NUTRITION AND FOOD SECURITY

GREATER RURAL OPPORTUNITIES FOR WOMEN LEARNING SERIES

MEDA

Canada
# TABLE OF CONTENTS

I. Abstract ......................................................................................................................... 1

II. Introduction .................................................................................................................. 1
   A. About the GROW Project ........................................................................................ 1
   B. Socioeconomic Overview ....................................................................................... 3
   C. Purpose of Intervention ......................................................................................... 5

III. Methodology .............................................................................................................. 6
   A. Summary of Design Concepts .............................................................................. 6
   B. Method of Measuring Results ............................................................................ 8

IV. GROW’s Food Security and Nutrition Model ............................................................ 8
   A. Women’s Empowerment/Women’s Energy Expenditure .................................. 9
   B. Food Production .................................................................................................... 14
   C. Agricultural Income/Food Processing .................................................................. 18

V. Results and Discussion ............................................................................................... 20

VI. Conclusion ................................................................................................................ 24

VII. References ................................................................................................................. 25

Appendix 1 ....................................................................................................................... 26
ACRONYMS

CAD  Canadian Dollar  
CBOs  Community Based Organizations  
FANTA  Food and Nutrition Technical Assistance  
GES  Ghana Education Service  
GHS  Ghana Health Service  
GHS  Ghana cedi  
GMF  GROW Mother Facilitators  
GROW  Greater Rural Opportunities for Women  
GSFP  Ghana School Feeding Program  
IGA  Income Generating Activities  
KFPs  Key Facilitating Partners  
LBW  Low Birth Weight  
M&E  Monitoring and Evaluation  
MEDA  Mennonite Economic Development Associates  
MoFA  Ministry of Food and Agriculture  
NGOs  Non-Governmental Organizations  
OFSP  Orange-Fleshed Sweet Potato  
TF  Technology Fund  
WIAD  Women in Agricultural Development

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I. ABSTRACT

GROW’s ultimate goal was to improve food security for 20,000 women farmers and their families in the Upper West Region of Ghana. Project activities centered around helping women improve the availability, access to and utilization of appropriate and nutritious foods. This paper uses a causal model to consider the pathways by which GROW impacted food security and nutrition. These pathways are not mutually exclusive but work together to strengthen the project towards better household food security and nutrition.

The paper finds that GROW increased food production by training on soy production, which steadily increased throughout the project lifecycle. The project also tackled seasonal food insecurity by focusing on dry season vegetable farming and training on keyhole gardens. Women used some of the resulting food for income, improving their ability to purchase better food, hygiene, technology or education for themselves and their children. Through GROW a variety of media, GROW provided care and nutrition education to further encourage these practices. The project held nutrition sensitization trainings for men in recognition of their role in household nutrition and food security and offered technology grants to women to reduce their time and energy burden in cultivating soy.

Compared to baseline, reported household food insecurity has decreased, with 14% of respondents reporting “often” or “sometimes” food insecure at endline in 2018, compared to 35% in 2012. The duration and severity of seasonal food insecurity has also decreased, with 90% of respondents reporting a state of food security for at least 9 months in 2018, compared only 4 months in 2012. Dietary diversity remained similar to endline, with 11 food groups consumed, and some indication of shifting towards more diverse foods. GROW’s success in improving food security can be attributed to its integration of food security and nutrition as cross cutting themes across its programming. The project not only empowered women economically but provided the education, enabling environment and resources necessary to allow continuous improvement in food security and nutrition after the project’s conclusion.

II. INTRODUCTION

A. About the GROW Project

Greater Rural Opportunities for Women (GROW) was made possible with the generous support of Global Affairs Canada and was implemented by Mennonite Economic Development Associates (MEDA) with a total budget of CAD 20 million.1 With support from five Key Facilitating Partners (KFPs) – PRONET North,

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1 The GROW budget of CAD 20 million was made up of CAD 18 million from the Government of Canada and CAD 2 million from MEDA. The project began in 2012 and closed at the end of 2018.
TUDRIDE, PRUDA, CARD and CAPECS\(^2\) – the GROW project operated in eight districts in the Upper West Region, empowering women farmers to create opportunities through cultivation, utilization and sale of soybeans, accessing extension services and markets to increase their household’s economic well-being.

GROW’s goal was to improve food security for 20,000 women farmers and their families in the Upper West Region of Ghana. Project activities included helping women improve the availability, access to and utilization of appropriate and nutritious food by strengthening production, processing and linkages to markets.

To achieve this, women Lead Farmers were identified to help train others in their communities on good agronomic practices to maximize crop yields, with a special focus on soybean cultivation. Entrepreneurial women farmers are trained and supported to become Sales Agents, buying and aggregating soy from other women and selling it to processors and markets. Women were linked to appropriate financial services, including Village Savings and Loan Association (VSLA) groups, financial institutions and insurance providers. Advocating for

\(^2\) MEDA’s KFPs are: CAPECS (Capacity Enhancement and Community Support), TUDRIDEP (Tumu Deanery Rural Integrated Development Program), CARD (Community Aid for Rural Development), ProNet (Professional Network North) and PRUDA (Partnerships for Rural Development Action).
women's increased agency, particularly as it related to decision-making within the household and community, was another key component of the GROW project.

