Endline Survey Report

March 16, 2015

Ogumaniha SCIP-Zambézia:

Improving health and livelihoods of children, women and families in the Province of Zambézia, Republic of Mozambique

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The authors have no conflicts of interest to declare. This survey has been supported by the United States Agency for International Development (USAID), Strengthening Communities through Integrated Programs (SCIP) under the terms of Cooperative Agreement #656-A-00-09-000141-00 to World Vision.

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This document was prepared by Vanderbilt Institute for Global Health on behalf of World Vision International and the Ogumaniha SCIP-Zambézia consortium, and submitted to the United States Agency for International Development under USAID Cooperative Agreement #656-A-00-09-000141-00

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EXECUTIVE SUMMARY

In 2000, the Millennium Declaration was adopted by world leaders, committing their countries to a new global partnership to reduce poverty and address a series of time-bound health and development targets. Out of this commitment, eight Millennium Development Goals (MDGs) were established as a pledge to uphold the principles of human dignity, equality, and equity. While important advances have been made, the multidimensional nature of conditions such as poverty, food security, health, educational achievement, and gender inequality calls for social, economic, and political interventions that work across sectors to achieve success, ensuring that even the most vulnerable and marginalized populations benefit proportionally.

Since the signing of the Millennium Declaration, the United States Government has launched several hallmark global health and development initiatives such as the US President´s Emergency Plan for AIDS Relief (PEPFAR), the President´s Malaria Initiative (PMI), and Feed the Future (FTF), each attempting to advance toward the Millennium Development Goals through coordination and shared responsibility with partner country governments.

Set against this backdrop, the Ogumaniha project began implementation in Zambézia Province, Mozambique in late 2009. The project is funded by the US Government under the United States Agency for International Development´s (USAID) Strengthening Communities through Integrated Programming (SCIP) grant and is implemented by a consortium of partners led by World Vision. In the local Echuabo language, *Ogumaniha* means "united/integrated for a common purpose". The overarching goal of the 5-year project is to improve the health and livelihoods of women, children and families in Zambézia Province by pursuing an integrated, innovative, and sustainable community-based program supporting cross-sector integration of USAID's development actions in the province.

The Ogumaniha consortium is currently the largest community-based development project in Zambézia Province in terms of overall financing, human resources mobilized, and breadth of its target intervention areas. However, Zambézia Province has been classified as a priority province for development interventions and, as such, receives assistance from a variety of private, governmental, and non-governmental agencies. Integral to Ogumaniha's design is a strong monitoring system and project evaluation framework based on performance indicators for the project's multi-sectoral interventions that were agreed upon with USAID and the provincial government. Because the project uses an interdisciplinary approach to poverty reduction, the consortium opted for an evaluation design that highlights each focus area. This report reflects the results of a province-wide survey evaluation conducted at Baseline (August/September 2010) and again in the final year of the project (May/June 2014), to measure population level changes in indicators over time as well as the associated effect that Ogumaniha´s implementation of interventions has had on those changes.

Recognizing the challenges in evaluating the impact of interventions on outcome changes in this context, data will be presented in multiple formats that are described in detail within the report.

Table 1 summarizes the outcomes of select indicators from several programmatic areas in three Focus Districts selected for the survey: Alto Molócuè, Morrumbala, and Namacurra. Oversampling of households in these three districts for the Baseline and Endline surveys allowed for more precise estimates in assessing change. These summary indicators represent key indicators for the corresponding program areas and are displayed in relation to the overarching Millennium Development Goals to which they would contribute. Results highlighted in green represent indicators with a statistically significant desirable result based on Ogumaniha's programmatic objectives. Results highlighted in light blue represent those indicators that are trending towards a desirable result based on programmatic objectives but fail to reach statistical significance.

Pre-post comparison of households in all enumeration areas (EA): In this section of Table 1 we show odds ratios and effects representing a comparison of Endline versus Baseline, ignoring whether or not a household falls within an EA that received interventions from Ogumaniha. Since Baseline, 17 of 25 indicators improved in a desirable direction with statistically significant differences for 13 outcomes.

EA with minimum Ogumaniha intervention score of >15: In this section we show odds ratios and effects comparing EA that received a minimum amount of Ogumaniha interventions (>15) to those EA with little or no intervention at Baseline and Endline. The estimates for Baseline show differences in EA where interventions were planned to eventually take place. Since intervention receipt was not randomized, we collected Baseline data to compare with Endline data, and that comparison is summarized by the P-value. The intervention score for this section is a summary score for interventions, regardless of whether the intervention was targeting the particular programmatic area or not. For example, the estimate for change in *Food Insecurity* may be reflective of an EA that only received water and sanitation interventions. This analysis aims to show the relationship or associated impact of any Ogumaniha project presence on indicator outcomes. Since Baseline, 10 of 25 indicators improved in a desirable direction, with significant differences for 5 outcomes.

Difference in OR with increasing Ogumaniha intervention score: In order to show the difference in odds ratios since Baseline for each programmatic area while incorporating the relationship of specific Ogumaniha interventions, we created program area specific intervention scores whereby an increasing score represents an increased quantity of intervention or increased length of time an intervention was implemented in a given EA. These results are depicted in each of the programmatic areas throughout the report. In this section of Table 1, we display the "difference in difference" from Baseline to Endline to show the directionality of the outcome, either in a desirable or non-desirable direction, based on program objectives. Since Baseline, 12 of 25 indicators improved in a desirable direction, with significant differences for 10 outcomes.

In summary, there is encouraging evidence that the integrated multi-sector Ogumaniha project has produced significant improvements in a variety of development domains and contributed positively toward Zambézia Province´s advancement in meeting its Millennium Development Goals.

Table 1: Project Outcomes for Enumeration Areas in Three Focus Districts: Alto Molócuè, Morrumbala, and Namacurra (comparing Endline vs. Baseline, Ogumaniha Intervention receipt, and Intensity of Intervention Implementation)

		Pre-post comparison of Households in all EA		EA with Minimum *Ogumaniha* Intervention Score > 15			Comparing high area specific intervention with no intervention and Endline versus Baseline		
		Endline vs Baseline		Baseline	Endline		Difference in differences		Programmatic
	Unit	OR (95% CI)	P-value	OR (95% CI)	OR (95% CI)	P-value	OR (95% CI)	P-value	Areas
MDG 1: Poverty and Hunger									
Food insecurity	Household	0.81 (0.67, 0.87)	0.019	0.67 (0.54, 0.85)	1.25 (0.96, 1.62)	< 0.001	0.88 (0.52, 1.52)	< 0.001	1,4,7
Wasting (-2 SD)	Child 6-23 m	0.40 (0.19, 0.85)	0.018	0.54 (0.18, 1.61)	0.67 (0.21, 2.10)	0.809	1.73 (0.17, 17.9)	0.809	1,5
Severe Wasting (-3 SD)	Child 6-23 m	0.48 (0.17, 1.31)	0.151	0.19 (0.02, 1.55)	0.19 (0.03, 1.41)	0.985	2.55 (0.10, 67.4)	0.515	1,5
Underweight (-2 SD)	Child 6-23 m	0.58 (0.32, 1.04)	0.069	0.93 (0.37, 2.36)	0.53 (0.26, 1.08)	0.385	2.95 (0.34, 25.7)	0.108	1,5
Severe Underweight (-3 SD)	Child 6-23 m	0.18 (0.08, 0.41)	< 0.001	0.27 (0.08, 0.84)	0.53 (0.12, 2.45)	0.486	6.10 (0.38, 97.5)	0.384	1,5
Stunting (-2 SD)	Child 6-23 m	1.31 (0.82, 2.09)	0.257	0.76 (0.36, 1.58)	0.84 (0.52, 1.37)	0.822	4.17 (1.19, 14.7)	0.106	1,5
Severe Stunting (-3 SD)	Child 6-23 m	1.61 (0.94, 2.78)	0.085	1.00 (0.36, 2.75)	1.06 (0.67, 1.69)	0.915	3.25 (0.66, 16.1)	0.426	1,5
		Effect (95% CI)	**P-value**	**Effect (95% CI)**	**Effect (95% CI)**	**P-value**	**Difference**	**P-value**	**Area**
Monthly income (meticais)	Household	378Mt (254, 502)	< 0.001	-65.13 (-161.55, 31.3)	189 (-56.51, 434)	0.066	+1,626 Mt	<0.001	4,7
MDG 4: Child Health									
Fever prevalence	Child 0-59 m	1.02 (0.81, 1.27)	0.881	1.19 (0.89, 1.60)	1.22 (0.93, 1.60)	0.898	0.72 (0.33, 1.59)	0.127	1,2
Diarrhea prevalence	Child 0-59 m	0.83 (0.66, 1.04)	0.104	0.91 (0.69, 1.20)	1.55 (1.10, 2.18)	0.015	1.14 (0.52, 2.48)	0.637	2,5,6
Respiratory Illness prevalence	Child 0-59 m	0.86 (0.68, 1.07)	0.176	1.05 (0.77, 1.42)	1.54 (1.05, 2.27)	0.101	0.42 (0.17, 1.02)	0.022	1,2
Full immunization (by card)	Child 12-23 m	1.08 (0.48, 2.44)	0.850	1.85 (0.57, 6.04)	1.66 (0.72, 3.82)	0.885	1.42 (0.01, 330)	0.018	1,2
Full immunization (by card)	Child 12-59 m	1.73 (1.12, 2.68)	0.013	0.96 (0.55, 1.68)	1.62 (0.95, 2.79)	0.152	0.83 (0.23, 2.97)	0.054	1,2
MDG 5: Maternal Health									
# of antenatal care visits	HH with < 5yrs	0.88 (0.72, 1.07)	0.202	1.24 (0.89, 1.72)	1.60 (1.14, 2.25)	0.194	1.69 (0.83, 3.45)	0.024	1,2
Health facility delivery	HH with < 5yrs	1.50 (1.24, 1.81)	< 0.001	1.27 (0.94, 1.71)	1.83 (1.26, 2.64)	0.063	1.46 (0.90, 2.37)	0.072	1,2
Bed net use	Pregnant female	2.17 (1.78, 2.64)	< 0.001	1.27 (0.94, 1.70)	1.70 (1.18, 2.45)	0.136	2.69 (1.62, 4.45)	< 0.001	1,2
Full package of antenatal services	HH with < 5yrs	2.49 (1.84, 3.35)	< 0.001	1.15 (0.67, 1.98)	1.85 (1.20, 2.85)	0.111	0.82 (0.20, 3.40)	0.358	1,2
MDG 6: HIV, Malaria, other Diseases									
Ever received HIV testing	Household	1.48 (1.14, 1.93)	0.003	0.94 (0.69, 1.26)	1.77 (1.17, 2.67)	0.012	1.31 (0.44, 3.88)	0.039	1,2
Antenatal HIV testing	Household	2.40 (1.94, 2.98)	< 0.001	0.90 (0.64, 1.26)	1.40 (1.01, 1.93)	0.042	1.02 (0.46, 2.28)	0.155	1,2
Bed net use	Child < 5yrs	3.48 (2.80, 4.33)	< 0.001	1.43 (1.08, 1.88)	1.25 (0.87, 1.79)	0.510	0.72 (0.36, 1.46)	0.192	1,2
Bed net use	Household	7.67 (6.43, 9.16)	< 0.001	1.39 (1.11, 1.73)	0.93 (0.67, 1.31)	0.027	2.31 (1.42, 3.78)	< 0.001	1,2
		Effect (95% CI)	**P-value**	**Effect (95% CI)**	**Effect (95% CI)**	**P-value**	**Difference**	**P-value**	**Area**
HIV stigma – Negative labeling	Household	-1.44 pts (-2.92, 0.04)	0.056	-2.85 (-4.84, -0.86)	-0.31 (-2.21, 1.58)	0.048	-1.50 (-6.69, 3.70)	0.810	1,2
HIV stigma - Social exclusion	Household	-4.50 pts (-6.58, -2.41)	< 0.001	2.55 (0.40, 4.69)	-3.75 (-6.92, -0.58)	< 0.001	-5.65 (-10.79, -0.51)	<0.001	1,2
MDG 7: Environmental Sustainability									
Access to safe water	Household	0.50 (0.41, 0.62)	< 0.001	0.81 (0.54, 1.23)	1.22 (0.89, 1.68)	0.056	1.03 (0.53, 2.01)	0.029	5,6
Access to improved latrine	Household	1.24 (0.85, 1.80)	0.273	1.24 (0.69, 2.22)	1.23 (0.77, 1.97)	0.990	0.11 (0.01, 1.06)	<0.001	5,6

EA, enumeration area; OR, odds ratio; CI, confidence interval
For Programmatic Area definition see Table 2 below

Introduction

Ogumaniha Background

The Ogumaniha project began implementation in Zambézia Province, Mozambique in late 2009. The project is funded by the US Government under USAID's Strengthening Communities through Integrated Programming (SCIP) grant and is implemented by a consortium of partners led by World Vision. In the local Echuabo language, *ogumaniha* means "united/integrated for a common purpose". The purpose of the 5-year project is to reduce poverty in Zambézia by pursuing the consolidation of an integrated, innovative, and sustainable community-based program supporting cross-sector integration of USAID's development actions in the province.

