

Land Husbandry, Water Harvesting and Hillside Irrigation (LWH) Project

Phase 1C Baseline Household Survey Report

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LWH Project,
Development Impact Evaluation (DIME) &
Global Agriculture and Food Security Program (GAFSP)

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Acronyms and Abbreviations

CIDA	Canadian International Development Agency
DIME	Development Impact Evaluation Initiative
FANTA	Food and Nutrition Technical Assistance Project (FANTA)
FAO	Food and Agriculture Organization
GAFSP	Global Agriculture and Food Security Program
GOR	Government of Rwanda
HHS	Household Hunger Scale
IDA	International Development Association
LWH	Land Husbandry, Water Harvesting & Hillside Irrigation
MAHFP	Months of Adequate Household Food Provisioning
MINAGRI	Ministry of Agriculture and Animal Resources
SHG	Self-help Group
USAID	United States International Development Agency
WDDS	Women’s Dietary Diversity Score

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Concept Note

1. Background

The agricultural sector is a key driver of economic growth and poverty reduction in Rwanda. Agriculture accounts for 39% of GDP, and 80% of employment.¹ Rwanda's hilly geography and high population present significant challenges for agricultural development. Agricultural growth requires intensification; however, as 90% of arable land is found on hillsides, intensification must be accompanied by good land husbandry practices to avoid erosion and maintain soil quality.²

The government of Rwanda designed and developed the Land Husbandry, Water Harvesting and Hillside Irrigation Project (LWH) to address the critical agenda of hillside intensification. Financed by IDA, USAID, CIDA, and GAFSP, the LWH project is a flagship program in the Government's overall poverty reduction and agricultural strategies, both for the agricultural sector and for the country as a whole. It is a key element of the GoR's Economic Development and Poverty Reduction Strategy (EDPRS), addressing the strategic outcome of raising agricultural productivity, and is fully aligned with the key EDPRS indicators of increasing land sustainably managed against soil erosion and raising exports.

LWH uses a modified watershed approach to introduce sustainable land husbandry measures for hillside agriculture on selected sites, and develops hillside irrigation for sub-sections of each site. It is designed to address some of the key constraints to agricultural growth in Rwanda: the need for larger scale, community-based infrastructure approaches rather than household level interventions; and, the need for strong farmer mobilization, education and support alongside these investments.

The project has three components: (a) Capacity Development and Institutional Strengthening for Hillside Development, which aims to develop the capacity of individuals and institutions for improved hillside land husbandry, stronger agricultural value chains, and expanded access to finance; (b) Infrastructure for Hillside Intensification, which provides the essential hardware for hillside intensification to accompany the capacity development of the first component; and (c) Implementation through Ministry of Agriculture and Animal Resources (MINAGRI's) SWAp structure, which aims to ensure that project activities are effectively managed within the government program.³

LWH is being rolled out in three phases: implementation in the four Phase 1A sites began in 2010, in the three Phase 1B sites in 2012, and in the Phase 1C sites in late 2013.

Impact Evaluation of LWH

The GAFSP Steering Committee is supporting impact evaluation of its public sector investment portfolio to "foster learning and accountable and effective aid."⁴ The Steering Committee has contracted the World Bank's Development Impact Evaluation

¹ LWH Project Appraisal Document

² LWH Project Appraisal Document

³ Rwanda GAFSP LWH Project Paper

⁴ "Impact Evaluation for GAFSP Financed Investment Projects",
http://www.gafspfund.org/sites/gafspfund.org/files/Documents/DIME_TOR.pdf

Initiative (DIME) to carry out rigorous impact evaluations of GAFSP investments in selected countries, including Rwanda.

DIME has worked closely with the LWH team to design a rigorous impact evaluation to measure the overall impact of the project on GAFSP core outcomes such as agricultural productivity, household income, and food consumption. This will be done through comparison of LWH Phase 1B and Phase 1C sites with control sites selected using pairwise matching. In addition, DIME has designed specific impact evaluation studies for the sub-components of LWH related to rural finance and provision of extension, identified by the Rwandan Ministry of Agriculture (MINAGRI) as priority areas for real-time learning. In rural finance, LWH will evaluate innovative savings products introduced to increase saving for agricultural inputs. For extension, LWH will test the effectiveness of different types of feedback mechanisms (phone calls, individual report cards, and group report cards) to monitor the quality of private extension services.⁵

2. Phase 1C Baseline Household Survey

From May-June 2014 the survey firm Laterite conducted the baseline household survey in the LWH Phase 1C sites, with technical assistance from DIME and the LWH project. This report presents the main findings from that household survey.

