qualitative component of the study. There were

also a few limitations in the qualitative component of the study one of which was that we did not interview private sector stakeholders. The inclusion of private sector stakeholders would have helped better understand their engagement in nutrition and their relationship with other stakeholders. Lastly, while, the study focuses on the three guiding categories of commitment, coherence, and community, there may be other narratives that contribute to the story of how nutrition changed in Rwanda that may not have been captured in this study.

In summary, Rwanda has made significant progress in improving nutrition outcomes over the last 25 years. The push for change was facilitated by strong political commitment to nutrition and developments in institutional commitment that solidified multisectoral approaches. The government also took steps to develop institutional, horizontal, and vertical coherence, though it will need to improve the operationalization of these different forms of coherence in order to improve implementation of the NFNP, increase integration of nutrition in different sectors involved in nutrition, and collaborations between these sectors. The country will also need to develop a more integrated monitoring and evaluation system for nutrition nationally. To achieve these things, the country will need to move from a focus on raising awareness to providing more technical trainings to the leaders in charge of nutrition, improving monitoring and evaluation tools and systems, and increasing financial commitment to nutrition. Improving coherence will be instrumental for continued progress in improving nutrition outcomes, as it was one of the biggest differences observed between the two types of study districts. At the community level, FLWs in health and agriculture helped to improve the implementation of nutrition and nutrition-related programs and collaboration across sectors also seemed to be stronger at this local level than at the district and national levels, but improvements in this area were still needed especially in non-reduced districts. It is not surprising then that FLWs, especially CHWs, were viewed as key to the changes observed in nutrition, by respondents. It will be important to sustain their achievements in coming years. Lastly, it will also be important to address food security for the most vulnerable households in communities and the impact of climate change on agriculture and nutrition as these things were perceived as key barriers to improving nutrition by many community members.