Ogumaniha's overarching goal is to improve the health and livelihoods of children, women, and families in the Province of Zambézia. To achieve this goal, Ogumaniha aims are to:

1. Strengthen and increase access to the health, nutrition and HIV&AIDS care system for its numerous target groups, including: women and men of reproductive age, pregnant and post-partum women, newborns, children under 5 years of age, orphans and vulnerable children (OVC) and people living with HIV/AIDS (PLWHA);

2. Promote and finance demand-driven community investments for agricultural production, value chain additions, income-generation, health improvement, potable water, and sanitation; and

3. Build and reinforce existing institutional capacity of governmental departments at provincial and district level, as well as that of community associations, councils, and groups, to empower them to make decisions that are directly related to improving the living conditions of the rural population.

This project is in line with the priorities of the Ministries of Health (MOH), Agriculture (MOA), and Public Works and Housing (MOPH), and in strong coordination with and leadership from the Zambézia Provincial Health Directorate (DPS), the Provincial Agriculture Directorate (DPA) and the Provincial Directorate of Public Works and Housing (DPOPH).

Ogumaniha capitalizes on structures, experiences, and relationships built by numerous previous and ongoing projects of its consortium members, including USAID-funded COACH, RITA, MozArk, TAM, and MYAP programs, and the CDC-funded PEPFAR program. Ogumaniha is being implemented under the leadership of World Vision as the prime recipient of the funds with key roles and responsibilities assumed by five experienced and uniquely qualified partners: Adventist Development and Relief Agency (ADRA), International Relief and Development (IRD), Vanderbilt University and its affiliate non-governmental organization (NGO) Friends in Global Health (FGH), and the John Hopkins University's Center for Communication Programs (JHU/CCP).

Ogumaniha Interventions

In order to achieve the above objectives, the Ogumaniha consortium has structured its interventions through a mixture of indirect training and capacity building of local community volunteer groups called community health committee´s (CHC), as well as direct implementation of activities by consortium partners.

CHC´s are networks of volunteers within a community usually consisting of 20 to 30 volunteers. Efforts were made to ensure CHC´s consisted of a minimum of 20% female volunteer members. These volunteers were then divided into areas of community support such as nutrition, maternal health/family planning/reproductive health (RH), home based care (HBC), water and sanitation, home visits and active case finding for persons living with HIV, child health, malaria education and prevention, orphans and vulnerable children, local economic

development, etc. Work plans for volunteers were developed jointly with Ogumaniha support based on prioritized solutions to health in their respective communities.

Through the life of the project Ogumaniha worked with 652 CHC´s in 16 of Zambézia´s 17 districts. Ogumaniha´s role with these CHC´s was to ensure they were trained in the specific areas of work, provide materials and supplies needed to conduct the work, and to provide supervision to volunteers in terms of the quality of activities implemented as well as documentation/collection of indicators pertaining to a particular volunteer activity.

CHCs held monthly coordination meetings between Health Facility staff, CHC leaders, and Ogumaniha field staff. In order to assist with facilitation of activities, Ogumaniha distributed over 500 bicycle ambulances which were managed by the various CHCs to alleviate the challenges of transport. A total of 519 standard bicycles were provided free of charge to all HBC, RH, and child health volunteers to enable them to visit wider geographic areas. Additional support was provided by Ogumaniha towards building organizational capacity within the CHC´s that was designed to improve sustainability of project benefits once the project ends. As part of this organizational capacity building, Ogumaniha staff assisted CHC members in conducting an Organizational Self-Assessment composed of 5 steps described below:

Step 1: Discovering/sharing of stories.
Step 2: Visioning/comparing existing situations with the desired future.
Step 3: Determining capacity areas to achieve the vision.
Step 4: Assessing the level of CHC maturity in each capacity area.
Step 5: Developing action plans to build capacities.

Over the life of the project, Ogumaniha implemented a total of 168 different target interventions, each with a varying duration of implementation time and geographic distribution. The following are highlighted interventions by thematic area:

HIV/AIDS: Interventions targeting HIV/AIDS focused on 3 areas: 1) HIV prevention through community education and messages; 2) linkages to HIV care and treatment through community-based HIV counseling and testing and referral to the health facility for those found to be HIV positive; and 3) utilization of Home Based Care volunteers to conduct follow-up home visits and active case finding for persons living with HIV who need additional support or are lost to follow-up from the health facility.

CHC volunteers and Peer Educators (consisting of adolescents and adults) were trained on HIV prevention messages with a goal of their subsequent dissemination of this information at the community level. Messages were shared in schools through local theater groups and through CHC meetings. Ogumaniha used multimedia channels to communicate behavioral change messages such as abstinence, being faithful, and using condoms during every sexual encounter – some of which targeted youth in particular. The project also produced community radio spots promoting antiretroviral treatment adherence and encouraging HIV+ patients on treatment to join a *Grupos de Apoio e Adesão Comunitária* (GAAC) community adherence group.

Approximately 134,000 persons were counseled, tested and received their HIV results during the first five years of the project. People were tested in various locales and settings, some during large community-based HIV campaigns/camps and others through individual or small group settings, for example family members or couples. In the latter years of the project more focused targeting of high risk persons was done. This included TB patients, family members of HIV+ persons, pregnant women and orphans and vulnerable children (OVC). People testing HIV positive were referred to nearby health facilities to be enrolled in care and treatment.

Ogumaniha staff participated in weekly Treatment Adherence Committee meetings at the health facility where priority lists of persons either lost to follow-up or who had abandoned care were distributed for active consented case finding. Lists were subsequently distributed by Ogumaniha staff to the home based care volunteers who

visited the patient at home in order to encourage their return to care. In this process, Ogumaniha staff worked closely with other USG funded clinical partners in the province to ensure no overlap of activities and proper coordination.

Malaria: Midway through the life of the Ogumaniha project, World Vision began assisting with the distribution of long lasting insecticidal nets (LLIN), in five districts, through funds received from the Global Fund to Fight AIDS, Malaria, and Tuberculosis (GF) in coordination with provincial/district health authorities and other malaria prevention implementers to ensure appropriate geographic coverage of net distribution and logistical planning. Ogumaniha´s district staff worked closely with the Global Fund to coordinate implementation activities and regional meetings. Children under five years of age were referred by *Agentes Polivalentes Elementares/Community Health Volunteers* (APEs/CHVs) to health facilities for suspected malaria.

Health Access: Ogumaniha interventions targeting increased health access included training and supervision of CHC volunteers to be engaged in household advocacy that encourages and promotes community- and facility-based health seeking behaviors. Ogumaniha project staff established referral systems to health facilities for persons testing HIV positive as well as malnourished children identified in the community. Ogumaniha provided technical assistance to district and provincial health authorities for implementation of monthly community health management meetings between health facility staff and community members to increase dialogue and promote community usage of health services. Additional community mobilization towards improved health seeking behaviors was encouraged through local community radio stations, local theater groups, and distribution of information, education, communication (IEC) and behavior change communication (BCC) materials to the communities.

Maternal Health/Family Planning/Reproductive Health: Ogumaniha built and equipped a number of waiting houses for pregnant women at sites selected by local and provincial health authorities. Ogumaniha provided these houses to encourage institutional deliveries for women who live far from the health facility, providing a safe, comfortable place for them to stay a few days prior to the expected delivery date.

Oral contraceptives and condoms were distributed by reproductive health volunteers and through Ogumaniha supported mobile brigades (teams of health facility and project staff who visit distant communities from the health facility). Key messages of healthy timing and spacing of pregnancy (HTSP) were also promoted.

Child Health: Following trainings by Ogumaniha, CHC volunteers emphasized the following: 1) identifying malnourished children in the community and referring them to the health facility for treatment; 2) community health education messages about preventing diarrhea, such as proper hand washing and food preparation, as well as community demonstrations on child nutrition, including appropriate feeding practices, breastfeeding, and home based oral rehydration therapy; and 3) children under five years of age with fever or respiratory symptoms were referred by CHVs to either health facilities for suspected malaria treatment or treatment of pneumonia or to APEs for treatment if an uncomplicated case. Ogumaniha also promoted and facilitated childhood immunization and Vitamin A promotion through financial and logistic support to mass vaccine campaigns and mobile brigades.

Water, Sanitation, Hygiene (WASH): Ogumaniha's WASH strategy aimed to provide a rural water supply and sanitation facilities, through either rehabilitation or new construction, according to the needs and priorities identified by a discreet number of communities that were prioritized to receive this service. Ogumaniha supported communities to make informed choices based on the full range of available technologies including hand dug wells and boreholes. Ogumaniha focused on creating and training new water committees (WC) at the community level, selecting and training new volunteers and local technicians, and training the community in WASH using participatory methodologies for solid waste clean-up and construction of household latrines. WC members were trained to promote best practices on hygiene and sanitation, based on participatory hygiene and sanitation transformation (PHAST) and community-led total sanitation (CLTS) methodologies.

The CLTS is a new approach to sanitation promotion that encourages community self-analysis of existing defecation patterns and threats and promotes local solutions to reduce and ultimately eliminate the practice of open defecation. CLTS involves mobilizing communities to build latrines and work through peer pressure to completely eliminate open air defecation. Through a process of facilitation, community members come to realize the links between open air defecation and negative health impacts, and as a result they become motivated to take collective action to change habits.

The PHAST approach is a participatory learning methodology that seeks to help communities improve hygiene behaviors, reduce diarrheal disease and encourage effective community management of water and sanitation services. PHAST works on the premise that as communities gain awareness of their water, sanitation and hygiene situation through participatory activities, they are empowered to develop and carry out their own plans to improve this situation. Furthermore, the method tries to enhance the self-esteem of the participating community members by involving them into the planning process. Empowering the community helps to plan environmental improvements and to own and to operate water and sanitation facilities.

Livlihood Capabilities/Economic Development: Ogumaniha´s Women First (WF) groups provide entrepreneurial training and created a means for sustainable income generation and financial independence for rural women. The Women First program takes a holistic approach through integration of gender-focused health and HIV/AIDS activities with the economic and social development of women. The target of WF was 30 groups with 540 member´s total. The programs objective was to increase employment opportunities and to improve the economic status of rural women through small business development and skills training; to provide a rotational in-kind credit for new groups; to establish a sustainable supply chain of marketable products; and to strengthen the knowledge of women with regards to basic health care and HIV/AIDS prevention, including skills to discuss sexual and reproductive health issues with their children. The female entrepreneurs directly participating in this program have income at their disposal to improve food security, access to health care services, and access to education for themselves and their families. In year 5, USAID requested including girls (aged 13-18) into the program. Ten girls were added to each of the 30 WF groups, bringing the number of adolescents to 300. The adolescents received different training than the original 540 women. The original 540 WF women still make up part of the groups but doing their business independently.

To further improve the group´s base capital for conducting business, Accumulated Savings and Credit Associations (ASCA) were established within the groups. This provided easy access to loans for the members. Some income generation activities included sewing, animal breeding, and food production and sales.

Nutrition: Ogumaniha nutrition trainings were composed of informational sessions and demonstrations on how to prepare nutritious food and on the selection of food that can provide essential supplements to children, mothers, and people living with chronic diseases. Exclusive breastfeeding for infants 6 months and under was emphasized and promoted. Water, hygiene and sanitation technicians were provided with training sessions on nutrition themes, which were then passed on through local trainers, CHC volunteers, water committee members, and communities in general. Nutrition activities were also carried out in Women First groups and Mother and Father Groups (MFG) and were integrated with Ogumaniha WASH interventions.