2.1 Data Collection

The Baseline Household Survey used a multi-module questionnaire, with a specific focus on agricultural production, access to agricultural extension services, rural finance, and food security. In addition, the questionnaire contains modules on housing, labor, and household assets. The full questionnaire is attached as Annex 1.

Fieldwork occurred during the month of June 2014. The field team included 15 enumerators and 2 field managers. All data was collected electronically on tablet computers using Open Data Kit/SurveyCTO.

2.2 Sample

The LWH Project works at a site level (the valley and surrounding hills chosen for the intervention). Table 1 shows the sample of this baseline survey by Site and Site Location. The LWH project implements different activities at different areas within the site: the Command Area, Command Area Catchment, and Water Catchment areas. Because Phase 1C site Gicumbi is only receiving land husbandry interventions, the sample was taken only from the Water Catchment area of the site. At Muyanza site, the full portfolio of LWH interventions will be implemented, as reflected in the sampling across the different areas.

⁵ For more details on the impact evaluation design, refer to the “Land Husbandry, Water Harvesting, and Hillside Irrigation (LWH) Project: Impact Evaluation Concept Note”, attached as Appendix 2.

Table 1: Sample by Site, Treatment, and Site Location

	Muyanza (Treatment)	Cyonyonyo (Control)	Gicumbi (Treatment)	Nyamuziga (Control)
Command Area	49	51	0	0
Command Area Catchment	51	50	0	0
Water Catchment Area	51	47	100	101
Total	151	148	100	101

2.3 Control Sites

The impact evaluation will calculate the overall impact of the LWH project, using as comparison groups similar pre-identified sites that will not receive LWH project activities. The main identifying assumption is that the only difference between the pre-identified sites receiving LWH and those that do not is the project itself.

Comparison sites were selected using pair-wise matching, from a list of sites considered eligible for the LWH project but will not receive the project. Extensive data was recorded for the sites considered eligible for the project, including data on geography, weather and land use patterns, making the identification of such matching sites possible.

Data from this baseline survey shows the treatment sites and the selected controls are similar at baseline on a number of observable characteristic, found in **Error! Reference source not found.**

Note: The remainder of the report presents data from the two treatment sites only.

Table 2: Comparison of Treatment and Control Sites

Comparison of Treatment and Control Sites									
	N (Treat)	N (Control)	Total N	Treat Mean	Treat SD	Control Mean	Control SD	Diff in Means	P Value
Female Headed HH	251	249	500	.33	0.51	0.36	0.51	-0.03	0.57
HH Head Completed Primary School	251	249	500	0.04	0.30	0.02	0.30	0.02	0.54
HH Owns a Cow	251	249	500	0.25	0.74	0.28	0.74	-0.03	0.73
HH Agricultural Income	251	249	500	33310	122572	36481	121922	-3171	0.80
Gross Yield of HH Farm	251	249	500	853399	1185719	736036	1185719	117362	0.38

3.3 Results Framework Indicators

The key indicators identified in the LWH Project Results Framework are listed in by site in Table 3. The technology indicators are defined as the proportion of HHs using any one technology in each of the three 'baskets' (Soil Fertility Management, Soil Erosion Control, Productivity Enhancing). Use of soil fertility management technologies is low at both sites. 64% of households in Muyanza site and 45% of households in Gicumbi site have a formal bank account. The number is particularly low for female headed households in Gicumbi – only 29% of these households have a formal bank account. Baseline food consumption scores show about 80% of the sample to have acceptable food consumption. Again, female-headed households in Gicumbi are particularly lower, with only 57% of households there scoring in the acceptable range and many more (40%) at the border. It is important to note that the food consumption scores are likely an overestimation of the baseline situation, as the data was collected after the LWH project had already begun in certain portions of the site and the recollection period for this indicator is the week prior to the survey.