During the 2017 harvest season, GROW supported 21,500 farmers to harvest 13,643 hectares of soybean, producing a yield of 14,632 metric tons. GROW farmers sold 11,169 tons of this soya at an average price of GHS 200 per 100kg, earning a total of over GHS 22.3 million, or approximately CAD 6.7 million (2017 harvest figures).³

The GROW Learning Series

Over seven years of implementation, the GROW project has learned a great deal about women’s economic empowerment and food security in northern Ghana. The project team is happy to share our lessons learned in the GROW Learning Series, a set of documents we are releasing in 2018. Topics include women’s economic empowerment, nutrition and food security, financial inclusion, women and technology and conservation agriculture.

B. Socioeconomic Overview

At project inception in 2012, malnutrition was the underlying cause in 55% of all deaths in children under the age of five in Ghana. Malnutrition is typically characterized by two indicators: the prevalence of stunting (chronic malnutrition; low height-for-age) and of wasting (acute malnutrition; low weight for height). These outcomes vary regionally. For example, in 2011, the prevalence of stunting was 29.5% nationally but amounted to 30.6% in the Upper West. The prevalence of wasting was also higher in the Upper West at 11%, compared to a 7.6% national average (Ghana Multiple Indicator Cluster Survey, 2011).

Beyond malnourishment, the Upper West region has the highest prevalence of food insecurity in all of Ghana (Ghana Ministry of Agriculture, 2009). Food insecurity embodies the idea that individuals may be deprived of food, not exclusively because it's unavailable in the market, but because their access to the food is constrained (explained further in section III.A.i)). Northern Ghanaians also

³ In 2017, the average exchange rate was 1 GHS (Ghanaian cedi) to 0.30 CAD (Canadian dollars).
suffer from seasonal insecurity in the “dry season” period before the rainy season when food production is limited.

Nutrition is also impacted by the early age of childbearing in Ghana. By the age of 19, 36.1% of adolescents had begun childbearing in 2014, an increase from 28.9% in 2008 (USAID 2018; GSS, GHS, and ICF International 2015). Relative to older mothers, adolescent girls risk becoming malnourished and giving birth to a baby with low birth weight (LBW). This is due to the fact that younger mothers may not reach optimal body size and may have inadequate nutrient stores before conception (Ramakrishnan, 2004). These women are both at a higher risk of dying from pregnancy or delivery related causes. For children born to these mothers, malnourishment in the womb and during the first two years of life can result in stunting, or low height for age. These children have a higher risk of illness and are more likely to die as children and in early childhood. Poorly nourished girls are more likely to be stunted as adults and giving birth to LBW babies, continuing the cycle (Figure 1).

Anemia, particularly in children under 5 years, is also a significant public health problem. Although rates of anemia have declined from 78% in 2008 to 66% in 2014, the rate is still far above the 40% WHO threshold for a severe public health concern (GSS, GHS, and ICF International 2015; de Benoist et al. 2008).

Women are generally responsible for selecting food purchased to complement staple foods and to balance the household’s diet. In Ghana, men control the granaries, but women are responsible for supplementing the grains in the family
diet, and therefore providing the bulk of the micronutrients (MEDA, 2012). Several other complementary factors are required to attain food and nutrition security. These include hygienic environments, access to health services, and access to family planning.

**C. Purpose of Intervention**

Within GROW there was a recognition that having access to food of sufficient quality did not automatically translate into good nutritional status for individuals. Nutrition was mainstreamed throughout project programming and women were placed at the center of this transformation. The role of women in food utilization is critical for food security, alongside the importance of their role in food production and how they spend the income they earn. Women are typically responsible for food preparation and, thus, are crucial to the dietary diversity of their households. The project postulated that through the successful cultivation of soybeans, a woman could improve the amount of food available to her family, improve the nutrition of her family’s diet (utilization), and through the sale of surplus beans, she could increase the family’s ability to purchase (access) food they need but could not produce.

The purpose of the food and nutrition security programming within GROW was to address the root causes of malnutrition through increased food production, women’s empowerment and improved agricultural practices. Specifically, the project sought to increase food security by providing appropriate services to assist women in improving family consumption of foods with high nutritional value, expanding food production to diversified food sources and increasing family income.

In doing so, the project:

- Established soybeans as an anchor crop and main vehicle by which by which women could
  - Improve their family’s nutritional intake
  - Decrease vulnerability to food price volatility
  - Develop practice of selling directly to markets and storing for price optimization
- Provided training and technical support to maximize nutrition of keyhole garden produce and dry season food production
- Educated women on appropriate care practices, feeding practices, exclusive breastfeeding and food utilization for under five children
- Diversified the food basket to include over 11 different nutritious foods into household consumption to include orange flesh sweet potato and moringa
- Provided women with time-saving technologies to reduce the time and labour burden that could be associated with soybean production.

The role of women in food utilization is critical for food security, alongside the importance of their role in food production and how they spend the income they earn. Women are typically responsible for food preparation and, thus, are crucial to the dietary diversity of their households.
III. METHODOLOGY

A. Summary of Design Concepts

This case study examines the dimensions of food security and nutrition and considers the key drivers of both that were addressed through the GROW project. It is important to note that GROW did not set out to address all drivers of food security and nutrition. This case study considers the project’s major outcomes as a lens in understanding the intended intervention points in addressing food and nutrition drivers.

i) Food Security Defined

Food security is defined as a state in which “all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (World Food Summit, 1996). The four dimensions of food security need to be addressed: availability, access, utilization and stability (FAO, 2006).