Methods

Background to the Ogumaniha Survey Tool

Integral to Ogumaniha's design is a strong monitoring system and project evaluation, based on performance indicators agreed upon with USAID and the provincial government. Because the project uses multi-sectoral interventions and an interdisciplinary approach to poverty reduction, the consortium opted for an evaluation design that includes each focus area. A survey instrument to be used at baseline (conducted August/September 2010) and the final year of the project (conducted May/June 2014) was designed based on human development

theory originated by (Amartya Sen 1999) and further developed by researchers from the Oxford Poverty and Human Development Institute (OPHI). This instrument uses multiple dimensions to measure poverty including health, education, income, access to goods and services and self-empowerment. The OPHI is one of the principal contributors to the United Nation's Human Development Index (HDI).

Survey Design

The survey was designed to collect general health and development information on the population of Zambézia Province that would allow for analysis of the impact of Ogumaniha interventions while also providing compatible information for comparison with other population-based surveys such as the Multiple Indicator Cluster Survey (MICS) and Demographic Health Survey (DHS). As such, questions were included that may only indirectly reflect an association with the interventions implemented by the Ogumaniha consortium. For example, data were collected on the percentage of children under five years old receiving vaccination. Ogumaniha interventions related to vaccinations included community mobilization and logistic support to the provincial health system for conducting vaccine campaigns, yet the actual vaccine campaigns and administration of vaccines falls under the auspices of the national health system and not under the direct control of the Ogumaniha consortium.

The survey instrument was designed to achieve three objectives:

- To provide baseline estimates of selected indicators that are representative of the households of the entire Province of Zambézia,

- To provide estimates for as many project indicators as possible, where the information sought would be most appropriately collected in a population-based survey, and

- To collect a sufficient number of multi-dimensional indicators to be able to apply the Oxford Poverty and Human Development methodology to evaluate the medium term impact of the project.

The survey tool was developed by a multi-disciplinary team of researchers, including staff, faculty, and graduate students from Vanderbilt University and the University Eduardo Mondlane. Faculty and students involved were from the Departments of Community Medicine, Preventive Medicine, Infectious Diseases, Pediatrics, Epidemiology, Nutrition, Anthropology, Political Science and the Schools of Nursing, Education, Management, Engineering, and Divinity. The survey designers borrowed many questions and scales deemed appropriate from previous national surveys in Mozambique (including various INE surveys focusing on poverty and economic status) and other international surveys (DHS and MICS). The survey was made available to technical and leadership staff at World Vision and each of the consortium partners who provided feedback on questions and design.

The first part of the survey collects demographic information about all household members and includes household language and ethnicity. The second part collects child health information, including questions about vaccinations, malaria, diarrheal disease, respiratory disease, and measures of weight and height to estimate malnutrition. This set of questions was primarily selected and adapted from the Demographic and Health Survey 5 (DHS5) – Model Women's Questionnaire (DHS, 2006). The survey tool includes two instruments adapted from the Wide Range Achievement Test (WRAT-1) to measure literacy and numeracy of the interviewee (Wilkinson, 1993). Questions on education achievement and aspirations were designed based on previous instruments used in Malawi (Grant, 2008; Lockheed et al., 1989). The next section of the instrument focuses on food security, dietary diversity and food coping strategies. These questions were adapted from the Household Food Insecurity and Access Scale (HFIAS) of the Food and Nutrition Technical Assistance Project (Coates et al., 2007), as well as

from Food and Agriculture Organization and other resources (FAO Nutrition and Consumer Protection Division, 2008; Tirivayi et al., 2009). The section on social barriers and social participation addresses various factors that shape well-being, from access to social support networks to decision making within the family and gender differences. Questions in this section were selected from the Oxford Poverty and Human Development Initiative, UNICEF and others (Oxford Poverty and Human Development Initiative, 2010; Buiya et al., 2007; Pulerwitz and Barker, 2007; ChildInfo, 2010). Questions on material possessions and consumption of goods were adapted from several sources based primarily on the unsatisfied basic needs approach, where the aim is to estimate use or acquisition of assets presumed critical for well-being. Questions were included from the Demographic and Health Survey, the Multiple Indicator Cluster Survey as well as from other sources (DHS, 2010; Government of South Africa, 2007; Pradhan and Ravallion, 2000; World Bank, 2007; UNICEF, 2010a). The section on reproductive health relied heavily on DHS questions, as were the sections on malaria and HIV knowledge, attitudes, and practices. Questions related to HIV/AIDS stigma were primarily adapted from the Brazilian truck driver stigma study (Population Council, 2003). The section related to quality of life was based on several WHO quality of life scales (WHO, 1997, 1998, 2002). Questions related to agency and self-determination were partly adapted from the Social Support Appraisal's Scale (Vaux et al., 1986). Questions about income and income generation were adapted from the Core Welfare Indicators Questionnaire (QUIBB/CWIS) survey (Wold, 2004) as well as the DHS. Agricultural practice and production questions were based on surveys previously used by World Vision and other partners in Zambézia.

The survey was designed to collect information about the household from the female head of household, defined as the principal wife of the nuclear (immediate) family. The female head of household was selected to be the interviewee, because she is thought to be the person most familiar with the health and caretaking of all household members, including nutrition, food procurement, cooking, water and sanitation, health events and health care access, and agricultural practices. In cases of polygamous families, the principal or eldest wife was selected, which may introduce some bias if the younger wives and their children are less well off.

Initial revisions at Baseline (2010) were done prior to field-testing in order to adapt the Portuguese version of the document to reflect the linguistic and social context of Mozambique. Field tests were then conducted in the districts of Namacurra and Quelimane to localize the questionnaire in rural and urban communities. The draft questionnaire was then revised and tested again in Alto Molócuè, Namacurra, Morrumbala, and Quelimane at district training workshops. These field tests ensured that the way questions were phrased and the logic of the instrument, worked in the field; particular attention was paid to whether answers were best collected in categories, ranges, or scales depending on the solicited response. Field-testing at baseline was conducted with the support of experienced staff from Vanderbilt's Latin American Public Opinion Project (LAPOP).

Once the survey was deemed ready in Portuguese it was encoded onto a software platform that enabled interviewers to use mobile phones to collect survey data. Interviewers were trained to conduct interviews in local languages reading from the Portuguese questionnaire uploaded onto the mobile phone. This was done to ensure consistency of query and that the interviewers were correctly and consistently entering responses into the Portuguese form on the mobile phones.

Anthropometric Measures

We assessed nutritional status of Zambézian children under age five years (<59 months) using anthropometric indicators – physical body measurements including height and weight along with attributes such as age and sex (O'Donnell et al., 2008). Weight-for-height (W/H) measures body weight relative to height. Weight-for-height is normally used as an indicator of current nutritional status, and can be useful for screening children at risk. Extreme cases of low W/H are commonly referred to as **"wasting"**. Height-for-age (H/A) reflects cumulative linear growth. H/A deficits indicate past or chronic inadequacies in nutrition and/or chronic or frequent illness. Extreme cases of low H/A, where shortness is interpreted as pathological, is referred to as **"stunting"**. Weight-for age (W/A) reflects body mass relative to age; the term "underweight" is commonly used to refer to severe or

pathological deficits in W/A. W/A is commonly used for monitoring growth and to assess changes in the magnitude of malnutrition over time. Anthropometric indices are constructed by comparing relevant measures with those of comparable individuals (in terms of age and sex) in the reference data (WHO child growth charts). This comparison is often expressed as a Z-score (standard deviation score): the difference between the value for an individual and the mean value of the reference population for the same age or height, divided by the standard deviation of the reference population.

For this survey, we randomly selected one child under age 12 months (when available) and one child age 13 to 59 months (when available) in households of enumeration areas selected to conduct anthropometric measurements. Children's measurements were carried out following WHO recommendations for children's nutritional anthropometry (WHO expert committee, 1995). All measurements were conducted by the survey team leaders, who received extensive training on measuring height and weight of children. Weight for children was measured using a Salter scale, calibrated upon arrival to each household where a child was to be measured using a 5-kg sack of sand. Children 12 months or younger were placed in a halter and weighed, whereas children over 12 months were placed on a swing designed specifically for the study and measured. Length/height for children was measured using altimeters. Children 12 months or younger were measured lying down, while children over 12 months were measured standing up.

Survey Implementation Plan

Interviewers and team leaders were recruited from a pool of women with prior experience in survey work, prioritizing geographical areas where the 5 most common local languages in Zambézia were spoken. Fourteen teams of 5 women were formed composed of one team leader and four interviewers. The teams were assigned by language abilities to a specific region to work under the supervision of a regional supervisor. The team leaders were responsible for the operational side of the survey, including the following tasks: accompanying interviewers to the enumeration areas (EAs), ensuring that GPS localization was conducted upon arrival to new EA, supervising the selection of households in all EAs, assigning interviewers to selected households, conducting the random sampling and anthropometric measurement of children aged 0-59 months in selected EAs, backing up data, maintaining registers of data collection for each member of their team, keeping supervisors well-informed of activities, and charging phones.

Interviewers were trained on general aspects of survey implementation, including: the Responsible Conduct of Research, confidentiality, obtaining informed consent, procedures for locating the pre-selected enumeration areas, selecting a random child in the appropriate age groups for anthropometry and child health questions, scenarios requiring termination of an interview, procedure to use when no eligible head of household is present, procedures to engage local political and traditional authorities to obtain authorization to conduct interviews in a given locality, etc.

A lot of care was taken to ensure that local authorities at multiple levels were aware of the survey activities, providing their sanction in order to facilitate acceptance into communities and survey completion. Upon arrival into each district, each of the survey teams were to present themselves to the District Administrator, to introduce the survey, produce all necessary governmental and ethical review approvals, explain the methodology, and identify the enumeration areas where they would be working. Upon arrival at each of the localities wherein the EAs were to be found, the teams further introduced themselves to the local leaders, again explaining the survey purpose. Local leaders were asked to help direct the teams towards the enumeration areas, which were often but not always tied to specific communities. Upon arrival at the community included in the EA, the teams met with the local Régulo, or community representative, who confirmed the team's arrival at the appropriate EA and oriented the team on the EAs limits.

Data Collection and Management

The surveys were administered face-to-face using mobile phones. Because the key challenge in conducting surveys digitally is to protect the data in case of hardware failure, our questionnaire was set up to be submitted securely via the GSM wireless network. The interviewers and team leader were equipped with a mobile phone (Samsung Galaxy) and each phone had a spare battery. Team leads were responsible for checking mobile phone battery charge and recharging batteries at the end of each day. Each team had access to both conventional wall chargers, as well as a car charger. Open Data Kit, an open source suite of tools that enables data collection on mobile phones and data submissions to a central server, was deployed with the development support of Dimagi for the survey (Dimagi, Inc., 2010). Mobile communications coverage in rural Zambézia is incomplete, such that cell phones were set up with enough memory to store hundreds of completed surveys and to send data as soon as the phone detected a signal.

Sample Frame

According to the 2007 census (INE, 2007), the population for Zambézia is estimated at 3,794,489 living in 918,025 households which are divided into 9,073 enumeration areas (EAs). The Province of Zambézia is divided into 17 districts: Cidade de Quelimane (population: 193,343), Alto Molócuè (271,650), Chinde (119,898), Gilé (169,285), Gurué (297,935), Ile (289,542), Inhassunge (91,196), Lugela (135,485), Maganja da Costa (276,881), Milange (498,635), Mocuba (300,628), Mopeia (115,291), Morrumbala (358,915), Namacurra (186,410), Namarroi (125,999), Nicoadala (231,850), and Pebane (185,333). There are 155,202 urban households (1,458 EA) and 762,823 rural households (7,615 EA) in the province. We collected two representative samples. One sample of Zambézia Province will allow for general estimates. A second concentrated sample in Alto Molócué, Morrumbala, and Namacurra will allow for precise estimates and better precision of the difference from Baseline to Endline following SCIP-Ogumaniha start-up. These three districts make up approximately 20% of the provincial population.