Table 3: Results Framework Indicators

	Male-Headed	Female-Headed	Total
<u>Muyanza Site</u>			
Used Soil Fertility Management Technology	48%	26%	41%
Used Soil Erosion Control/Terracing Technology	80%	79%	79%
Used Productivity Enhancing Technology	53%	53%	53%
HH Has Formal Bank Account	67%	55%	64%
Poor Food Consumption Score	4%	4%	4%
Borderline Food Consumption Score	15%	9%	13%
Acceptable Food Consumption Score	81%	87%	83%
N	104	47	151
<u>Gicumbi Site</u>			
Used Soil Fertility Management Technology	25%	17%	22%
Used Soil Erosion Control/Terracing Technology	92%	83%	89%
Used Productivity Enhancing Technology	49%	57%	52%
HH Has Formal Bank Account	54%	29%	45%
Poor Food Consumption Score	3%	3%	3%
Borderline Food Consumption Score	17%	40%	25%
Acceptable Food Consumption Score	80%	57%	72%
N	65	35	100

3. Household Profile

This section describes the households and their socioeconomic status, including characteristics of the household head, the dwelling, access to water and sanitation, energy sources, and assets.

3.1 Characteristics of the Household Head

A female heads one in three households in the sample. As seen in Table 4, female-headed households tend to be older and less educated than male-headed households.

Table 4: Characteristics of the Household Head

HHH Characteristic	Male-Headed	Female-Headed	Total
Gender of HHH	67.3%	32.6%	100%
Age of HHH	45.14	52.73	47.62
HHH has No Formal Education	26%	44%	32%
HHH Attended Some Primary School	40%	26%	35%
HHH Completed Primary School	28%	24%	27%
HHH Attended Some Secondary School	4%	1%	3%
HHH Attended Some University	1%	1%	1%
HHH Completed Vocational Training	1%	4%	2%
N	169	82	251

3.2 Physical Characteristics of the Dwelling

More than half of the dwellings in the sample are made of improved adobe or brick materials. Nearly all households (90%) have simple earthen floors. Female-headed households have slightly lower quality household characteristics than male-headed households. Female-headed households are more likely to have walls of Wattle & Reeds (22%) than male-headed households (12%), and are less likely to have improved cement/concrete household floors (5%) than male-headed households (9%).

Table 5: Physical Characteristics of the Dwelling

	Male-Headed	Female-Headed	Total
<u>Household Walls</u>			
Adobe/Unburnt Bricks	63%	57%	61%
Fired Bricks	0%	2%	1%
Cemented Mud & Wattle	2%	5%	3%
Uncemented Mud & Wattle	15%	9%	13%
Wattle & Reeds	12%	22%	15%
Concrete/Cement Blocks	1%	0%	0%
<u>Household Floors</u>			
Mud/Earth/Sand	88%	93%	90%
Clay	1%	0%	0%
Cement/Concrete	9%	5%	8%
N	169	82	251

While very few households rely on surface water as source of water to drink, very few also have a water tap inside the house or on the property. The majority of households drink from protected springs (43%) or a public tap (26%). There is little difference between male and female-headed households.

Table 6: Household Source of Drinking Water

Drinking Water Source	Male-Headed	Female-Headed	Total
Tap Inside House/On Property	1%	2%	1%
Public Tap	28%	22%	26%
Protected Well	9%	10%	10%
Unprotected Well	2%	1%	2%
Protected Spring	40%	48%	43%
Unprotected Spring	14%	11%	13%
Surface Water	6%	6%	6%
N	169	82	251

Table 7 shows the household's access to sanitation. The majority of households use a pit latrine (90%), while 8% use an open pit.

Table 7: Household Sanitation

Toilet Type	Male-Headed	Female-Headed	Total
Pit Latrine	91%	88%	90%
Open Pit	8%	6%	8%
Other Toilet	1%	6%	3%
N	169	82	251

3.3 Energy Sources

The majority of households use torches as the main lighting source (57%), as seen in

Table 8. Only slight differences are seen between male and female-headed households, with slightly more female-headed households using lamps/lanterns (10%) compared to male-headed households (4%). Only 3% of households use electricity as the main source of light. Nearly all households use firewood as the main source of cooking fuel (Table 9).