Within the context of the project, GROW was able to address several of these drivers, including food production (food availability), poverty/purchasing power, market infrastructure (access) as well as health and sanitation, care and feeding (utilization). GROW placed a specific emphasis on addressing seasonal food insecurity and improving production and utilization of food in the dry season (food stability). These are discussed further in section IV.

<table>
<thead>
<tr>
<th>AVAILABILITY</th>
<th>ACCESS</th>
<th>UTILIZATION</th>
<th>STABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>The availability of sufficient quantities of food of appropriate quality, supplied through domestic production or imports (including food aid).</td>
<td>Access to adequate resources for acquiring appropriate foods for a nutritious diet.</td>
<td>Utilization of food through adequate diet, clean water, sanitation and health care to reach a state of nutritional well-being where all physiological needs are met.</td>
<td>Access to adequate food at all times. Individuals should not risk losing access to food as a consequence of sudden shocks (e.g. an economic or climatic crisis) or cyclical events (e.g. seasonal food insecurity). The concept of stability can therefore refer to both the availability and access dimensions of food security.</td>
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Figure 2: Dimensions of Food Security (Adapted from FAO, 2006)
ii) Nutrition Defined

Nutrition is defined as the consumption of a wide range of foods that provide essentially needed nutrients to both function and develop optimally. Nutrition is driven by food access, care and feeding practices and health and sanitation. The adapted UNICEF framework (Figure 3) on the determinants of child nutrition highlights these drivers and within it, agriculture’s explicit and subtle links to nutrition. Cultivation of soybeans can affect food security by influencing food availability and access. The GROW project also influences women’s workload, decision-making power, income, and time, which consequently affect their ability to care for children or for themselves, especially while pregnant. GROW focused heavily on empowering women with nutrition knowledge and reinforcing care practices to improve nutrition. Lastly, cultivation of soy or other crops can affect health and the environment in which a child develops by exposing them to agrochemicals and diseases influenced by agronomic practices. Agriculture may also influence the basic causes of malnutrition including environmental resources and poverty. These are discussed further in section IV.

**Figure 3:** Determinants of Nutrition  
Adapted from Herforth & Harris, 2012, UNICEF, 1990
B. Method of Measuring Results

Project documentation, including annual reports, workplans, project proposal and supplementary documents were considered. While the endline analysis was not complete at the time of this review, baseline and midterm evaluations were included in the analysis. GROW management staff in Canada and Ghana and GROW nutrition staff in Ghana were interviewed to provide additional perspective. These individuals were offered an opportunity to review this case study for consistency.

Following this review, relevant nutrition and food security results, stories and documents pertaining to food security and nutrition were recorded and categorized thematically by driver of food and nutrition security. These were then mapped out as a causal diagram, describing the various pathways GROW used to impact nutrition ultimately, but with each driver also as a standalone outcome.

IV. GROW’S FOOD SECURITY AND NUTRITION MODEL

GROW used a multifaceted, but harmonized approach to address food and nutrition security that expanded over the course of the project and adapted to its clients. Figure 4 combines agricultural approaches to address food security with the determinants of nutrition programming (adapted from Gillespie et al, 2012). Through this lens, the figure illustrates the drivers of food and nutrition security addressed through GROW’s programming, describing how each factor interconnects to promote overall nutrition, and how each is an important outcome itself.

The model highlights seven main pathways by which agriculture can affect nutrition (Gillespie et al., 2012), including:

1. agriculture as a source of food,
2. agriculture as a source of income,
3. the link between agricultural policy and food prices (supply and demand factors),
4. income derived from agriculture and how it is spent (education and health, for example),
5. women’s socioeconomic status and their ability to influence household decision making,
6. women’s ability to manage the care, feeding and health of young children, and
7. women’s own nutritional status.
The darker orange boxes represent areas in which GROW had direct impact. The lighter shaded boxes were areas indirectly affected by GROW programming. The blue boxes represent outcomes at national as well as mother and child levels outcomes. Each pathway is elaborated in the section below.

### A. Women’s Empowerment/Women’s Energy Expenditure

In GROW, women’s empowerment was an overarching theme necessary for all the pathways to be successful. Improvements in household food supply or income can mean little if women do not have the autonomy to make decisions about where these resulting resources are allocated. Evidence suggests that empowering women improves not only their nutrition, but that of their children and of other household members. Some studies have found that women’s discretionary income has greater impact on child nutrition and food security than men’s (United Nations Children’s Fund 2011; Smith et al. 2003 as cited in Spring, 2014). Evidence also suggests that for those agriculture interventions that have improved nutrition, women’s active involvement was a consistent factor (Ruel and Alderman 2013, as cited in Spring 2014).