Sampling Methodology

Sampling was conducted by the Chief Sampling Statistician from the National Statistics Institute (INE) using the Government of Mozambique sampling frame created for use on all national surveys based on 2007 census results. The random sampling was performed in four steps. First, the sampling frame was stratified into urban and rural areas. Next, enumeration areas (EAs) were sampled for each stratum using probability proportional to size (PPS). Households within EAs were selected using simple random sampling or convenience sampling. In enumeration areas where anthropometric measurements were conducted, with households with one or more children aged 0-12 months, one child was randomly selected for weight and height measurements. Similarly, for households with one or more children aged 13-59 months, one child was randomly selected for weight and height measurements.

Step 1: Urban/ Rural/3 District Strata

According to FGH specifications, the sampling of EAs was done by the Chief Sampling Statistician and the National Institute for Statistics (INE) using the sampling frame of the 2007 census. The EAs from the master sample frame were split into four groups: urban, rural, and a concentrated 3 district sample divided into no or any planned interventions. To capture SCIP-Ogumaniha partner activity well without increasing the sample size and survey costs, FGH over-sampled within 3 districts by planned interventions at the village level; Alto Molócué, Morrumbala, and Namacurra were selected because they represent 3 distinct geographical regions and SCIP-Ogumaniha interventions will occur in each. A design weight was constructed to compensate for the oversampling of 3 districts to generate provincially representative figures.

Step 2: PPS Sampling of Enumeration Areas

EAs were sampled with replacement from strata using probability proportional to size. EAs with a higher number of households had a proportionally greater probability of selection than those with fewer households.

Step 3: Sampling of Households

Topographic maps from the National Institute of Statistics (Instituto Nacional de Estatística, INE) created for enumeration for national census were used, and a “spin the bottle" method adopted. To improve upon the quality of the sampling, a four-quadrant approach was used. The method works as follows:

- Divide the EA into quadrants.
- Choose a central point within each quadrant of the EA;
- Spin a bottle (or ink pen) to select a direction in which to proceed;
- Choose the first household in this direction as the starting point and then select the four nearest households.

Step 4: Simple Random Sampling of Children

In EAs where anthropometric measures were to be carried out, children ages 0-59 months were selected from participating households. Due to time constraints, we were not able to implement programming that would randomly select two children from all children aged 0-59 months. Instead a table was prepared by the project statistician listing randomly generated numbers for households with two to eleven children aged 0-12 or 13-59 months; the team lead sampled and measured up to one child 0-12 months and up to one child 13-59 months, selected based on this random number and corresponding birth order.

Sample Size

To measure the effectiveness of SCIP-Ogumaniha activities while giving consideration to cost of administering the survey, we implemented a two-stage cluster sampling design. We determined the number of EAs to be selected and the number of individuals to be interviewed in each EA in order to achieve the desired precision within the survey budget (Aliago and Ruilin, 2006). The desired level of accuracy for the survey was set to a confidence level of 95%. For a confidence interval of ± 5% we needed s = 0:025. The population proportion was set conservatively to p = 0:5 which maximizes the standard error (Levy and Lemeshow, 2008). The number of households interviewed per EA is set at n = 15; this decision was motivated by the number of enumerators and a one day per EA workload. The number of clusters (m) sampled was determined by the following equation (Bennet et al., 1991):

$$\overline{m} = \frac{p(1-p)D}{s^2\overline{n}}$$

Where D is the design effect, which quantifies the increase in the standard error of the estimate due to the sampling procedure used (Cochran, 1977; Bennet et al., 1991). The design effect increases with the number of interviews sampled within a cluster and decreases for small intracluster correlation (ICC), $D = 1 + ICC\ (n - 1)$. Empirical data from previous DHS surveys suggested that high ICC occurs when measuring healthcare access, so we set ICC = 0:15; the design effect was slightly larger than 3.

The total sample size required was 3,960 households.

Alto Molócuè, Morrumbala, and Namacurra

The enumeration areas of three Zambézian districts were first divided into two intervention levels (0, 1 or more). Each intervention level had 103 EA sampled with 15 interviews each. The sample size was calculated to achieve a precision of 4.5% in each of the two strata Probabilistic selection criteria was used throughout the 3 district sample, except at the level of the household, when random sampling was used. To ensure a representative sample of households with access to health care, we used implicit stratification during selection of EA. Provincial districts have an average of 7 health centers and health posts and another 7 community posts (Lindelow et al., 2004). There are, however, differences across districts in the number of community posts, with some districts having many posts and many districts having none.

Ministry of Health centers are known to be located in the center (Sede, first locality) of each Administrative Post at a minimum. This Sede stratification is used instead of the more traditional urban/rural strata. Because the great majority of the population in Zambézia lives in rural areas, and because access to health care and other services is a key factor in the SCIP-Ogumaniha project, our sample contains approximately 30% of these areas with known health centers. Implicit selection and probability proportional to size sampling involves five steps: 1) order the list of EA (sample frame) by strata (here: district then locality), 2) create a cumulative count of households for the sample frame 3) determine a sampling interval by dividing the total number of households in the frame by the desired number of EA to sample, 4) select a random number between 1 and the sampling interval as a random start and select the EA with the corresponding cumulative household count, 5) then proceed to select EAs with replacement by adding the sampling interval to the start and selecting the EA containing the cumulative household count until the desired number of EA have been identified.

Zambézia Wide

To maintain a degree of generalizability across the province, a sample of households were selected for interview throughout the remaining 14 districts. Because 20% of the population is well represented in our concentrated sample of 3 districts (above), we needed fewer households from the remaining 80% of Zambézia. For the remaining 14 districts, we sampled 58 EA with 15 interviews each for a total of 870 households. Sample size is based on having 15 interviews per EA and yields slightly better than 5% precision.

Child Anthropometrics

To determine the number of children 0-59 months needed for anthropometrics, we needed to select a minimum detectable difference. A 2008 survey from USAID indicated that median Z-scores fell between -1 and -1.99 for H/A and W/A and above -1 for W/H among eight Zambézian districts in the Multi-Year Assistance Program (MYAP). This same survey found that 77% of Zambézian households had one or more children aged 0-59 months. We assumed equal variance from baseline to endline. We wanted to be able to reject the null hypothesis that the anthropometrics are unchanged from baseline to endline with probability (power) 0.90 and have the Type I error probability associated with our test of this null hypothesis equal to 0.05 (Levy and Lemeshow, 2008).

$$N = \frac{(1 + ICC(\bar{n} - 1))(Z_{\alpha} + Z_{\beta})^2 (2\sigma^2)}{(\bar{X}_2 - \bar{X}_1)^2}$$

Note, the anthropometrics design effect is smaller than the overall survey design effect because previous DHS surveys indicate low intracluster correlation for child anthropometrics, ICC = 0:07 (Aliago and Ruilin, 2006). To detect an improvement in mean z-score for H/A from -1.8 to -1.4, we will need to measure a minimum of 482 children 0-59 months with 10 HH per EA. To detect an improvement in mean z-score for W/A from -1.25 to -1 we will need to measure a minimum of 941 children 0-59 months with 10 HH per EA. If we rely on the prior

USAID survey and expect 70% of Zambézian households to have at least one child 0-59 months, then we plan to measure children as follows: [1] 3 districts: 37 EA will yield approximately 10 HH with a child 0-12 or 13-59 months. [2] Zambézia-wide: All 58 EA will yield approximately 10 HH with a child 0-12 or 13-59 months.

In total, a minimum of 950 HH with children under five should be considered for anthropometrics.

Potential Sources of Error

Quality of household survey results in resource-limited settings is limited to the clarity of survey instrument, execution of good sample selection, minimal non-response, and effective interviews. Every effort was taken to reduce sources for error and bias in the allotted time frame; however, it is important to acknowledge potential downfalls while interpreting survey results.

The survey was programmed for electronic data capture to minimize data entry errors during the transfer of data from paper to electronic form. However, low levels of familiarity with the mobile phone technology could have created new sources of error, particularly if incorrect values were entered. The lack of hard copies of completed surveys limited our ability to clean data where discrepancies appeared.

When a head of household refused to participate in the survey, this is a case of non-response. The data may not be considered missing at random; every effort was made to minimize and then summarize non-response. Interviewers were prepared for situations of non-response and they were instructed on how to pursue an interview at the selected household with persistence, but not coercion. Another form of non-response is refusal to answer particular survey questions that might have been sensitive in nature. To distinguish between missing data versus refusal to respond, we had two categories for no response: DK (does not know) and No Response (does not answer). Additionally, the field-testing to assess appropriateness of questions to the local context removed questions that may be overly sensitive in nature.

Intervention Score

To better quantify the impact of Ogumaniha interventions, an intervention score was calculated using a dose-response approach. The study design for determining the effectiveness of Ogumaniha interventions would ideally assign interventions randomly across similar communities, however, Ogumaniha partners already had preexisting infrastructure in place at survey baseline in 2010. Instead, intervention activities were tracked across enumeration areas (EA). This approach, and subsequent intervention scores, are derived from the knowledge that households received a spectrum of interventions--varying from numerous and lengthy to limited and brief. It is posited that households within an EA exposed to numerous or lengthy interventions (i.e. higher intervention scores) will have better indicator measures compared to households in a different EA receiving limited or brief interventions (i.e. lower intervention scores).

Results from these analyses are presented in Table 2. The intervention score (possible range 0-100) is a combination of measures from seven topic areas which were aggregated from sixty-three activities (Table 4). Individual district intervention scores and combined median scores have a possible score range from 0-100 representing interventions across seven different programmatic areas. There are no intervention scores above 75. In comparing the three Focus Districts across each area, Alto Molócuè has the highest median intervention scores of 35 [IQR 28-36] and 20 [IQR 20-20] in Capacity building for Preventative and Curative Care (Area 1) and in Community Participation/Linkages (Area 3), respectively, compared with the other two districts. Namacurra has the highest intervention scores in Health Practices and Health Behavior Change (18 [IQR 18-18]; Area 2), Clean and Multi-use water (39 [IQR 1-40]; Area 5), and Hygiene Practices (75 [IQR 0-75]; Area 6). Compared with Alto Molócuè and Namacurra, Morrumbala lags with no areas with higher intervention scores; notably, Areas 4-7 have intervention scores of 0. Income/Savings/Livelihood Generation (Area 4) and Demand Driven Investments

for Agricultural Production and Value Chain Additions (Area 7) all have low district wide median intervention scores of 0.

Table 2. Intervention Score Area Summary, median (interquartile range).

	Alto Molócuè (EA n=54)	Morrumbala (EA n=94)	Namacurra (EA n=58)	Combined (EA n=206)
Area 1: Capacity Building for Preventive and Curative Care	35 (28 - 36)	18 (18 - 30)	33 (33 - 33)	31 (18 - 34)
Area 2: Health Practices and Health Behavior Change	17 (17 - 17)	14 (12 - 16)	18 (18 - 18)	17 (13 - 18)
Area 3: Community Participation/Linkages	20 (20 - 20)	2 (0 - 12)	5 (5 - 15)	5 (2 - 15)
Area 4: Income/Savings/Livelihoods Generation	0 (0 - 1)	0 (0 - 1)	0 (0 - 0)	0 (0 - 0)
Area 5: Clean and Multi-use Water	19 (19 - 19)	0 (0 - 0)	39 (1 - 40)	1 (0 - 19)
Area 6: Hygiene Practices	45 (45 - 45)	0 (0 - 0)	75 (0 - 75)	0 (0 - 45)
Area 7: Demand Driven Investments for Agricultural Production and Value Chain Additions	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

The derived intervention score, is a measure of Ogumaniha intervention intensity, not performance, and was used to help understand and quantify the 2014 Endline survey results. The intervention scores, when interpreted in conjunction with survey data, can help elucidate if households within an EA exposed to numerous and/or lengthy interventions or brief and limited interventions are associated with improved or unimproved indicator measures. For example, it would be generally expected that a district intervention score of 75 out of 100 in Namacurra for Hygiene Practices (Area 6) would yield associated gains in those indicator measures (e.g. using a safe source for drinking water or a decrease in childhood diarrhea prevalence). Conversely, it might be expected that a district intervention score of 14 out of 100 in Morrumbala for Health Practices and Health Behavior Change (Area 2) might result in less gain with little or no improvement in associated indicator measures (e.g. receiving full package of antenatal services or knowing about HIV counseling and testing services).