Table 8: Household Lighting Source

	Male-Headed	Female-Headed	Total
Electricity	2%	5%	3%
Lamp/Lantern	4%	10%	6%
Parrafin	17%	13%	16%
Solar	1%	1%	1%
Torch	62%	48%	57%
Candles	11%	11%	11%
N	169	82	251

Table 9: Household's Main Cooking Fuel

	Male-Headed	Female-Headed	Total
Firewood	96%	96%	96%
Charcoal	2%	1%	2%
Crop Waste	1%	1%	1%
N	169	82	251

3.4 Household Assets

Male-headed households have considerably more household assets than female-headed households (Table 10). For example, 80% of male-headed households have a radio, while only 49% of female-headed households do. The differences are less so, but still apparent, for agricultural assets such as rakes, spades, picks and wheelbarrows. 79% of male-headed households and 72% of female-headed households own at least one livestock asset. But male-headed households are more likely to own cows or chickens/poultry compared to female-headed households.

Table 10: Household Assets

Asset	Male-Headed	Female-Headed	Total
Radio	80%	49%	70%
Mobile Phone	62%	41%	55%
Living Room Suite	84%	76%	81%
Bicycle	12%	2%	9%
<u>Agricultural Assets</u>			
Hoe or Shovel	99%	99%	99%
Rake or Spade	23%	13%	20%
Pick	26%	20%	24%
Wheelbarrow	7%	2%	5%
Mill	30%	38%	33%
Mortar & Pestle	77%	73%	76%
Plough	1%	0%	0%
Tractor	1%	0%	1%
Pick Up Truck	1%	0%	0%

Asset	Male-Headed	Female-Headed	Total
<u>Livestock Assets</u>			
Cow	53%	37%	47%
Sheep	14%	11%	13%
Goats	41%	43%	41%
Pigs	8%	16%	10%
Rabbits	14%	4%	10%
Chicken/Poultry	37%	26%	33%
HH Owns Any Livestock Asset	79%	72%	77%
N	169	82	251

4. Agriculture

4.1 Agricultural Landholdings

Households farm very small, divided lands, as shown in Table 11. The most land is cultivated in Season A (.34 hectares), with slightly less land cultivated in Season B (.33 hectares), and very little land cultivated in the short Season C (.03 hectares). In both Seasons A and B, an average of 3 plots are cultivated by each HH.

Table 11: Agricultural Landholdings and Cultivation

	Male-Headed	Female-Headed	Total
HH Total Land Holdings (Ha)	0.38	0.29	0.35
Total Number Plots Owned by HH	3.05	2.63	2.92
<u>Number of Plots Cultivated</u>			
Season 13A	3.07	2.74	2.96
Season 13B	2.93	2.61	2.82
Season 13C	0.34	0.18	0.29
<u>Land Area Cultivated (Ha)</u>			
Season 13A	0.34	0.27	0.32
Season 13B	0.33	0.26	0.31
Season 13C	0.03	0.02	0.03
N	169	82	251

4.2 Public Extension & Farmer Organizations

There is little involvement with farmer organisations at baseline. 8% of households are members of any sort of farmer organization, with no apparent differences between male and female-headed households. Those that are members attended an average of 4 farmer organization meetings in year prior to the introduction of LWH project.

4.3 Adoption of Agricultural Technologies

Increasing the adoption of new agricultural technologies is a key component of the LWH project. As demonstrated in Table 12, use of these technologies is low at baseline. In general, male-headed households are more likely than female-headed households to utilize each technology. Female-headed households are slightly more likely to use productivity enhancing technologies, especially intercropping with plant cover. Table 12 shows the adoption of technologies both by “basket” or at least one of the group of practices, and by each individual practice in the basket.

Table 12: Use of Agricultural Technologies

Technology Used	Male-Headed	Female-Headed	Total
<u>Soil Fertility Management Technologies</u>			
<u>(Basket 1)</u>			
Any Technology in Basket	39%	22%	33%
Green Manure	5%	2%	4%
Mulching	37%	18%	31%
Lime	0%	1%	0%
<u>Soil Erosion Control/Terracing Technologies</u>			
<u>(Basket 2)</u>			
Any Technology in Basket	85%	80%	83%
Agroforestry Species	37%	28%	34%
Grasses for Terrace Protection	62%	45%	56%
Waterways on Terraces	10%	5%	8%
Forest Species	54%	51%	53%
Radical Terracing	14%	16%	15%
Progressive Terracing	53%	38%	48%
<u>Productivity Enhancing Technologies</u>			
<u>(Basket 3)</u>			
Any Technology in Basket	51%	55%	53%
Intercropping using plant cover	36%	43%	38%
Composting (Applied)	1%	2%	1%
Using Integrated Pest Management (IPM)	28%	18%	25%
N	169	82	251

4.4 Input Usage

Organic manure is the most commonly applied input, used by 69% of farmers in Season 2013 A and by 76% of farmers in Season 2013 B. Chemical fertilizers were used by a small portion of farmers (NPK 8%, 4%; DAP 12%, 10%), as were pesticides (10%, 8%). Only 1% of farmers applied compost at baseline.