In addition to its contribution to the other pathways, in GROW, women’s empowerment affected three unique pathways of nutrition: (a) the ability of women to care for themselves and their families, (b) women’s own energy expenditure in taking part in agricultural activities, and (c) women’s use of income.
for food and non-food expenditures. GROW also recognized that agricultural interventions must also be considerate of negative impacts. While improvements in income can allow for the purchase of better food, medicine or hygiene, excessive demand for women's time in the field can have consequences. Women are often responsible for many household and agricultural tasks, including infant and child care and feeding, as well as their own health and energy expenditure. GROW considered how agricultural responsibilities affected women's time and energy. This is especially important for pregnant women and those with young children as a mother's health during pregnancy and a child's first 1,000 days of development (from gestation to two years) are critical for both.

**Care Practice Instruction through Grow Mother Facilitators and Master Trainers**

GROW considered both care and feeding practices from project inception, ensuring that women were equipped with the skills and education to care for themselves and their families. In 2015, GROW piloted a concept called “GROW Mother Facilitators” (GMF) whereby women were trained by Ghana Health Services (GHS) on infant and young child feeding (IYCF) and nutrition counseling (care of moderately malnourished children, preparation of complementary food).

The pilot yielded positive results and GROW Mother Facilitators, Field Officers and the Ghana Health Services have continued to play a key role in promoting good nutrition behaviours among beneficiaries. These behaviours include exclusive breastfeeding, appropriate complementary feeding, handwashing, care of malnourished children and consumption of vegetables. A nutrition training manual was prepared in GROW’s Year 3 and has been used since by GMF and Lead Farmers as they pass this information on to their farmer groups.

In addition to the GMFs in nutrition counseling, GROW’s strategy has been to make the soy utilization skills, nutritious food groups, food safety and food hygiene more accessible. As a result, Master Trainers (resource Lead Farmers) were used to provide capacity building to new Lead Farmers.
Care Practice Education through Counseling Cards

The GROW counselling cards have also been instrumental in maintaining good nutrition habits across beneficiary households. The counselling cards were designed with key nutrition messages to promote behavior change among GROW groups and their families. Apart from its use at the group level, women rotated the cards among themselves so that multiple families benefit from their use. Women also indicated that the counselling cards helped them to explain specific behaviors (antenatal care, exclusive breastfeeding, hand washing, among others) to household members. To date, 598 groups have counselling cards.

Care Practice Education through Talking Books

The Talking Book, a battery powered device which plays pre-recorded messages on a range of topics, was also another valuable extension tool used to promote adoption and maintenance of good care and nutrition practices. New messages were drafted throughout the project lifecycle and uploaded quarterly onto the device to create awareness on important actions. As a result, over the years more women practiced exclusive breastfeeding, families consumed iodised salt, vegetables were washed before cutting and through food demonstrations, many more families varied their meals.

Women’s Time and Energy Expenditure

GROW also recognized that clients faced challenges that contributed to women’s increased time and labour in the field. For example, women practiced threshing soya manually which caused them to lose a portion of their product. They also received lower prices for their crop as they often could not remove enough rocks and debris from the soybeans with manual threshing. Further, water shortages, especially during the dry season, caused them to spend hours every day collecting and carrying water for their gardens.

To tackle these issues, GROW piloted the introduction of technologies that would could reduce time and burden for women soya farmers. Kickstart Irrigation Pumps and Personal Protective Equipment were piloted in years 4 and 5 of the project, respectively. Positive response from both prompted GROW to expand its offerings in 2017 by introducing a Technology Fund (TF) to allow women to benefit from equipment they otherwise would not be able to afford. The fund allowed these women the flexibility to select the technologies that will benefit them most, thus increasing their agricultural efficiency. Examples of these technologies are described in Appendix 1.
On the demand side, GROW facilitated increased usage of technology by stimulating demand and linking women to vendors. Even with increased supply, the technologies were expensive for the women farmers, many of whom would be unable to purchase even a single item of technology without financial support. As a result, coupons were distributed to women to cover a portion of the cost, which they would have to ‘match’ – their portion of the cost. Women would take these coupons to the vendor and redeem them for the technology.

**Supporting Women’s Decision Making — Men’s Nutrition-Sensitization Training**

In 2018, GROW conducted a sensitization training among GROW households on the role of men in family health and nutrition. The rationale for this activity stemmed from the fact over 65% of a woman’s income goes into household nutrition, compared to less than 35% of a man’s income. While the meal’s preparation is at the discretion of the woman, the main staple on which the meal is built is determined by the man. After men have provide women with the carbohydrate staples it is left on the woman to complete this meal. As such, men can indirectly limit their family to only one staple if that is only what he has cultivated that year (i.e. if he is a maize farmer) and the family cannot afford to purchase diverse staples. Often, women are not able to provide nutritious meals for their families throughout the year because the other ingredients of the meal are the most expensive. In GROW, women were trained on utilization of some nutritious crops, and were able to use this knowledge to provide some good nutrition for their families. However, the project recognized the need to sensitize men on the important role they need to play in family nutrition and support women in completing family meals.

In total, 416 men and their wives were sensitized on the nutritional value of the different food groups and the amount of participation they each have within the household. The sessions helped the participants increase their skill set with the introduction of new activities, like the use of a household meal preparation scenario to solicit reactions from male household members to their own contributions to a nutritious meal, compared to their spouses’. Husbands who previously thought they were “good” providers with one bowl of maize,
soon learned that their contribution was paltry compared to what their wives contributed to a nutritious meal (oil, tomatoes, maggi, dried fish, salt, pepper, onion, garlic, vegetables, green leaves or meat). Many of the men were embarrassed by their lack of understanding the true costs of a meal, leading some to start contributing more to household duties, from bathing children to sweeping the compounds.