Chart 1 outlines the key activities that fall within the seven aforementioned Program Areas, including color-coded intervention intensity levels based on the number of EA's receiving the intervention, all separated out by quarters of the project time period to illustrate length of the intervention. Table 3 summarizes only the 206 EA selected for impact evaluation in three focus districts. Thus, project interventions performed outside of these areas are not captured in this table.

Chart 1: Intervention score components by Program Area and Quarter among 206 EA

Legend	Number of *Ogumaniha* EAs																			
	127-188																			
	64-126																			
	1-63	Year 1				Year 2				Year 3				Year 4				Year 5			
	0	2009	2010			2011				2012				2013				2014			
Intervention	**Key Activity**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**	**Q1**	**Q2**	**Q3**	**Q4**
Area 1: Capacity Building for Preventive and Curative Care	Train and support for CHCs	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Train radio listening program moderators	0	0	0	0	0	0	0	136	0	0	0	0	0	0	0	0	0	0	0	0
	Train HBC activists to promote adherence to ART, nutrition , and provide quality palliative care	0	0	0	0	0	0	0	0	0	134	0	0	0	0	46	6	0	0	0	0
	Supply bicycles for home visiting activities	0	0	0	0	0	0	0	104	51	51	56	108	135	181	135	135	135	135	135	135
	Timed and Targeted Counseling and Household Registers	0	0	0	0	65	111	111	111	168	184	184	184	184	184	184	184	184	184	184	168
	Promote the consumption of local food crops with high nutritional values	0	0	0	0	33	130	130	130	130	130	121	114	121	72	72	72	72	72	72	72
	Build capacity of household members in best practices of food hygiene and food security	0	0	0	0	33	72	130	130	130	130	130	130	130	130	130	130	130	130	130	130
	Train Mother/Father Groups to proactively monitor children < 2 for adequate growth/weight gain	0	46	46	46	55	130	130	188	188	188	188	188	188	188	188	188	188	188	188	188
	Provide financial support for the pre-service training and supervision of APEs	0	0	0	0	0	0	0	0	0	0	0	0	0	58	0	0	0	0	0	0
	Support the construction of 32 new waiting houses for pregnant women	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	41	41
	Link and refer pregnant women by HCs to HFs and other partners to address antenatal and postpartum nutrition needs	0	46	46	46	57	188	188	188	188	188	188	188	188	188	188	188	188	188	188	188
	Support an interactive SMS radio program targeting adolescents health questions	0	0	0	0	0	0	0	0	0	0	0	0	0	43	89	89	89	89	89	89
	Bicycle ambulance provided to Health Committees	0	0	0	0	0	0	0	14	14	14	14	14	81	86	86	86	86	86	130	128
	Support camping mobile brigades	58	58	58	58	58	58	58	58	58	58	104	104	104	130	130	130	130	130	130	130
	Provide 5 motorcycles for use by peripheral HF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	6
	Rehabilitate 5 HF within target districts	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	21	12	12	12
	Community Case Management (CCM)	0	46	46	46	46	46	46	46	46	46	46	130	130	188	155	155	155	155	155	155
Area 2: Health Practices and Health Behavior Change	Refresher training for Home Visitors (HV)	0	0	0	0	0	0	0	0	0	7	0	46	0	126	182	78	124	136	78	78
	Mobilize community for adult male circumcision promotion, and surgery	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	46	46	0	0	0
	Target couples, family members, and the chronicall ill with HIV for ART for ATS-C and refer to HFs.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	46	46	46	46	46
	Improved Implementation of high impact interventions	0	0	0	0	0	0	0	0	4	82	133	133	133	133	133	133	133	133	133	133
	Household advocacy	0	0	0	0	0	0	0	0	0	0	0	0	0	0	84	84	0	0	0	0
	Family planning and HTSP	0	58	58	58	58	58	58	104	115	173	173	173	173	173	173	173	173	173	173	173
	Develop health messages	0	0	0	0	0	0	0	58	99	99	145	99	99	99	99	99	41	41	41	41
	Theater Groups	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Establish and strengthen mother support groups	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Create Parents Advisory Groups so both men and women are included in social transformation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Implement a Nicoadala 3-in-1 intervention with female sex workers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Implement discussion around multple concurrent partners and cross generational sex	0	0	0	0	0	0	0	0	0	7	16	58	58	58	58	58	58	58	58	58
	Distribute condoms and HIV/AIDS prevention materials	0	0	0	0	0	6	6	6	48	64	64	64	64	64	6	6	6	6	6	6
	Community Prevention	0	0	0	0	46	46	46	46	46	104	104	104	104	104	104	104	104	104	104	104
	Train 2 Junior Farmers per group to be peer educators	0	0	0	0	4	0	0	7	51	0	0	0	0	22	16	16	16	16	16	16
	Identify and train peer educators groups on prevention of HIV/AIDS	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	Health counseling and testing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Organize a training session for community leaders on Gender	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Encourage the referral of OVC and PLWHAs I / II to HF for primary health care and CT, PMTCT, HAART	0	0	0	0	125	180	180	180	180	180	180	180	180	182	182	182	182	182	182	182
	Train HBC activists to promote adherence to ART, nutrition , and provide quality palliative care	0	0	44	44	44	44	90	90	90	148	90	90	90	90	105	115	115	115	115	115
	Infant and young child feeding best practices	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Household food security	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Train new IMCI, RH agents and TBA in the HCs in HBLSS activities'	0	0	0	0	0	0	0	130	102	44	44	44	90	44	44	44	58	44	44	44
	Support to malnourished pregnant women	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Transport and community arrangements are in place	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Use Vulnerable Child Advocacy (VCA) to address underlying socio-cultural problems at community-level (ex. gender based violence).	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	46	46
	Establish new associations of PLWHA and provide support to legalize those that are yet to be legalized and continue to work with them to promote treatment adherence amongst patients on ART.'	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Mobilize and sensitize TBAs and APEs to refer emergency cases, postpartum care, and family planning to HF	0	86	86	86	86	104	104	108	188	188	188	188	188	188	188	188	188	188	188	188
Area 3: Community Participation/Linkages	Provide HFs with technical support in establishing co-management committee in all SDMAS	0	0	0	0	0	0	0	0	0	0	0	0	0	46	48	139	100	100	100	100
	Conduct participatory learning and action (PLA)	0	0	0	0	0	0	0	0	0	58	0	0	0	0	0	44	0	0	46	0
Area 4: Income/Savings/Livelihood Generation	Partner with and expand Women First distribution of health kits	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Inventory HC local health improvement initiatives and assist, in order of priority, to engage potential private sector entities for the facilitation of credit for the more advanced HC. '	0	0	0	0	0	0	0	0	0	0	29	0	0	0	11	0	0	8	0	0
	To train OVCs in IGAs assessment and implementation agreed activities	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	22	6	6	6	6
	Form and equip 51 new saving groups (96 groups by the end of FY13)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	0	0
	Junior Farmer Irrigation Groups to integrate OVC into Farmers associations	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Area 5: Clean and Multi-use Water	Construction of protected water sources by trained masons	0	0	0	6	0	0	0	63	0	0	0	0	0	0	0	0	0	0	0	0
	Rehabilitation of existing boreholes	0	0	0	10	0	5	0	21	0	0	0	46	0	0	0	46	0	0	0	46
	Promote point-of-use water treatment/response to epidemics	0	0	6	6	12	51	51	51	45	91	91	45	45	91	91	45	45	91	91	45
	Establish/re-organize water committees	0	0	6	6	12	51	51	51	51	97	97	51	51	97	97	51	51	97	97	51
Area 6: Hygiene Practices	Train communities in construction and use of tippy-tap	0	0	6	6	12	51	51	51	51	97	97	97	51	97	97	97	51	97	97	97
Area 7: Demand Driven Investments for Agricultural Production and Value Chain Additions	Assistance to strengthen storage, handling, and processing in target VCs	0	0	12	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Markets, federations, and commercial growing'	0	0	12	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Promote conservation farming basins for increased water and soil conservation	0	0	12	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Animal traction for increased labor productivity	0	0	12	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Statistical Analysis

The statistical analysis plan is dated 30 April 2014. In this plan, table shells were created for basic descriptive statistics of Baseline and Endline survey results. In all descriptive analyses, continuous variables were reported as weighted estimates of median (interquartile range) and categorical variables were reported as weighted percentages, with each observation weighted by the inverse of the household (or child) sampling probability. Missing data were considered ignorable if 5% or fewer observations are not recorded.

In the statistical analysis plan and below, we outlined the basic types of regression analysis that were conducted. Following that, we specified which outcomes from the survey instrument were to be assessed and any potential confounders that were to be included in multivariable regression analysis (not shown). The ideal experiment would be to collect a large list of communities and randomize interventions in a community randomized trial with little crossover and high fidelity of intervention; however, given existing infrastructure and lack of support for this approach, the M&E team settled on the alternative which was to condition on actual intervention. Following the project administration, the M&E team assessed all of the sampled enumeration areas (EA) for the Intervention Score (described above).

Generally, for each outcome, we assessed the associated impact of the *Ogumaniha* SCIP project using 1) an analysis that ignores intervention (i.e., a pre-post analysis), followed by 2) an analysis that dichotomizes intervention receipt (i.e., intervention score zero vs. >zero), and lastly by 3) an analysis that includes the domain specific intervention score as a continuous predictor (i.e., a dose-response analysis). The pre-post analysis (analysis 1) assessed the overall improvement of the population, although with this latter analysis, we will not be able to distinguish between changes due to intervention or natural changes over time. The dose-response analysis (analysis 3) should improve statistical power over the dichotomous "yes/no" intervention receipt analysis (analysis 2). All models accounted for correlation within EA using robust standard errors.

For interval (continuous) outcomes and intervention receipt dichotomized, we fit linear mixed effects models with random effect for EA. A simple model for the expected outcome, $E(Y_{ijk})$, for the k^{th} household in the i^{th} EA at the j^{th} timepoint is given by:

$$E(Y_{ijk}) = \beta_o + \beta_1 t_j + \beta_2 I_i + \beta_3 t_j I_i \qquad \text{(Equation 1)}$$

where time, t_j, took two values corresponding to surveys taken at Baseline and Endline. I_i is an indicator of intervention in the i^{th} EA. Therefore, β_1 can be interpreted as the average change in outcome from year 0 to 5 given no intervention, β_2 is the average difference in outcome at year 0 between those households in an EA with an intervention versus those without, and β_3 is the average intervention effect, corresponding to the average change in outcome over time for those households in an EA with an intervention versus those without. Of primary interest will be to test the hypothesis, $H_0: \beta_3 = 0$. The models included covariate adjustment (both at the household and EA levels) as specified in the statistical analysis plan. All models used the Huber-White method to adjust for correlated responses from cluster samples as a result of our sampling design.

Changes in modeling approach relative to scale of outcome (interval, binary, or ordinal) and assessment approach (pre-post ignoring intervention, dichotomous intervention receipt, and continuous intervention score) are summarized in Table 3. The basic form of each model is very similar to that described above, only the link function changed according to the outcome and the intervention assessment differently. For analyses incorporating continuous intervention score, we expanded the predictor using restricted cubic splines to avoid making assumptions of linearity between the continuous intervention score and the expected outcome.

Analytic results in this report were obtained using R statistical software (http://www.r-project.org/).

Table 3: Modeling approach relative to various outcomes and 3 assessment approaches

Scale[1]	**Model Outcome**	**Pre-post ignoring intervention**	**Dichotomous intervention receipt**	**Continuous intervention score**
Interval (continuous)	$E(Y_{ijk})$ Linear Regression	I_i is omitted $H_0: \beta_1 = 0$	$I_i = \{0,1\}$	$I_i = \{0, \dots, 100\}$ (transformed in case of nonlinearity)
Binary (dichotomous)	logit $P(Y_{ijk})$ Logistic Regression	I_i is omitted $H_0: \beta_1 = 0$	$I_i = \{0,1\}$	$I_i = \{0, \dots, 100\}$ (transformed in case of nonlinearity)
Ordinal (ordered category)	logit $P(Y_{ijk} \leq d)$ *where d* is the ordered response category. Proportional Odds Model	I_i is omitted $H_0: \beta_1 = 0$	$I_i = \{0,1\}$	$I_i = \{0, \dots, 100\}$ (transformed in case of nonlinearity)

[1]No outcomes with greater than 2 categories (i.e., nominal) were selected for assessment of primary outcomes. As an example, sources of drinking water were categorized as safe and unsafe in order to assess the increase in safe water access as opposed to changes in proportions of water accessed from tap, rain, well, river, bottled, or household container. Changes from unsafe to safe are more meaningful to the intervention.