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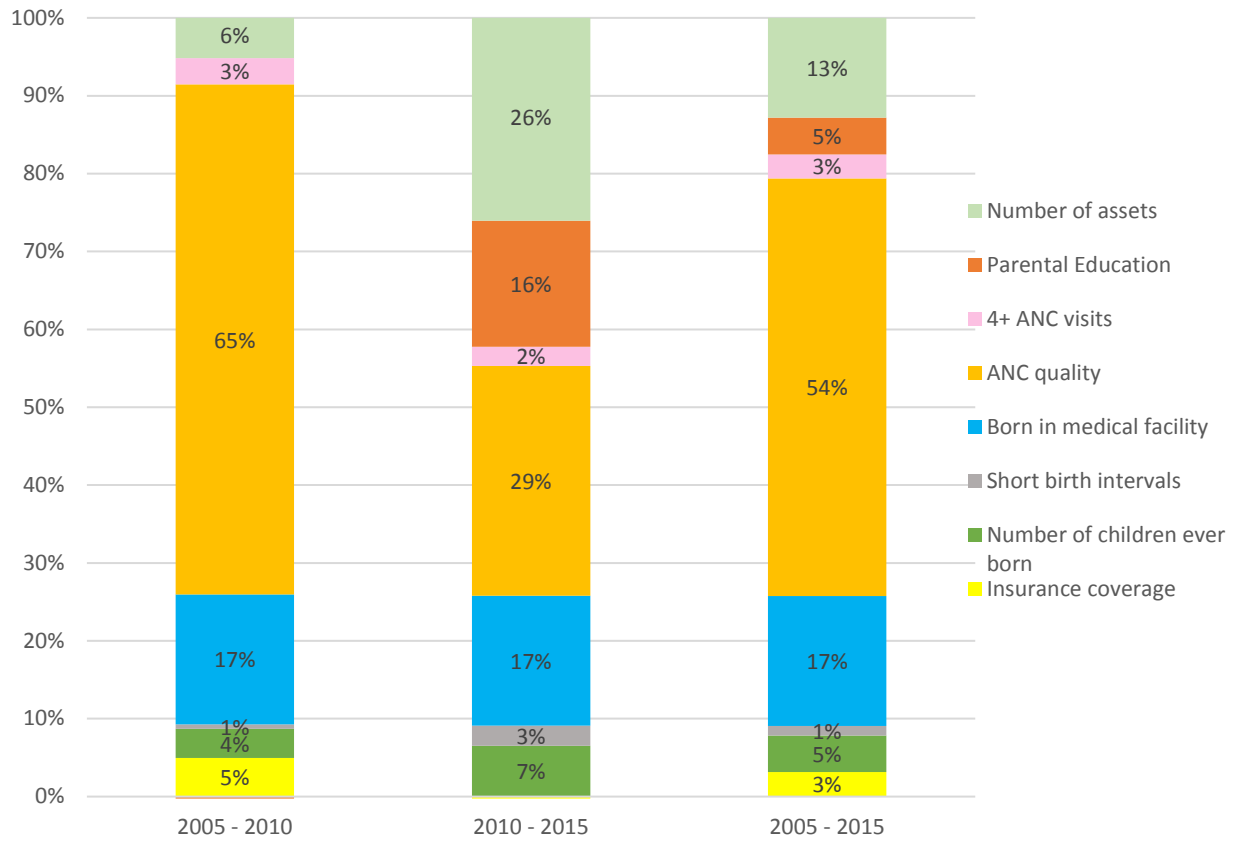
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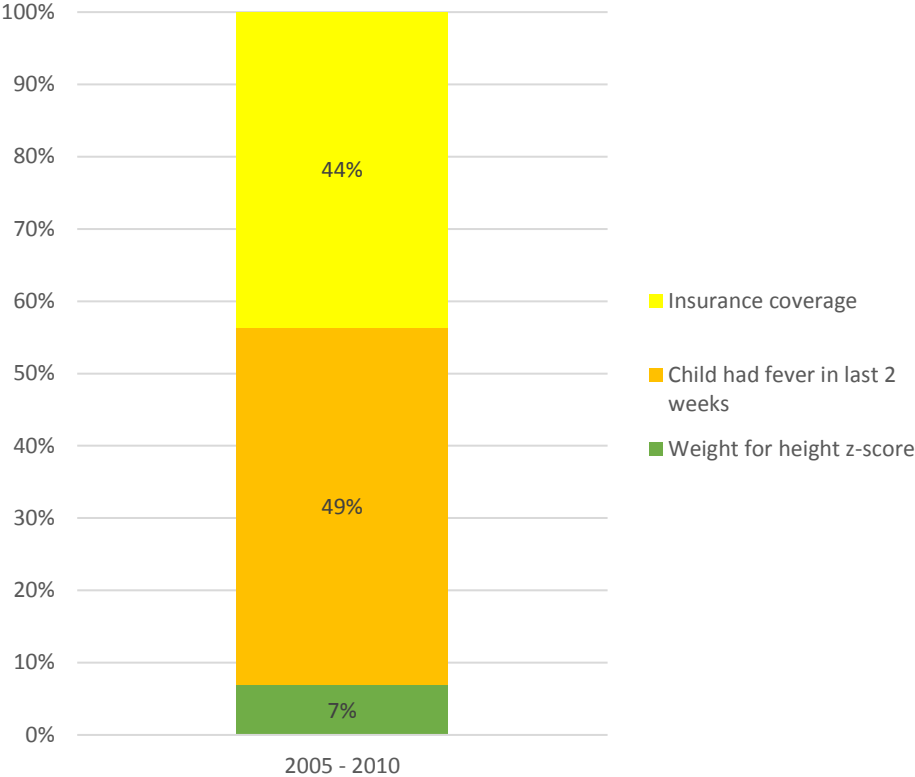
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12. Appendixes