The training also created awareness on the effects of chronic malnutrition and continued to sensitize GROW families on the health benefits of continuous utilization of soybeans in household meals. Feedback from the training suggested that men now support their wives with housekeeping money in addition to foodstuffs. This money is used for grinding of raw food and for the purchase of additional ingredients to supplement the families’ intake.

**Encouraging Nutrient Intake / Dietary Diversity**

Since its inception, GROW has continually sensitized women on the benefits of dietary diversity and how best to combine foods for optimum health and nutrition. More recently, trainings have expanded to include OFSP and moringa, the latter of which can be grown in the dry season, provided there is a water source. As of 2017, 475 groups received training on soya, OFSP and moringa utilization to promote dietary diversity among GROW families. At the endline evaluation in 2017, 86.53% of respondents were consuming pulses/legumes, 88.22% were consuming vegetables and 73% roots and tubers.

**GROW Soy Recipe Book**
With support from WIAD and GHS, a recipe book was designed containing 29 soya-based local dishes. This book shows a step-by-step guide for each dish that can be easily understood and followed. The has been a participatory process wherein caterers of the Ghana School Feeding Program (GSFP) and other restaurants who participated in GROW’s soya and OFSP utilization trainings contributed recipes to the book.

Copies of the book were shared to all KFP field staff to support them in the field. GROW also saw the soybean recipe book as an opportunity to increase local demand for soybeans in the region. Caterers of the GSFP and restaurants who participated in our utilization training were also given copies of the book as a reference material. In total, 600 copies of the book were printed for all KFP field staff and caterers.

**B. Food Production**

Increased food production is one of the most intuitive ways to improve food security and nutrition. More food in the market can often translate to more food in the household, improving food access and stability throughout the lean season. However, depending on the perceived or actual value of what is grown, some or all of the production could be used for income, especially in the case of cash crops. Moreover, depending on the gender roles and cultural practices around food production and income, improved food production and income may not always not end up in the hands of women’s decision making or influence.

By focusing on women and soy (considered a “gender neutral crop” at the time of project inception), GROW was able to promote improved production of a nutritious crop for household consumption and sale. Women were asked to plant a one-acre plot of soy, which yielded an average 400kg. Women were asked to keep 100kg of soy for the lean season and sell the remaining soy to increase their economic status. This dual approach of primarily ensuring food security at the household level before economic gain was important. Women who grew soy could supplement their diet throughout the year with their soy. Through Key Facilitating Partners (KFPs), GROW held regular soy utilization trainings that resulted in an improved understanding of the benefits of soy.

Beyond soybean production, GROW addressed seasonal food insecurity by considering what crops could be grown in the dry season and by using keyhole garden technology. Moringa and orange fleshed sweet potato received special consideration due to their nutrition content, and moringa in particular for its tolerance to drought conditions.

**Soybean Cultivation for Home Consumption**
Since project inception, soybean is now regarded as a staple in GROW communities with 97% of farmers and their families consuming soy harvested from their farms. On average, one bag (100kg) of soy is reserved for household consumption for an all year supply of good quality protein. Every year, GROW has managed to increase land under soybean cultivation (Figure 5). By September 2018, GROW women had cultivated about 42,244 acres (approx. 17,095 hectares), compared to 33,688 acres (13,679 hectares) in 2017, an incredible 25% increase in land. Soybean cultivation allows women to supplement their family’s diet with a complete protein source, either in its whole form, or processed at home into milk, yogurt or kebabs.

**Figure 5: Area of Soya Cultivated throughout the Duration of the GROW Project (acres)**

![Figure 5: Area of Soya Cultivated throughout the Duration of the GROW Project (acres)](image)

**Dry Season Vegetable Farming**

The Upper West region of Ghana has pronounced seasonal food insecurity during the dry season. From the outset, GROW programming promoted dry season vegetable farming to improve the sustained availability of food, especially among GROW women living near bodies of water such as dams. By the end of...
2017, 21% of GROW farmers participated in dry season vegetable cultivation. This represents 16.67% increase over the baseline, resulting in an increase in vegetable availability and consumption. GROW surveys indicated that 83.6% of women and their families consume vegetables all year round, thereby increasing their micronutrient intake. Traditional dry season vegetable production includes: tomatoes, pepper, bean leaves, pumpkin, okra, ayoyo, onion, lettuce and cabbage, among others. In more recent years, women farmers who have previously cultivated vegetables are now moving into higher value vegetables such as onions, okra, tomatoes and pepper. The vegetables are often sold in the village and urban markets while some of the green leafy vegetables (beans and pumpkins) are consumed at home. Many more women expressed interest in vegetable production in the dry season but were constrained with limited sources of water to sustain their production. Of these vegetable yields, part is sold both in rural and urban market while the rest is kept for household consumption. In Bullu, Jawia and Pulima, 150 women produced and sold dry season onions to the Tumu and Gwollo (higher income) markets, as well as supplying the Tumu Training College. On average, these women earned an income of GHS110.00 (~CAD 30) per month from these sales. The income from these sales may support purchase of more or higher quality foods, or non-food expenditures that maintain healthy practices.