Results

1. Data Collection and Survey Response

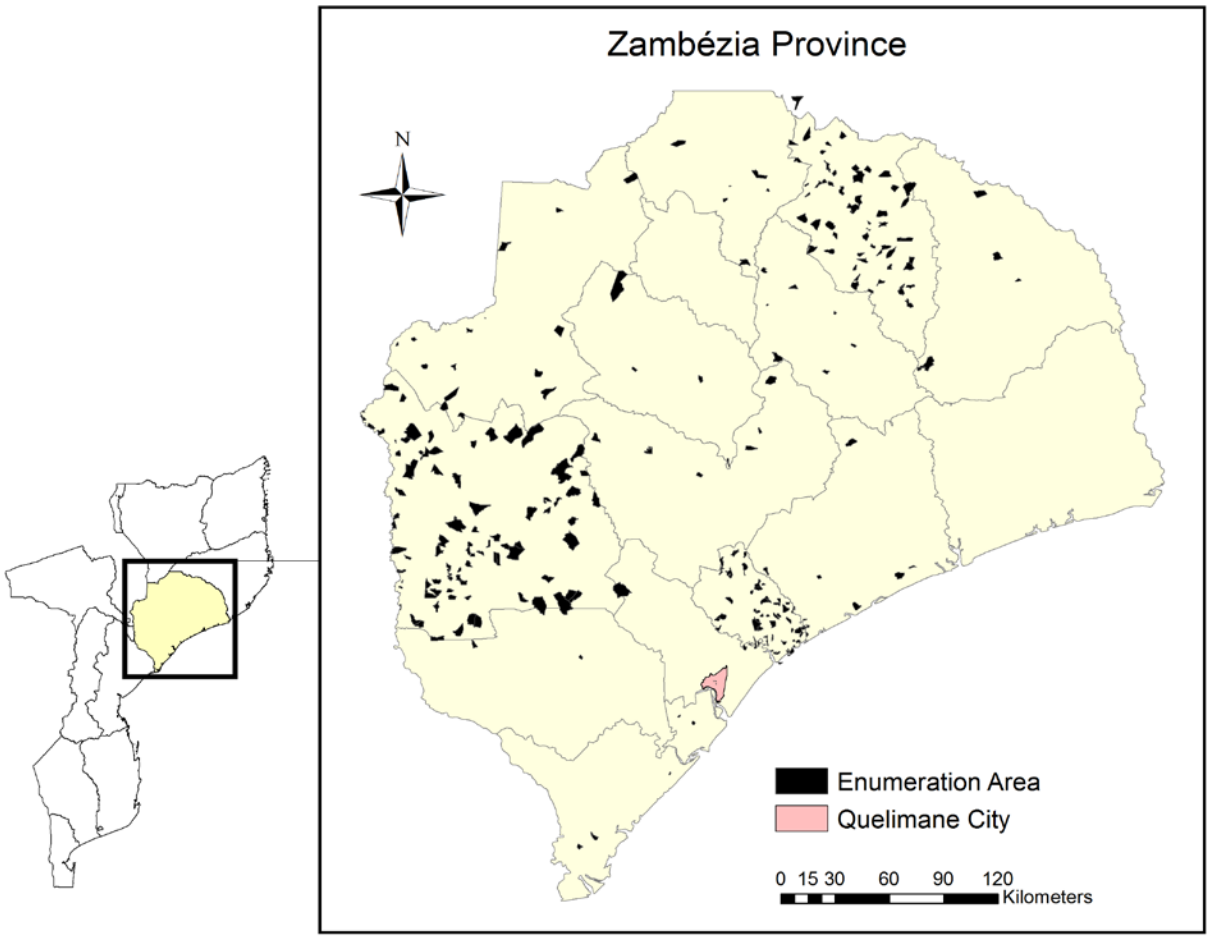
Baseline data collection was carried out between 8 August and 25 September, 2010 and Endline survey data collection was conducted from 12 May and 15 June 2014. Tables 4-6 below show metadata comparison from Baseline to Endline surveys.

Table 4: Survey Collection

	Total EAs			Total Households			Child Anthropometrics		
	Planned	Completed	Databased	Planned	Completed	Databased	Planned	Completed	Databased
Baseline	264	262	259	3960	3916	3749	950	1377	667
Endline	264	262	255	3930	3906	3892	950	1281	1120

Table 4 above captures the total number of EAs completed, households surveyed, and children measured during the Baseline and Endline surveys. Only two enumeration areas in the entire survey were not completed at Baseline and Endline. For Baseline, both of these enumeration areas were locations separated from contiguous land areas by rivers that were beyond normal volume capacity, due to the rainy season. At the time of survey implementation, no means for interviewers to cross the rivers (boat, canoe etc.) could be found. At Endline, one EA was inaccessible and one EA was deemed unsafe due to political conflicts.

Prior to survey implementation, survey teams were given copies of any maps or graphical representations of areas that could help in the identification of the area selected for data collection. Details of the descriptive names of the EAs were used to help narrow down the location: district, administrative post, locality, population area (povoado), and village. Upon arrival at the locality of the EA selected, local leaders were asked whether any additional graphical information, including community maps, were available for the area of interest. Once the team arrived in the population area and/or village, the team requested the *Régulo* to accompany the team to the area, in order to identify the area and its borders; any points of reference, such as roads, rivers, schools and others that could help identify the area to be covered.



Following the identification of the EA borders, the team divided the area into four quadrants. Starting in one quadrant, the team would split up, and then followed the protocols for household selection where only topographic maps were available.

At Endline, there were 3,906 surveys completed in 262 EAs across 14 districts in Zambézia with a median interview time of 54 minutes (Figure 1). Of these, 3,892 surveys had sufficient data completed to be databased for analysis. Endline survey interviews were conducted during a 35 day period, yielding approximately 114 interviews per day (Table 5 and 6).

Table 5: Survey Response

	Baseline	Endline	Combined
Survey Collection Status, n(%)			
Other, survey incomplete	10 (0.3%)	0 (0.0%)	10 (0.1%)
Participant quits	1 (< 0.1%)	0 (0.0%)	1 (< 0.1%)
Safety concern at location	2 (0.1%)	0 (0.0%)	2 (< 0.1%)
Survey´s Analyzed	3,736 (99.7%)	3,892 (100.0%)	7,628 (99.8%)
Length of interview (minutes)[a]	72 (49 - 107)	54 (39 - 88)	63 (43 - 99)

a) Interview time is reported as median (interquartile range).

Table 6: Survey Response by District

	Baseline		Endline	
District	Number of Interviews	Number of EAs	Number of Interviews	Number of EAs
Alto Molócuè	815	51	785	52
Chinde	43	3	46	3
Gile	58	4	65	4
Gurúe	106	7	90	6
Ile	68	6	104	7
Inhassunge	30	2	27	2
Lugela	55	4	61	4
Maganja da Costa	113	7	105	7
Milange	179	12	180	12
Mocuba	92	7	103	7
Mopeia	26	2	32	2
Morrumbala	1295	93	1379	91
Namacurra	824	58	860	56
Quelimane	45	3	55	3

2. Demographics

Table 7 gives summary demographic information of the female respondent and household. The median age (interquartile range, IQR) of survey respondents was 27 (22-34), ranging in age from 16 to 62 years. Most (67.9%) were officially married or in a common law relationship. Formal education was low, with a median (IQR) 3 (0- 5) years of completed education and a range of 0 to 12 years. Forty-three percent of female heads of households reported fluency in Portuguese.

Table 7: Basic Demographics: Female Head of Household

	Baseline (n=3749)	Endline (n=3892)
Age of respondent	29 (23 - 37)	27 (22 - 34)
Marital Status		
Single	17.4%	28.6%
Married/Common Law	74.0%	67.9%
Widowed	4.8%	1.6%
Divorced/Separated	3.8%	2.0%
Years of Education	2 (0 - 4)	3 (0 - 5)
Education category		
0-5 years	86.9%	79.7%
6-10 years	12.1%	17.1%
> 10 years	1.0%	3.3%
Household size	5 (3 - 6)	5 (4 - 6)
Any child under age 5	76.7%	86.9%
Respondent understands Portuguese	39.0%	43.1%
Primary language of household		
Cinyanja	15.0%	14.3%
Cisena	12.5%	11.8%
Echuabo	23.8%	20.3%
Elomwe	40.0%	33.6%
Emakhuwa	0.5%	0.3%
Maindo	0.0%	0.7%
Nharinga	0.0%	1.4%
Portuguese	8.2%	8.3%
Ethnic group identity:		
Elomwe	37.8%	27.1%
Echuabo	34.7%	14.1%
Cisena	12.7%	10.2%
Cinyanja	11.3%	8.4%
Emakhuwa	2.6%	0.5%
Religion		
Missing, n(%)	315 (8.4%)	261 (6.7%)
Catholic	44.3%	52.2%
Protestant	14.9%	10.7%
Evangelical and Pentecostal	16.5%	16.1%
Other Christian	4.3%	5.1%
Muslim	8.9%	11.9%
Non-Christian Eastern	2.5%	0.5%
Other	8.5%	3.5%
Length of residency (years)	5 (3 - 11)	8 (6 - 12)
Urban/rural		
Rural	80.4%	80.2%
Urban	19.6%	19.8%
Household has orphans	17.3%	10.5%
Household with orphans receive assistance	2.9%	4.1%

a) Continuous variables are reported as weighted estimates of median (interquartile range), with each observation being weighted by the inverse of the household sampling probability.
b) Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability.
c) `Other Christian' includes LDS Mormon and Jehovah's Witness. `Other' includes Spiritual, Traditional Religions, and Agnostic or Atheist.
d) Percentages may not sum to 100%.

The median (IQR) household size was 5 (4- 6) members. Surveys were conducted in Elomwe, Echuabo, Cisena, and Chinyanja in order of volume, with a small proportion of Emakhuwa households (0.5%). Eighty-six percent of households had at least one child under the age of five. Most households self-identified their religion as Catholic (52.2%), although there were various other religions. The median (IQR) length of residency in the current location was 8 (6-12) years. Greater than 80% of respondents reported living in a rural location. Just over 10% of respondents reported having orphans living within their household, with 4.1% reporting that they had ever received assistance through OVC activities.

OBJECTIVES

For each of the three Ogumaniha Programmatic Objectives, data will be presented in the following sequence of results:

All Province -

- **Whole Province General Estimates**: Percentage and median response at Endline *from all survey respondents,* with Baseline estimates shown for comparison.

Three Focus Districts -

- **Change since Baseline within the 3 Focus Districts**: Odds ratios (OR) and Effects with 95% confidence intervals (CI) for select indicators *from all EAs within the three focus districts (Alto Molócuè, Morrumbala, and Namacurra).*

- **Change since Baseline for EAs within the 3 Focus Districts exposed to some Ogumaniha interventions**: OR and Effects with 95% CI for select indicators *from only those EA within the three focus districts* comparing receipt of at least some interventions from Ogumaniha (determined by an intervention score >15) with little to no intervention. This allows for of change from Baseline to Endline in areas exposed to intervention versus those that were not.

- **Change since Baseline for EAs within the 3 Focus Districts by intensity of area specific Ogumaniha interventions (dose response):** OR and Effects with 95% CI for select indicators *from only those EA within the three focus districts* by level of exposure to area specific Ogumaniha interventions believed to directly impact the project indicator.