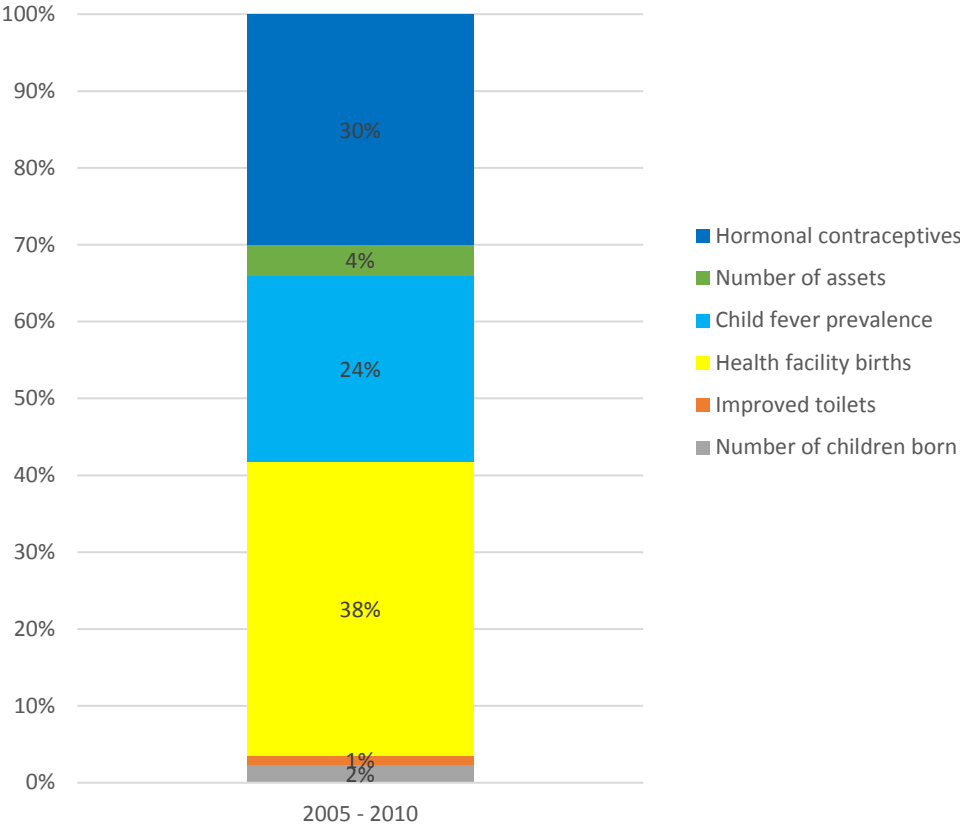
Appendix 1: Predicted drivers of improvements in child height-for-age Z-scores



Appendix 2: Predicted drivers of improvements in child hemoglobin levels



Appendix 3: Predicted drivers of improvements in women’s hemoglobin levels



Appendix 4: Nutrition-specific, nutrition-sensitive and other nutrition-related programs in Rwanda

Program	Year launched	Target group(s)	Intervention(s)	Implementation area	Scale	Lead sector	Other sectors involved	Nutrition-specific, -sensitive, other
Provision of milk [50]		-Malnourished children under 59 months	Provision of therapeutic formula milk to malnourished children	Nationwide		Local administrative entities development agency (LODA)	Local government	Nutrition-specific
Community-Based Nutrition [51]	1996	-Children 0-59 months -PLW	Various (see below)	Nationwide	Large-scale	Health	Various (see below)	Various (see below)
Growth monitoring and promotion (GMP)[51]		-Children 0-59 mo	Monthly weighing of children 0-59 mo	Nationwide	Large-scale	Health		Nutrition-specific
BCC through Parent's Evenings [51]		-Mothers and caregivers of children 0-59 mo	Education sessions on health, nutrition, and hygiene	Nationwide	Large-scale	Gender	Health, Local government	Nutrition-specific
BCC through individual counseling[51]		-Mothers and caregivers of children 0-59 mo	Individual counseling during GMP or during home visits	Nationwide	Large-scale	Health		Nutrition-specific
Cooking demonstrations[51]		-Mothers and caregivers of children 6-59 mo	Monthly culinary demonstration at the village level	Nationwide	Large-scale	Health	Local government	Nutrition-specific
Community-based management of malnutrition[51]		-Children 0-59 mo -PLW	Detecting moderately or severely malnourished children or mothers using MUAC and other signs of malnutrition	Nationwide	Large-scale	Health	Local government	Nutrition-specific