**Keyhole Gardens**

After the successful pilot of the keyhole garden carried out in 3 communities in 2014, a scale-up of the pilot took place. Due to their construction, keyhole gardens utilize less water (even using kitchen waste water) than traditional farming. This is especially important for women to produce vegetables in the dry season, who do not have access to large bodies of water to attempt any large-scale dry season gardening. After receiving the training, 70 keyhole gardens were constructed in 2015 and another 308 were constructed 2016 in different GROW

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communities. By 2017, 2,486 women had adopted keyhole gardens. The gardens allow women to produce vegetables such as pumpkin, garden eggs, pepper, tomatoes and beans leaves. Although most women use these vegetables for household consumption some have seen the business opportunity in marketing their keyhole garden vegetables.

**Moringa and Orange Fleshted Sweet Potato**

GROW continues to promote the cultivation and utilization of moringa and orange fleshted sweet potato among women farmers. Moringa is a source of protein, as well as being high in vitamins A, B6 and C, iron and riboflavin. All the plant can be consumed (stems, leaves and pods) and it can be cultivated year-round and in dry environments. After being trained on the health benefits of moringa, there was a rising interest among women to preserve existing trees and plant new ones for household consumption. In 2018, 20,659 farmers reported having knowledge on the health benefits of moringa, compared to 16,755 farmers in 2017 (a 23% increase). Of these, 17,902 women (87%) reported moringa consumption, particularly pregnant and lactating women, to improve the nutritional status of their children and to increase breastmilk supply. Moringa is prepared at the household level as soups and stews and on market days, it is popularly sold with bean cakes or koose.

Orange fleshted sweet potato (OFSP) was introduced in some GROW communities to provide additional nutrition for the family, especially for its vitamin A content. Step-down trainings (from KFPs, to Lead Farmers, to GROW clients) resulted in participants developing 8 new recipes that could be easily adapted by GROW clients with minimal change to the dishes to which they were accustomed. The training stressed OFSP utilization, the importance of micro-nutrients and examples of foods that could be combined to be good sources of Vitamin A, iron and iodine.

**C. Agricultural Income/Food Processing**

Since inception, GROW has been deliberate to orient the food security strategy away from subsistence farming to economic empowerment for women who grow soy. The project operated under the premise that while food production can support the household food supply, entrepreneurial women have always found ways to sell a portion of their crop to gain additional income. GROW trainings focused on empowering women economically through sale of raw soy and processed foods, especially in the dry season. This can be equally important for food security and nutrition as the sale of food can enable women to buy other...
nutritious foods, medicine or sanitation technologies. Additional income can also purchase time-saving technologies that enable women to spend less time and energy on field tasks, and more time on care practices.

At project midterm (2015), the average annual income of women farmers from all sources (personal farm, stored farm produce, and remittances and other income-generating activities or IGAs) was GHS 1,083 (CAD 294) compared to GHS 538 (CAD 146) at baseline. Women’s decision-making contributions have also increased: 88% of women farmers now contribute to family farm decisions compared to 72% in 2012, and 94.1% agree and strongly agree they contribute to decisions made about their personal farm.

**Soy Processing**

One example soy was processed in GROW was through the use of the SoyaKit; a technology that allows women to make soymilk or yogurt at home for consumption or sale. The kit enables production of 7 L/hr of soymilk or yoghurt without necessitating running water or electricity. The kit also uses heat-retention cooking to greatly reduce fuel cost and smoke. As of 2017, 11 women have acquired SoyaKits for business and household soy utilisation. On average, these women made a profit of GHS 58 (CAD 15.75) daily from the sale of soy milk using
2 bowls of soya and the SoyaKit. This is a considerable sum, considering that the average Ghanaian earns GHS 9.68 (CAD 2.63) per day.\(^5\)

The availability of soya grinders has also enabled women to increase their processed products and make soy flour and kebabs readily available for use. In 2017, 103 women were engaged in year-round soy processing, supplying children with kebabs and soymilk through schools.

**Soy Utilization Trainings**

Soy utilization trainings have also resulted in creating income opportunities for GROW clients, especially in the dry season. GROW collaborated with Ghana Health Services, Women in Agricultural Development (WIAD) and the Ghana School Feeding Programme – a World Food Programme initiative – to train caterers and matrons of beneficiary schools in the region on soybean utilization. These women were educated on food hygiene, basic personal hygiene, childhood nutrition and the concept of balanced diet. Practical training was carried out on soybean processing for meal preparation and how to incorporate processed soybean flour into any meal. The aim was to improve the nutritional status of under 5 who are school-going age and spend a greater part of their day in school.

By 2018, 146 caterers and 130 health teachers were equipped with soy utilization skills in order to be able to train the women farmers. Some farmers sold soy kebabs (tofu), ‘koose’ (soybean cake), soymilk or ‘tombrown’ (roasted maize and soybean flour used for porridge—especially liked by children) to supplement their earnings from their farms. GROW makes these trainings open to all community members, to create an enabling environment to promote and sustain behavior change.