3. Objective 1: Increase access, quality and use of community and facility-based services

3.1 Malaria, HIV Care and Treatment Services, Health Access and Satisfaction

Malaria, HIV CT Services, Health Access & Satisfaction - All Province

3.1.1 Malaria

Malaria is an endemic disease across all regions of Mozambique. Though decreasing over time, the burden of this disease remains large. In 2011 (DHS, 2011), Malaria accounted for upwards of 40% of all outpatient clinic visits and represented 60% of causes for being admitted to the pediatric inpatient wards. Additionally, 20% of pregnant women are reported as being positive for malaria at some point during their pregnancy. The main interventions

for controlling malaria consist of in-door residual spraying, utilization of insecticide treated bed nets, and the rapid diagnosis and treatment of cases.

Table 8 provides information on malaria in the household. Twenty-four percent of respondents reported having had malaria either currently (8.2%) or recently (16.7%), down from 45.8% at Baseline. Between Baseline and Endline, the proportion of interviewees that reported NEVER having had malaria increased from 26.7% to 47.7%. Sixty-four percent of households reported having mosquito nets in the house, which was similar to Baseline (64.9%). The number of respondents reporting having slept under a bed net the previous night increased from 46.9% at Baseline to 83.8% at Endline, nearly a 37% increase.

Table 8: Malaria Occurrence and Prevention

	Baseline (n=3749)	Endline (n=3892)
Fell ill with malaria		
Missing, n (%)	141 (3.8%)	420 (10.8%)
No	26.7%	47.7%
Yes, now	10.3%	8.2%
Yes, recently	35.5%	16.7%
Yes, now + recently	45.8%	24.9%
Yes, ever in the past	27.4%	27.5%
Inventory of household bed nets		
None	35.2%	35.7%
Less than the number of beds	23.0%	35.4%
One for every bed	38.4%	25.5%
More than the number of beds	3.5%	3.3%
Household purchased 1 or more bed net	68.7%	60.3%
Number of bed nets purchased	1 (0 - 2)	1 (0 - 2)
Household received 1 or more bed net donations	59.3%	34.7%
Number of bed nets donated	1 (0 - 2)	0 (0 - 1)
Respondent slept under bed net previous night	46.9%	83.8%

a) Continuous variables are reported as weighted estimates of median (interquartile range), with each observation being weighted by the inverse of the child household probability.
b) Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the child household probability.

3.1.2 HIV Care and Treatment Services

Since 2006, considerable resources have been invested in Zambézia Province, through programs such as the President´s Emergency Plan for AIDS Relief (PEPFAR), to scale-up access to HIV prevention, care and treatment. Table 9 provides information on respondents' knowledge and/or utilization of select HIV services offered. In general, only 50% of respondents had ever heard of HIV counseling and testing (CT) services, a proportion relatively unchanged since Baseline. However, of those who had knowledge of CT, 96.2% could correctly identify where to receive services. Of respondents who had knowledge of CT, roughly half (48.8%) had been tested within the 6 months prior to survey implementation, an increase from 34% at Baseline. Of those tested, 92.7% received their HIV test result, up from 76.2% at baseline.

Additionally, 76.5% of respondents reported being aware that HIV could be treated with ART, an increase from 69.3% at baseline. Of those with knowledge that HIV could be treated with ART, 99.2% correctly reported that ART services could be received at a hospital, health facility, or health post and nearly 95% of respondents answered they felt ART helps people to be healthier. Of these same respondents, 43.4% reported they believed that traditional healers had alternative treatments to ART that were available to treat HIV, up from 24.3% at baseline.

Table 9: HIV Care and Treatment Services

	Baseline (n=3749)	Endline (n=3892)
Ever heard of counseling and testing services	43.8%	49.8%
Among respondents who know of CT:		
Locations identified to receive CT		
Hospital, health facility, and health post	87.7%	96.2%
School	5.8%	1.5%
Church	5.2%	1.4%
Traditional Healer	0.9%	0.8%
Other	0.0%	0.2%
Received CT in past 6 months	34.0%	48.8%
Received CT result	76.2%	92.7%
Received CT prior to past 6 months	30.6%	47.1%
Received CT result	84.6%	97.5%
Believes it is worthwhile to test and know HIV status	77.2%	70.1%
Knows that HIV can be treated with ART	69.3%	76.5%
Among respondents who know of ART, knowledge of where to receive ART services:		
Hospital, health facility, and health post	88.0%	99.2%
School	3.5%	1.6%
Church	1.0%	0.6%
Traditional Healer	1.6%	0.8%
Other	0.4%	0.6%
ART helps people with HIV to be healthier	85.6%	94.9%
Alternative treatments available to treat HIV from Traditional healers	24.3%	43.4%

3.1.3 Healthcare Access and Satisfaction

Table 10 describes health care utilization and satisfaction. Respondents were asked if they had EVER used government supported health facilities as well as traditional healers for their health care. Of all respondents, 68% reported having ever used a government supported health facility, compared to 42.2% that reported ever using a traditional healer. Among those who visited a health facility, 88.8% reported they were treated well, 88.7% were satisfied with their care, 88.2% reported their medical problem improved, 88.7% were satisfied with the condition of the facility, and 89.4% reported they would return to the facility.

Among those who had ever visited a traditional healer, 83.2% reported being treated well, 81.5% were satisfied with their care, and 80.9% reported their medical problem improved.

Table 10: Health Care Access and Satisfaction

	Baseline (n=3749)	Endline (n=3892)
Ever visited a government health facility for health problem	75.0%	68.0%
Among those who have ever visited a government health facility:		
Treated well by staff	91.8%	88.8%
Satisfied with care received	89.4%	88.7%
Medical problem improved	87.0%	88.2%
Satisfied with condition of health facility	90.1%	88.7%
Health facility was clean	93.4%	92.1%
Would return to health facility	95.9%	89.4%
Number of visits to health facility by any household member in 3 months	1 (0 - 2)	1 (0 - 2)
Ever visited a traditional healer for health problem	45.4%	42.2%
Among those who have ever visited a traditional healer:		
Treated well by traditional healer	80.7%	83.2%
Satisfied with care received	77.8%	81.5%
Medical problem improved	70.8%	80.9%
Number of visits to traditional healer by any household member in 3 months	1 (0 - 2)	1 (0 - 2)

a) Continuous variables are reported as weighted estimates of median (interquartile range), with each observation being weighted by the inverse of the household sampling probability.
b) Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability.

Malaria, HIV CT Services, Health Access & Satisfaction - Three Focus Districts

3.1.4 Malaria, HIV Care and Treatment Services, Healthcare Access: Change since Baseline in 3 Focus Districts

In comparison to Baseline, the three Focus Districts show statistically significant improvements in nearly all of the selected Malaria, HIV, and Health Services indicators (Table 11). Respondents had nearly 8 times higher odds of sleeping under a bed net in the previous night. Additionally, statistically significant improvements were seen for knowledge of and receipt of counseling and testing for HIV. Respondents showed significant improvement in the use of a health facility for health problems, as well as higher odds of reporting this as a positive experience.

Stigma related to HIV remains a common barrier to a persons seeking testing, disclosure of status, and subsequent pursuit of needed healthcare to remain healthy. For this survey, questions were asked 1) related to attitudes, beliefs, and behaviors that the respondent endorses that reflect labels and stereotypes that devalue an HIV positive person to a socially undesirable state (negative labeling/devaluation); and 2) related to specific discriminatory actions the respondent endorses that could lead to the social exclusion of an HIV positive person (social exclusion). Since Baseline, both indicators have seen a net decrease (negative shift) in the respondent´s endorsement of these discriminatory behaviors, with this being statistically significant for decrease for attitudes and beliefs promoting social exclusion.

Table 11: Malaria, HIV, and Health Services: Endline versus Baseline

	Number in model	OR (95% CI)	P-value
Slept under bed net last night	4742	7.67 (6.43, 9.16)	< 0.001
Knows of counseling and testing (CT)	5229	1.36 (1.09, 1.69)	0.006
Received CT in past 6 months	5212	1.59 (1.24, 2.05)	< 0.001
Ever received CT	5221	1.48 (1.14, 1.93)	0.003
Ever visited a government health facility (HF) for health problem	5801	1.79 (1.51, 2.13)	< 0.001
Number of positive experiences with HF (increased)	3419	1.39 (1.06, 1.81)	0.016
		Effect (95% CI)	
HIV stigma - Negative labeling/devaluation	4906	-1.44 (-2.92, 0.04)	0.056
HIV stigma - Social exclusion	4861	-4.50 (-6.58, -2.41)	< 0.001

a] The odd ratio comparing endline survey with baseline survey ignoring intervention receipt. Effect estimates are from linear regression and represent the average change in the indicator from baseline to endline ignoring intervention receipt.
b] Test of association between survey period and indicators. This does correspond to the odds ratio.
1] Adjusted for: rural/urban; sex of child; maternal education; transportation; household size; traditional healer use in past 12 months
2] Adjusted for: rural/urban; age of child; sex of child; maternal education; household size; Portuguese speaker
3] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker
4] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker; traditional healer use in past 12 months

In EA with a minimum Ogumaniha intervention score > 15, statistically significant improvements were shown for knowledge of and receipt of counseling and testing for HIV as well as in the reduction of attitudes and behaviors that endorse social exclusion for an HIV-infected individual. However, sleeping under a bed net in the previous night showed a statistically significant decline, suggesting that improvements in this area were due to work of other projects. Of note, Alto Molócuè received 155,149 bed nets distributed in 2012 by World Vision with Global Fund monies. Namacurra received 199,719 bed nets from USAID partner PSI in February 2014. Morrumbala at the time of this report has not received large scale bed net distribution.

Table 12: Malaria, HIV, and Health Services with Some Intervention Exposure (Score > 15)

	Number in model	Baseline OR (95% CI)	Endline OR (95% CI)	P-value
Slept under bed net last night	4742	1.39 (1.11, 1.73)	0.93 (0.67, 1.31)	0.027
Knows of counseling and testing (CT)	5229	0.99 (0.75, 1.30)	1.52 (1.09, 2.13)	0.032
Received CT in past 6 months	5212	0.98 (0.72, 1.32)	1.55 (1.02, 2.36)	0.065
Ever received CT	5221	0.94 (0.69, 1.26)	1.77 (1.17, 2.67)	0.012
Ever visited a government health facility (HF) for health problem	5801	1.72 (1.33, 2.22)	1.52 (1.16, 1.97)	0.449
Number of positive experiences with HF (increased)	3419	0.90 (0.66, 1.22)	1.17 (0.83, 1.65)	0.247
		Effect (95% CI)	Effect (95% CI)	
HIV stigma - Negative labeling/devaluation	4906	-2.85 (-4.84, -0.86)	-0.31 (-2.21, 1.58)	0.048
HIV stigma - Social exclusion	4861	2.55 (0.40, 4.69)	-3.75 (-6.92, -0.58)	< 0.001

a] The odds ratio comparing intervention receipt versus no intervention receipt for the baseline and endline survey periods. Effect estimates are from linear regression and represent the average change in the indicator for corresponding intervention receipt.
b] Test of interaction between survey period and intervention receipt. Interpreted as the contrast between the two odds ratios from baseline and endline. Result of testing whether indicators among respondents from EAs with intervention had a larger difference from baseline to endline than respondents from EAs with no recorded intervention.
1] Adjusted for: rural/urban; sex of child; maternal education; transportation; household size; traditional healer use in past 12 months
2] Adjusted for: rural/urban; age of child; sex of child; maternal education; household size; Portuguese speaker
3] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker
4] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker; traditional healer use in past 12 months

In order to show the relationship between Ogumaniha intervention implementation and the changes seen in indicator results since Baseline, we analyzed the Malaria, HIV, and Health Services indicators in relation to the intensity of area specific intervention score (Table 13). For this analysis we developed a "health intervention specific" score utilizing intervention Areas 1 and 2 and a "health infrastructure" score utilizing intervention Area 3 (see Methods section: Intervention Score). As intensity of Ogumaniha health interventions increased in a given EA within the three focus districts, an increasingly larger odds of improvement was seen for sleeping under a bed net, having ever received counseling and testing for HIV, having visited a health facility for a health problem, having a positive experience at the health facility, and reduction in attitudes and behaviors that endorse social exclusion in an HIV-infected individual.