Table 13: Input Usage

Input	Male-Headed	Female-Headed	Total
<u>Season 2013 A</u>			
Compost	1%	2%	1%
Manure	69%	63%	67%
NPK	8%	4%	7%
Urea	14%	9%	12%
DAP	12%	2%	9%
Lime	0%	1%	0%
Pesticides	10%	2%	8%
<u>Season 2013 B</u>			
Compost	1%	1%	1%
Manure	76%	71%	74%
NPK	4%	1%	3%
Urea	9%	6%	8%
DAP	10%	6%	9%
Lime	0%	0%	0%
Pesticides	8%	5%	7%
N	169	82	251

4.5 Major Crops Produced

The top ten crops grown across all sites and all seasons are shown in Table 14. The top ten for female-headed households is slightly different from the total, with Eggplant and Soybeans replaced by Carrots and Onions. Female-headed households were more likely to grow Sorghum and Irish Potatoes. Male-headed households, in contrast, grew more Sweet Potatoes and Maize.

Table 14: Most Popular Crops (All Seasons)

Male-Headed	Female-Headed	Total
Cabbage 92%	Cabbage 94%	Cabbage 93%
Dry Beans 55%	Sorghum 62%	Dry Beans 56%
Sorghum 51%	Dry Beans 59%	Sorghum 55%
Sweet Potatoes 41%	Sweet Potatoes 33%	Sweet Potatoes 39%
Maize 38%	Irish Potatoes 26%	Maize 32%
Irish Potatoes 16%	Maize 18%	Irish Potatoes 19%
Peas 9%	Peas 6%	Peas 8%
Eggplant 7%	Carrots 6%	Eggplant 6%
Tomatoes 7%	Tomatoes 5%	Tomatoes 6%
Soybeans 5%	Onions 4%	Soybeans 5%
N 169	N 82	N 251

Table 15 and Table 16 break down the crop production by season, showing the top 5 crops grown. While cultivation rates are the same in Seasons 13A and 13B, the crops grown vary slightly. Dry beans are much more common in Season A (89%) than in Season B (57%). Sorghum production is minimal in Season 13A, but high (55%) in Season 13B.

Table 15: Season 13A Crop Cultivation

Crop	% Farmers Cultivating
Any Crop	97%
Dry Beans	89%
Sweet Potatoes	34%
Maize	27%
Irish Potatoes	21%
Peas	14%
N	251

Table 16: Season 13B Crop Cultivation

Crop	% Farmers Cultivating
Any Crop	97%
Dry Beans	57%
Sorghum	55%
Sweet Potatoes	31%
Maize	22%
Irish Potatoes	15%
N	251

The rate of production in Season C is much less than the A and B seasons (18%). The main crops are vegetables: eggplant, tomatoes, carrots and onions. This is expected, as these crops have a short life cycle and are well suited for the short (July-August) Season C.

Table 17: Season 13C Crop Cultivation

Crop	% Farmers Cultivating
Any Crop	18%
Eggplant	3%
Tomatoes	2%
Carrots	2%
Onions	1%
N	251

4.6 Agricultural Production Value

The total value of agricultural production for the household is show in Table 18. This is the total value, in RWF, of all production from the household farm, including what was not sold. Figures are similar across the different sites. Value is slightly lower in Season

B than in Season A. Values for Female-Headed HHs are noticeably lower than those of Male-Headed households for both seasons.

Table 18: Value of Total Agricultural Production (RWF)

Season/Site	Male-Headed	Female-Headed	Total
Season 13A (All Sites)	87532	59305	78310
Season 13B (All Sites)	81663	51318	71750
	169	82	251
Season 13A (Muyanza Site)	87002	50890	75762
Season 13B (Muyanza Site)	82018	50835	72312
	104	47	151
Season 13A (Gicumbi Site)	88379	70607	82159
Season 13B (Gicumbi Site)	81097	51967	70901
	65	35	100

4.7 Labor for Agricultural Activities

Table 19 shows the breakdown, by task and season, of the household's labor on their farm. Of all the agricultural tasks, the most time is spent on preparing the fields for planting. A bit less labor is completed in Season B than Season A. Female-headed households spent consistently less time working on the household's farm, across all the different tasks.