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\(^5\) [https://mywage.org/ghana/home/salary/minimum-wages](https://mywage.org/ghana/home/salary/minimum-wages)
V. RESULTS AND DISCUSSION

GROW evaluated its impact at baseline and endline using a sample of 419 GROW women farmers in 2012 and 2,034 in 2018. Three indicators were employed to measure the project’s overarching impact on food security and nutrition:

**Household Food Insecurity:** *the number of clients who expressed that they were worried about access to food in the last 4 weeks*

Reported household food security is both a food security and nutrition indicator that underscores a family’s ability to acquire food. Generally, food security improved for the GROW clients surveyed. Fewer respondents at endline, a combined 14%, reported being “often” or “sometimes” food insecure, compared to 35% in 2012. More importantly, more respondents reported being “rarely” or “never” food insecure, a combined 86% in 2017 rather than 65% in 2012.

![Reported Household Food Insecurity 2012 and 2018](image-url)
**Seasonal Food Security:** the number of clients who had enough food to meet their needs in any given month

Seasonal food security measured the project’s ability to tackle food shortages in the lean season. Results from both 2012 (baseline) and 2018 (endline) show incidence of seasonal food insecurity in June-August. However, the duration and severity of acute food shortage has reduced considerably. Results from 2018 show a smoothing of food security wherein the lean season is delayed, beginning in June/July rather than in May. For 9 months of the year in 2017-2018, 90% of women were food secure, an improvement from 4 months in 2012. In the final growing season, at least 70% of women were food secure throughout the year. This is compared to 2012 where only 36% of women were food security throughout the lean season.

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**Percentage of Food Secure Women, By Month**

2012 and 2018

- **Dry Season**
  - April: 84%
  - May: 41%
  - June: 36%

- **Growing Season**
  - July: 54%
  - August: 68%
  - September: 82%
  - October: 89%
  - November: 97%
  - December: 97%
  - January: 97%
  - February: 99%
  - March: 93%

- **Harvest Season**
  - April: 96%
  - May: 90%
  - June: 72%
  - July: 71%
  - August: 97%
  - September: 99%
  - October: 100%
  - November: 99%
  - December: 99%
  - January: 99%
  - February: 99%
  - March: 93%

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![Line graph showing percentage of food secure women by month for 2012 and 2018. The graph compares the dry season, growing season, and harvest season percentages.](image-url)
Dietary Diversity: the number of food groups clients reported consuming in the past two days

Dietary diversity is a qualitative measure of food consumption, and a proxy nutrition indicator, that reflects household access to variety of foods. Compared to baseline, women consumed more pulses, legumes and nuts, like soya bean in 2018 than previously. In 2012, the median number of foods consumed was five or six groups. In 2018, the median number of foods consumed rose to 7 groups.

By leveraging food production, income from agriculture and women’s empowerment, and reinforcing these with utilization trainings, GROW was able to influence regional and household food security and nutrition for its clients. The success of the project in addressing food security and nutrition stems from its careful design and intentional and consistent consideration of its client needs. These strengths can be summarized as follows:6

i) Incorporation of explicit food security and nutrition objectives and indicators across its design.

GROW’s ultimate outcome was to improve food security for smallholder farmers, particularly women in the Upper West Region of Ghana. From the outset, GROW

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6 Adapted from, “Key recommendations for improving nutrition through agriculture and food systems.” These recommendations have been formulated following an extensive review of available guidance on agriculture programming for nutrition, conducted by FAO (see: http://www.fao.org/docrep/017/aq194e/aq194e00.htm), and through consultation with a broad range of partners (CSOs, NGOs, government staff, donors, UN agencies) in particular through the Ag2Nut Community of Practice.
focused not only on the production of soy and income from soy, but considered how a woman could better feed her family, how her income could purchase better quality foods, health care or time-saving technologies. The project did not satisfy itself with improvements in livelihood alone, but throughout its programming linked back to food security and nutrition. This emphasis guided the direction of the project and ensured food security was not a standalone pillar of the project, but instead a cross-cutting theme.

ii) Sensitivity to root causes of food insecurity and malnutrition

GROW recognized that food insecurity is multifaceted, and therefore tackling it would also need to incorporate several approaches. For example, the project recognized that food insecurity in the Upper West was seasonal and therefore made dry-season farming and revenue generation a priority. Keyhole gardens and moringa cultivation, as examples, were introduced to alleviate some of these seasonal impacts. The project also recognized that food utilization, hygiene and infant and young child feeding as critical areas to improve nutrition. The project provided care practice training, recipe books, and cooking demonstrations as resources for women to improve household feeding. The project also tracked women's decision making, understanding that intra-household spending contributed to nutrition. It trained men on the importance of spending income on nutritious foods to round out women's efforts in providing healthy meals for the family.

iii) Facilitation of increased production of nutrient-dense crops, processing and storage

Diversified production systems are important to enable resilience to climate and price shocks. GROW introduced women farmers not only to soy, but to OFSP, moringa and dry-season vegetable farming to provide improved household nutrition and food security. GROW's focus on processing, storage and preservation extended soy products to wider market (i.e. schools), helped to retain nutritional value and shelf-life.

iv) Women's empowerment

Women's empowerment underscores all of GROW's activities. The project ensured that women farmers had access to information, resources, income opportunities, markets, extension services and credit. Through this, women were equipped with the tools and resources to build profitable soy enterprises. GROW ensured that women were provided with training and resources to support proper feeding and care practices. Combined, these allowed GROW women to couple increased incomes with better quality foods, medicines or living conditions for their families. GROW was considerate of women's time and labour, providing a Technology Fund that would allow women to improve efficiency of their operations, gaining better
incomes or relieving them of field activities to complete other tasks. Lastly, the project tackled household decision making, sensitizing men to their role in food security and reinforcing women’s role in deciding the health and welfare of their families.