Program	Year launched	Target group(s)	Intervention(s)	Implementation area	Scale	Lead sector	Other sectors involved	Nutrition-specific, -sensitive, other
Promoting community participation by Triple A [51]		-Community	Analysis of the state of nutrition at village level through the participation of community members and village leaders	Nationwide	Large-scale	Health	-Local government	Other
Vitamin A supplementation [51]–[53]		-Children 6-59 mo	Provision of high dose vitamin A supplements twice per year	Nationwide	Large-scale	Health		Nutrition-specific
Deworming [48], [51]		-Children 12-59 mo --School-going children 5-15 y	Provision of deworming tablets twice per year	Nationwide	Large-scale	Health	Local government, Education	Other
Iron and folic acid supplementation [51]		-Pregnant women	Provision of iron-folic acid supplements to pregnant women	Nationwide		Health		Nutrition-specific
School gardens[50]		-School children	Integrating nutrition education, garden skills in primary and secondary school curricula, promoting school gardens	4 districts	83,000 students	Agriculture	Education, Local government, Health	Nutrition-sensitive
Kitchen gardens[50], [54]		-Households with children < 59 mo	Promotion of a direct food source close to the home with the aim of improving dietary diversity	Nationwide		Agriculture	Local government, Health	Nutrition-sensitive
Small livestock[50]		-Households in Ubudehe 1 & 2	Provision of animals for small-scale husbandry	Nationwide		Agriculture	Local government	Other
Early childhood development (ECD) program		-Children <59 mo	Establishment of ECD centers where children receive care and in some cases, porridge			Gender	Health, Local government	Other

Program	Year launched	Target group(s)	Intervention(s)	Implementation area	Scale	Lead sector	Other sectors involved	Nutrition-specific, -sensitive, other
Community-based health insurance [55]	Pilot 1999 National 2004	-All Rwandans	Roll-out of a national health insurance plan	Nationwide	Large-scale	Finance	Health	Other
One Cow per Family [52]	2006	- Poor households	-Distribution of cows	Nationwide		Agriculture	Line ministries	Other
Crop intensification program (CIP) [56]	2007	-Farmer households	Various (see below)	Nationwide		Agriculture		Other
Provision of subsidized fertilizer and free seed[56]		-Households in Ubudehe 1 & 2	Limited quantity of improved seeds distributed, and prices for fertilizers also subsidized by the government	All districts		Agriculture		Other
Land use consolidation program[56]	2007		Growing one crop in the same area by different farmers, with each farmer owning his own plot; crop choice motivated by agro-bio climate and economic potential	All districts		Agriculture		Other
Social safety nets (direct cash transfers) through Vision 2020 Umurenge Program [57], [58]	2008	-Vulnerable families and households (Ubudehe 1 & 2)	Provides direct support to poor families with no adult labor capacity	All districts		Local government		Other
One cup of milk per child [50], [59]	2010	- Children aged 3 to 9 y	Provide milk to school-going children	6 districts in 2010 15 districts in 2017	78,646 pupils as of 2017	Agriculture - other document says local government	Education, Health, Local government	Nutrition-specific

Program	Year launched	Target group(s)	Intervention(s)	Implementation area	Scale	Lead sector	Other sectors involved	Nutrition-specific, -sensitive, other
Home Grown School Feeding Program [60], [61]	2016	Primary and lower secondary school children	Provide daily school meals consisting of either maize, beans, and vegetable oil or a fortified porridge	4 districts: Karongi, Rutsiro, Nyamagabe, Nyaruguru	Small-scale, ~2% coverage	Education	Agriculture	Nutrition specific
One Thousand Days in the Land of a Thousand Hills (1,000 Days Campaign) [62]	2013	-Children <5 y -PLW	Nutrition counseling related to best health, nutrition and hygiene practices during the first 1,000 days conducted through mass media and community outreach	Nationwide	Large-scale	Health	Gender, Agriculture, Local government (Social Cluster Ministries)	Nutrition-specific
Home fortification with micronutrient powders (MNP) (Ongera) [63]	2014	-Children 6-23 months	Provision of 10 MNP sachets per month to all children 6-23 mo	All districts as of 2017 (2 districts in 2014, 18 in 2015, 19 in 2016, 30 in 2017)	Large-scale	Health		Nutrition-specific
Fortified food blend program (Shisha Kibondo) [53]	2017	-Children (6-23 mo) in Ubudehe 1 PLW in Ubudehe 1	Fortified foods provided to target groups	Nationwide		Health		Nutrition-specific