Table 19: HH Labor on the HH Farm

	Male-Headed		Female-Headed		Total	
	HH Labor (Person-Days)	Hired Outside Labor	HH Labor (Person-Days)	Hired Outside Labor	HH Labor (Person-Days)	Hired Outside Labor
<u>Season 2013 A</u>						
Composting	0	0%	0	0%	0	0%
Preparing Fields	23	35%	18	33%	22	34%
Planting	11	30%	8	28%	10	30%
Applying Inputs	6	16%	4	17%	5	16%
Weeding	12	26%	11	28%	12	27%
Irrigating	1	0%	1	0%	1	0%
Harvesting	8	16%	7	16%	7	16%
Processing	4	10%	3	12%	3	10%
<u>Season 2013 B</u>						
Composting	0	0%	0	0%	0	0%
Preparing Fields	18	33%	13	27%	16	31%
Planting	8	23%	6	23%	7	23%
Applying Inputs	3	13%	3	14%	3	14%
Weeding	9	20%	8	22%	9	21%
Irrigating	1	0%	1	0%	1	0%
Harvesting	7	11%	6	14%	7	12%
Processing	4	8%	2	12%	4	9%
N	168	168	77	77	245	245

4.8 Agricultural Storage & Commercialization

Table 20 shows the major crops produced at each site and, for those that cultivated the crop, the proportion of the total harvest that was sold. Commercialization remains minimal, across the two sites, and over the different major crops. Table 21 shows the use of a post-harvest infrastructure for any crop. For both sites, the rates of use are low, around 30%.

Table 20: Production and Commercialization of Key Crops

	Muyazana		Gicumbi		Total	
	% Growing	% Comm	% Growing	% Comm	% Growing	% Comm
<u>Season 2013 A</u>						
Sorghum	2%	0%	2%	0%	2%	0%
Dry Beans	89%	20%	89%	15%	89%	18%
Sweet Potatoes	32%	15%	36%	23%	34%	18%
Maize	29%	22%	24%	17%	27%	20%
Irish Potatoes	19%	23%	24%	18%	21%	21%
<u>Season 2013 B</u>						
Sorghum	49%	24%	65%	22%	55%	23%
Dry Beans	64%	16%	46%	12%	57%	15%
Sweet Potatoes	26%	14%	38%	66%	31%	40%
Maize	21%	13%	22%	27%	22%	19%
Irish Potatoes	13%	20%	18%	17%	15%	18%
N	151		100		251	

Table 21: Use of Post-Harvest Infrastructures

Season	Muyazana	Gicumbi	Total
Season 13A	30%	30%	30%
Season 13B	23%	33%	27%
N	151	100	251

4.9 Yields for Major Crops

Yields are displayed in

Table 22. Gross yields are calculated as the value (RWF) of agricultural production divided by the total area (hectares) cultivated. Net yields subtract the amount spent on seeds, inputs and labor from the total value of agricultural production before dividing by total area. Following the trend of the agricultural value figures, gross and net yields are lower in Season B than in Season A, and lower for female-headed than for male-headed households. The difference between gross and net yields – for example, 20184 RWF for male-headed households in Season 2013 A – is quite small, indicating a minimal amount is investing in inputs.

Table 22: Gross and Net Yields (RWF/Ha) in 13A & 13B

	Male-Headed	Female-Headed	Total
Gross Yield for HH - 13A	490521	417125	467566
Net Yield for HH - 13A	470337	403203	449340
N	167	76	243
Gross Yield for HH - 13B	436206	371565	415639
Net Yield for HH - 13B	421098	363024	402620
N	165	77	242

4.10 Agricultural Income

The total agricultural income for a household is defined as the money earned for all production that is commercialized. As discussed previously, levels of commercialization are low, with households earning an average of 20,033 RWF in Season 2013 A and 13,277 RWF in Season 2013 B (Table 23). These numbers are quite small compared to the value of total production.