VI. CONCLUSION

Agricultural investments alone do not always improve food security. GROW represented a project that understood the root causes of food security and nutrition and by empowering women, these could be improved measurably. All of the project’s major outcome indicators; food access, seasonal food insecurity and dietary diversity show marked improvement over the project’s lifecycle.

GROW improved food access, not only through soya production, but through dry season farming, moringa and OFSP cultivation. Income from the sale of these foods in their raw form, and in processed form, allowed women to purchase better quality foods and other items for their families. GROW also empowered women and was considerate of their time and energy expenditure. The project provided resources to improve antenatal care, feeding and hygiene practices. The project also tackled male participation in the household by and sensitized men on becoming more responsible for household food spending. Lastly, the project provided women with productive and time saving technologies to improve their efficiency and profits.

The landscape for soy production changed significantly throughout the project lifecycle and will continue to change after project end. While these economic and cultural effects are outside of the project’s control, GROW has maintained a steady mission provide women with the tools and skills to succeed in maintaining household food security and nutrition.
VII. REFERENCES


## APPENDIX 1

Technologies available to GROW women farmers through the Technology Fund.

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<thead>
<tr>
<th>Agricultural Stage</th>
<th>Technologies</th>
<th>Impact</th>
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| **Land preparation** | **Personal Protective Equipment (PPE):** GROW promotes safe and effective use of agro-chemicals by ensuring the adoption of personal protective equipment during chemical application. A package of seven items increases personal safety when handling, mixing or applying agrochemicals: helmet, mask, goggles, gloves, overalls, boots and a knapsack sprayer. PPE helps GROW women farmers to practice minimal or zero tillage by simply spraying their fields to control weed before planting, rather than using tractors or other mechanized forms of tilling. PPE is used at multiple points in the soy growth cycle to control weeds and apply fertilizers. GROW farmers were taught to apply and handle agrochemicals effectively. **Chain link fencing package** encloses cultivated land, usually keyhole or kitchen gardens, protecting the crop from animals. This allows GROW woman to maintain gardens year-round, including during the dry season, when soy does not grow. | • Minimal soil disturbance  
• Weed control  
• Personal protection  
• Protects gardens from grazing animals |
| **Planting** | **Planter:** Traditionally, planting is done by hand, with farmers scattering seeds randomly. GROW farmers are taught Good Agricultural Practices (GAPs), which increase yield by planting soy is planted in regularly spaced rows. The narrower and more even the rows, the more quickly the growing soy shades the ground, preventing some weeds from germinating. Using narrow rows also preserves soil moisture and keeps the ground cooler during the day, improving plant health. The planter automatically spaces seeds in rows for optimum plant population and maximum yield. | • Maximum plant population  
• Easy row planting  
• Reduces need for weed killer and other chemicals |
| **Growing** | **Irrigation pump:** Allow women farmers to water their plants during the dry season. The foot-operated pumps are easy to install and maintain. | • More regular watering than with manual process  
• Reduces time required to fetch water |

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1 From an internal GROW report written by Angela Dee, a US-based soy farmer who visited GROW in July 2017 and advised on good agronomic practices for boosting yield.
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| Post-harvest Processing  | **Thresher:** Soy threshing is by far the most difficult task in the soya production business. Due to the huge capital requirement in acquiring the thresher, men were also allowed to buy at the same subsidised price on condition that they would use it to thresh for the GROW women.  
**Tarpaulin:** Soy is spread on the ground to dry, but foreign matter such as rocks and twigs get mixed in with the soy. Tarpaulins allow the soy to be spread for drying, without accumulating debris. This helps to minimize post-harvest losses and saves time. | • Minimal post-harvest losses  
• Cleaner beans  
• More time-efficient |
| Utilization              | **Soya kit:** Helps turn soya into milk and yoghurt through a less time consuming and more hygienic process.  
**Soya grinder:** Allows soy milling at home. Otherwise, women must go to community mills where operators do not prioritize soy, forcing women to wait until other crops have been milled.  
Both technologies enhance the utilization of soya, both at the household level and in soya food business. This has a direct impact on the nutrition and income levels of these women and their households. | • Fresh soya products/foods  
• Increases revenue streams for women  
• Hygienic  
• Increased nutritional impact on households |
| Marketing (Women Sales Agents only) | **Motorized tricycle and donkey cart:** These are technologies available to Women Sales Agents (WSAs), aimed at making their aggregation/marketing business more effective. Before the introduction of this package, the biggest challenge facing WSAs was transportation. They relied heavily on unpredictable public transport which sometimes left them stranded.  
**Weighing scale:** Helps women market soya by weight instead of volume, a more consistent measurement, and one that is more commonly used by large-scale processors. | • Reliable and available means of transport  
• Gives women more control over their business and time |
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