Appendix 5: Rwanda's National Food and Nutrition Policy 2013-2018 (NFNP)

The NFNP, mentioned throughout this report, brings together different ministries to address the multiple influences on nutrition. Its development and focus on using multisectoral approaches to nutrition was a key factor in advancing nutrition in the country. The policy was intentionally designed to be co-owned by three ministries, the Ministry of Health (MINISANTE), Ministry of Agriculture and Animal Resources (MINAGRI), and the Ministry of Local Government (MINALOC), to increase collaboration, partnerships, and ownership of nutrition in multiple ministries or sectors [44]. The policy also assigns key roles to the Ministry of Gender and Family Promotion (MIGEPROF), Ministry of Education (MINEDUC), and the Ministry of Disaster Management and Refugees (MIDIMAR). The policy, made up of seven key strategies, describes the role of each involved ministry and the strategies that require the input and contribution of multiple ministries. The 7 strategies of this policy are:

1. Advocacy for food and nutrition, and resource mobilization: Assuring and sustaining commitment across all levels of government and promoting the importance of food and nutrition for health and national development. This strategy also includes increasing family and household awareness regarding the first 1,000 days.
Joint Responsibility: MINAGRI, MINISANTE, MINALOC
Collaborator: MIDIMAR, MIGEPROF
2. Preventing stunting in children under two years of age: Focuses on three main interventions at national, district, and community level. These interventions are the national campaign for the First 1,000 Days, the strengthening of the District Plans to Eliminate Malnutrition (DPEM) and its steering committee, and the First 1,000 days Community-Based Food and Nutrition Program (CBF&NP) that promotes antenatal care, breastfeeding, dietary intake for pregnant and lactating mothers and children of complementary feeding age, hygiene, cooking demonstrations, micronutrient nutrition, deworming, and more.
Joint Responsibility: MINAGRI, MINISANTE, MINALOC, MIGEPROF
Collaborator: MINEDUC
3. Improving household food security: Incorporates the Nutrition Action Plan from MINAGRI and aims to improve food production quantity and diversity and access and use of nutritious foods at household level through programs such as the One Cow per Poor Family, provision of subsidized fertilizer and seeds to vulnerable families, kitchen and school gardens, and the provision of small livestock to increase protein availability and provide a pathway for income generation for vulnerable families.
Primary Responsibility: MINAGRI
Collaborator: MINEDUC, MIGEPROF, MINISANTE, MINALOC
4. Preventing and managing all forms of malnutrition: includes interventions mainly in the mandate of MINISANTE to prevent and manage all forms of malnutrition. These activities include addressing acute malnutrition, maternal, infant, and young child nutrition (MIYCN), nutrition and HIV/AIDS, hygiene and sanitation, prevention and control of nutrition-related non-communicable diseases, and micronutrient deficiencies in women and children.
Primary Responsibility: MINISANTE
Collaborator: MINAGRI, MINEDUC, MIGEPROF, MINISANTE, MINALOC

5. Improving food and nutrition in schools: focuses on improving and expanding school feeding programs which includes meals in secondary schools and the One-Cup of Milk program for children in primary schools, including nutrition education in school curriculum at appropriate levels, school gardening, and nutrition assessments in schools. These activities fall under the nutrition elements of the MINEDUC School Health Policy. This strategy also promotes the continuation of Vitamin A supplementation and deworming of children in schools.
Primary Responsibility: MINEDUC
Collaborator: MINAGRI, MINISANTE, MINALOC

6. Assuring food and nutrition in emergencies: mandates MIDIMAR to assure adequate nutrition for persons affected by disaster and refugees, especially to children who were breastfeeding but have been separated from their mothers, all children under five years of age, pregnant and lactating women, and HIV positive mothers.
Primary Responsibility: MIDIMAR
Collaborator: MIGEPROF, MINALOC

7. Supporting activities and services: promotes supportive services and organization needed for the effective implementation of the NFNP including good governance, planning, budget allocation, and monitoring and evaluation.
Joint Responsibility: MINAGRI, MINISANTE, MINALOC
Collaborator: MIDIMAR, MIGEPROF

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