Table 23: Total Agricultural Income (RWF) in 13A & 13B

	Male-Headed	Female-Headed	Total
Season 13A	23595	12692	20033
Season 13B	13836	12123	13277
N	169	82	251

5. Rural Finance

Table 24 shows the savings and access to credit for the sample households. More households have informal savings than formal savings accounts. 43% of the sample has a formal bank account; of these the individual current account at the SACCO is the most common. Amounts of formal savings are much lower for female headed households (9561 RWF) than male households (32920 RWF). Nearly all HH in the sample that requested a loan, received one. Female headed households requested fewer loans than male-headed households.

Between the two sites, rates of formal savings are lower in Gicumbi (45%) and higher in Muyanza (64%). Access to credit is similar between the two sites, at around 60%. Nearly all households that request a loan from a formal source do receive one.

Table 24: Household Savings and Loans

	Male-Headed	Female-Headed	Total
HH Has Any Formal Bank Account	47%	35%	43%
Amount HH Has in Formal Savings	32920	9561	26750
HH Has Informal Savings	67%	52%	63%
Amount HH Has in Informal Savings	46824	19500	39340
HH Received a Loan in Last 12 Months	11%	4%	9%
Amount of Formal Loans HH Had	496844	550000	502750
Amount of Informal Loans HH Had	17522	10648	15276
N	169	82	251

6. Food Security & Nutrition

The baseline questionnaire included three standardized measures of food security created by the Food and Nutrition Technical Assistance Project (FANTA), USAID and the FAO: the Household Hunger Scale, Women’s Dietary Diversity Score, and Months of Adequate Household Food Provisioning. Food security depends on the availability, access and utilization of food. These multiple measures assess food security across these different factors. This section also includes data on the adoption of kitchen gardens.

6.1 Household Hunger Scale (HHS)

The Household Hunger Scale (HHS) is presented below, in Table 25. Female-headed households are three times as likely to experience severe hunger than male-headed households. They are also twice as likely to experience moderate hunger than male-headed households. Food security levels are similar across the two LWH project sites.

Table 25: Household Hunger Scale

Household Hunger Score	Household Hunger Categories	Male-Headed	Female-Headed	Total
0-1	Little to No Hunger in HH	85%	70%	80%
2-3	Moderate Hunger in HH	14%	24%	17%
4-6	Severe Hunger in HH	2%	6%	3%
N		169	82	251

6.2 Food Expenditures & Consumption

Data was collected on all food the household consumed in the last week, the source of the food, and the amount spent in the case of purchase food. Table 26 presents the results. It is important to note that this one week food recall was conducted during the baseline survey in May 2014, so it will be an overestimate of the baseline situation.

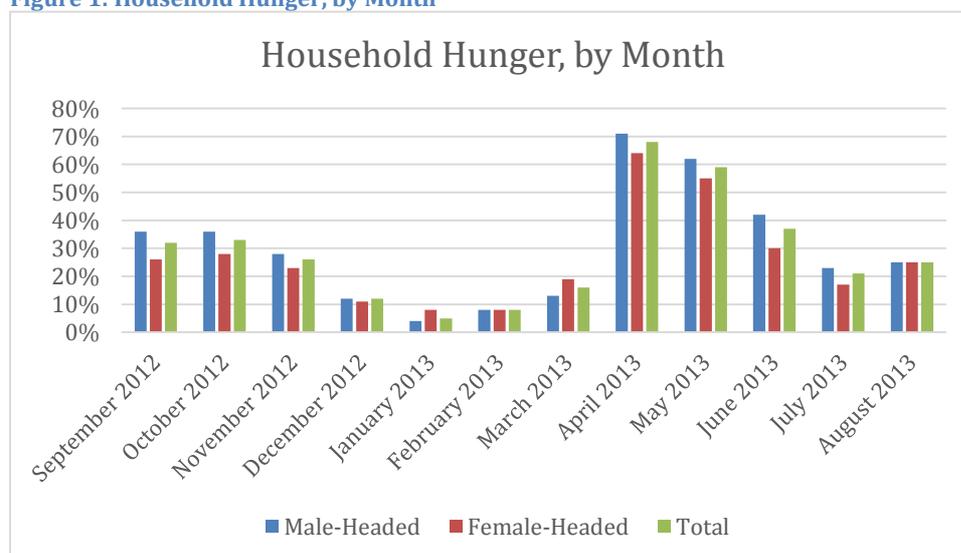
Table 26: Household Food Consumption, Purchase, & Expenditure

	HH Consumed from Own Production	HH Purchased	Amount Spent (Contingent on Purchasing)
FLOUR	24%	46%	1512
BREAD	0%	13%	509
RICE	0%	27%	1567
MEAT/FISH	0%	16%	1451
POULTRY	3%	1%	550
MILK/DAIRY	15%	7%	494
EDIBLE OILS	0%	82%	601
FRUITS	26%	16%	291
BEANS	64%	31%	1482
VEGGIES	71%	22%	321
MATOKÉ	66%	28%	1614
JUICE/SODA	7%	16%	820
SUGAR/HONEY	0%	31%	606
SALT/SPICES	0%	97%	184
NUTS	0%	25%	327
PREPARED MEALS		2%	1138
	251	251	

6.3 Months of Adequate Household Food Provisioning (MAHFP)

55% of households reported no shortages of food in the year prior to the project. On average, households reported adequate food supplies for 10.2 months of the year. For those households that reported shortages of food within the recall period, the average was for a total of 4 months of the year. The most common months for food shortages in these household are illustrated in Figure 1.

Figure 1: Household Hunger, by Month



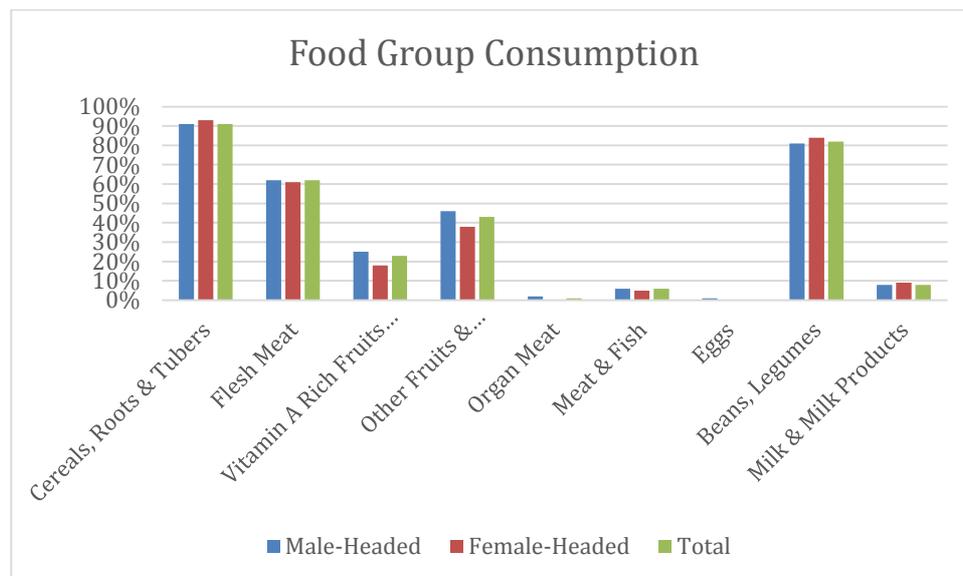
6.4 Women’s Dietary Diversity Score (WDDS)

Most women report consuming foods from 4-5 of the different food groups, which qualifies as “Moderate” dietary diversity on the Women’s Dietary Diversity Score (WDDS). 34% of households with male heads report the lowest dietary diversity; this is slightly less than the 41% of households with female heads that report the same. **Error! Reference source not found.**2 shows consumption in the household of the different food groups

Table 27: Women’s Dietary Diversity Score (WDDS)

	Male-Headed	Female-Headed	Total
Lowest Dietary Diversity (<=3 Food Groups)	34%	41%	36%
Moderate Dietary Diversity (4-5 Food Groups)	51%	46%	49%
Highest Dietary Diversity (6+ More Food Groups)	15%	12%	14%
N	169	82	251

Figure 2: Food Group Consumption



6.5 Kitchen Gardens

45% of household in the sample cultivated a kitchen garden at baseline. This number is the same for male and female headed households.

Irrigation

Table 28 shows HH irrigation on any plot during the different seasons. Irrigation is highest during the short duration dry season, Season C. Irrigation in male-headed households is twice that of female-headed households. All irrigation structures on all plots of these households were managed and maintained by the household themselves.

Table 28: Irrigation on Any Plot, by Season

	Male-Headed	Female-Headed	Total
Season 2013 A	5%	5%	5%
Season 2013 B	6%	2%	5%
Season 2013 C	11%	6%	9%
N	169	82	251