Table 13: Malaria, HIV, and Health Services by Amount of HEALTH and/or INFRASTRUCTURE Intervention Exposure

	Number in model	Baseline OR (95% CI)	Endline OR (95% CI)	P-value
Slept under bed net last night	4742			< 0.001
16.25 vs. 0		0.85 (0.53, 1.36)	2.16 (1.24, 3.76)	
24 vs. 0		1.40 (0.93, 2.10)	3.93 (2.37, 6.53)	
26 vs. 0		1.58 (1.06, 2.35)	3.65 (2.22, 5.99)	
Knows of counseling and testing (CT)	5229			0.027
16.25 vs. 0		1.30 (0.75, 2.24)	1.50 (0.75, 3.01)	
24 vs. 0		3.18 (1.98, 5.10)	2.42 (1.24, 4.75)	
26 vs. 0		3.45 (2.17, 5.47)	2.91 (1.51, 5.61)	
Received CT in past 6 months	5212			0.139
16.25 vs. 0		1.22 (0.64, 2.36)	1.16 (0.41, 3.29)	
24 vs. 0		1.69 (0.99, 2.90)	1.78 (0.64, 4.91)	
26 vs. 0		1.76 (1.03, 2.99)	2.17 (0.81, 5.84)	
Ever received CT	5221			0.039
16.25 vs. 0		1.08 (0.55, 2.13)	1.17 (0.40, 3.43)	
24 vs. 0		1.66 (0.96, 2.89)	1.83 (0.64, 5.26)	
26 vs. 0		1.70 (0.99, 2.91)	2.23 (0.80, 6.23)	
Ever visited a government health facility (HF) for health problem	5801			0.005
2 vs. 0		1.76 (1.49, 2.09)	1.67 (1.42, 1.97)	
5 vs. 0		3.34 (2.30, 4.86)	3.13 (2.18, 4.50)	
15 vs. 0		1.31 (0.91, 1.89)	2.36 (1.71, 3.25)	
Number of positive experiences with HF (increased)	3419			0.002
2 vs. 0		1.22 (1.00, 1.49)	1.55 (1.18, 2.04)	
5 vs. 0		1.59 (1.03, 2.45)	2.58 (1.42, 4.69)	
15 vs. 0		1.24 (0.84, 1.82)	1.70 (1.07, 2.72)	
		Effect (95% CI)	**Effect (95% CI)**	
HIV stigma - Negative labeling/devaluation	4906			0.810
16.25 vs. 0		-3.96 (-10.18, 2.26)	-4.15 (-7.63, -0.67)	
24 vs. 0		0.00 (-5.90, 5.90)	-1.45 (-4.62, 1.72)	
26 vs. 0		0.36 (-5.34, 6.06)	-1.14 (-4.27, 2.00)	
HIV stigma - Social exclusion	4861			< 0.001
16.25 vs. 0		-2.84 (-7.60, 1.91)	4.12 (-1.01, 9.25)	
24 vs. 0		-4.45 (-8.71, -0.19)	-6.05 (-10.82, -1.28)	
26 vs. 0		-4.29 (-8.44, -0.14)	-9.94 (-14.59, -5.29)	

a] The odds ratio comparing corresponding intervention intensity versus no intervention receipt for the baseline and endline survey periods. Effect estimates are from linear regression and represent the average change in the indicator for corresponding intervention intensity versus no intervention receipt. The scores were selected as the 25th, 50th (median), and 75th percentiles.

b] Test of interaction between survey period and intervention intensity. Interpreted as the contrast between the two odds ratios from baseline and endline. Result of testing whether indicators among respondents from EAs with increasing intervention had a larger difference from baseline to endline than respondents from EAs with no intervention.

1] Adjusted for: rural/urban; age; marital status; education; transportation; household size; Portuguese speaker

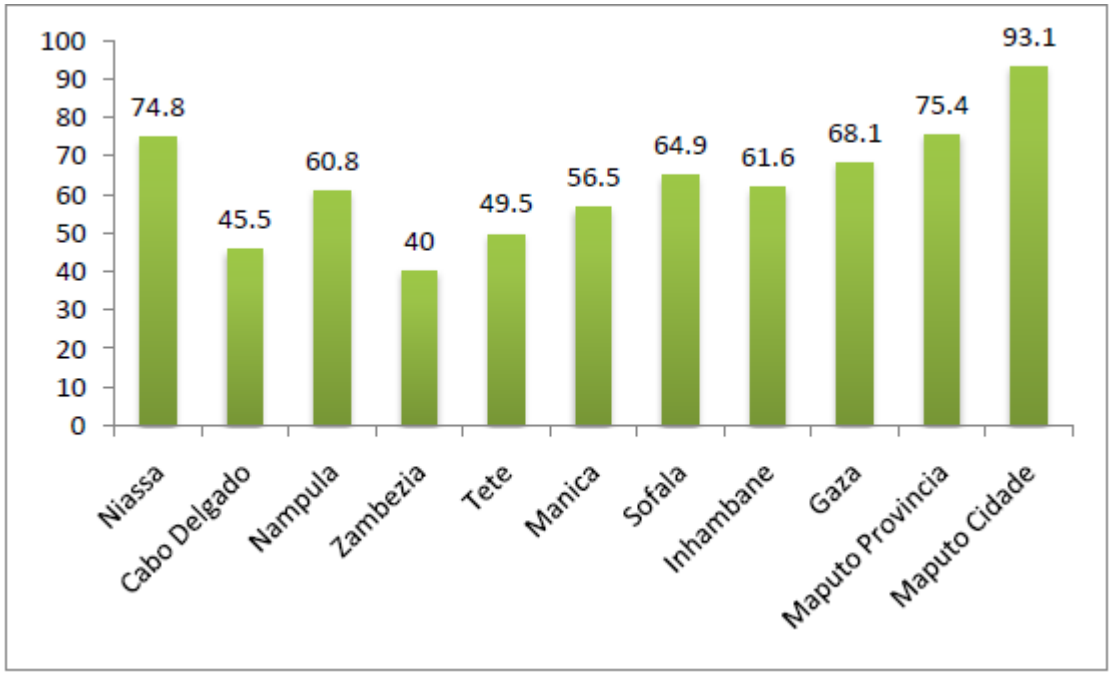
2] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker

3.2 Maternal Health

Maternal health is defined as the health of a woman during pregnancy, childbirth, and the post-partum period and encompasses the health dimensions of family planning, prenatal and postnatal care, with a goal of reducing maternal mortality and morbidity. In Mozambique, maternal mortality rates have shown a gradual decrease over time from 1,000 to 500 deaths per 100,000 live births between 1990 and 2007, with a goal of reaching <250 deaths per 100,000 live births by 2015 (Mozambique MDG report, 2010). Health care during pregnancy is essential to ensure the healthy evolution of the pregnancy and to prevent potential complications during the pregnancy or delivery. Good quality care must be provided by skilled health personnel equipped to detect potential complications and provide the necessary attention or referral. Per the Multiple Indicator Cluster Survey (MICS) 2008, only 40% of deliveries in Zambézia Province were performed at a health facility (Figure 2).

The World Health Organization has recommended a minimum of four antenatal care visits to ensure the well-being of mothers and newborns. During these visits, women should receive—at least—a minimum care package and be monitored for warning signs during their pregnancy (UN MDG report, 2014).

Figure 2: Percent of 15-49 year old females with institutional deliveries by province 2006-08



Source: MICS 2008

Maternal health - All Province

3.2.1 Antenatal Care, Pregnancy, and Delivery

Of interviewees who reported ever having children (n=3,219), 53.4% reported the recommended minimum of four or more antenatal visits during their last pregnancy (Table 14). While this proportion has remained relatively unchanged since Baseline (54.4%) and is consistent with national percentages as reported in the IDS 2003

(53.1%), the overall percentage of pregnant women seeking prenatal care increased 12.1%, from 57.4% at Baseline to 69.5% at Endline, thus increasing the overall number of women seeking any prenatal care and the overall number of women with four visits or more.

Of women who visited a health facility during their antenatal period, 80.6% reported subsequently delivering at a health facility, down from 93.6% at Baseline. However, the odds of having an institutional delivery increase significantly in EA with Ogumaniha interventions. In general, interviewees felt they received good treatment at the health facility for both their antenatal care (89.3%) and delivery (87.1%), with 84% reporting they would return to the facility for their next birth.

Among women pregnant at the time of survey implementation, 95.1% reported having visited a health facility for prenatal care at least once. Of these women, 68.4% reported sleeping under a bed net the previous night, compared to 58.6% at Baseline.

Table 14: Antenatal Care, Pregnancy, and Delivery

	Baseline (n=3259)	Endline (n=3219)
Visited a health facility for antenatal care during last pregnancy	57.4%	69.5%
Among women who visited a health facility during last pregnancy:		
Number of health facility visits for antenatal care		
1	8.8%	15.3%
2	13.2%	10.5%
3	23.6%	20.8%
4 or more	54.4%	53.4%
Received good treatment for antenatal care at health facility	93.5%	89.3%
Delivery performed in a health facility	93.6%	80.6%
Received good treatment for last delivery performed in a health facility	91.4%	87.1%
Willing to return to health facility for next birth	93.9%	84.0%
Among women currently pregnant	(n=352)	(n=304)
If pregnant, visited a health facility for antenatal care	65.9%	95.1%
If pregnant, sleeps under bed net	58.6%	68.4%

b) Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability.

In line with WHO recommendations, current Mozambican National guidelines recommend that all pregnant women receive a full package of prenatal services when pregnant and prior to delivery. A full package of prenatal services is defined as receipt of malaria prophylaxis with Fansidar, a tetanus vaccine, iron supplementation, a bed net, and provider initiated counseling and testing (PICT) for HIV. Among all women interviewed of reproductive age (16-49 years), 18.6% reported receiving a full package of prenatal services during their last pregnancy, an increase from 8.5% reporting similarly at Baseline. For those women who reported visiting a health facility at least once, the proportion of women receiving a full package of services was 25.7%, up from 14.7% at Baseline (Table 15).

Table 15: Services Received During Antenatal Period

	Baseline (n=3259)	Endline (n=3219)
Among all respondents who ever reported having children		
Received iron supplements during last pregnancy	61.1%	73.6%
Received vitamin A within 2 months post-partum	52.9%	65.9%
Vaccinated with tetanus toxoid during last pregnancy	67.0%	71.3%
Received any Fansidar during last pregnancy	49.7%	65.8%
Received a mosquito net during last pregnancy	34.9%	54.2%
Offered CT during last pregnancy	30.5%	52.9%
Received full package** of antenatal services	8.5%	18.6%
Among women who visited a health facility during last pregnancy:		
Received iron supplements during last pregnancy	79.9%	75.2%
Received vitamin A within 2 months post-partum	67.7%	67.3%
Vaccinated with tetanus toxoid during last pregnancy	83.3%	72.2%
Received any Fansidar during last pregnancy	68.1%	67.7%
Received a mosquito net during last pregnancy	49.6%	54.7%
Offered CT during last pregnancy	42.6%	53.4%
Received full package** of antenatal services	14.7%	25.7%

b) Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability.
**Full package defined as receipt of fansidar, tetanus vaccine, iron supplements, bed net, and offered VCT

Of women who were pregnant at the time of survey implementation, we asked them to list symptoms they considered to be warning signs during pregnancy as well as symptoms they considered to indicate a danger to the health of a newborn child. At both Baseline and Endline, roughly 70% of women could provide at least one correct response (Table 16).

Table 16: Knowledge of Emergency Symptoms for Pregnancy and Newborns

N= Women currently pregnant at time of survey	Baseline (n=352)	Endline (n=304)
List symptoms that are warning signs during pregnancy		
Missing, n (%)	35 (9.9%)	30 (9.9%)
No correct responses	31.4%	27.6%
One correct response	49.2%	48.8%
Two correct responses	18.2%	18.3%
More than two correct responses	1.1%	5.3%
List symptoms that indicate danger to the health of a newborn child		
Missing, n (%)	51 (14.5%)	29 (9.5%)
No correct responses	29.9%	23.9%
One correct response	35.2%	60.5%
Two correct responses	27.4%	14.7%
More than two correct responses	7.5%	0.9%

b) Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability.
1) Correct responses include: bleeding; convulsions; fever; previous Cesarean section delivery; short stature
2) Correct responses include: difficulty breathing; jaundice (yellow eyes/skin); not eating well; fever; convulsions; vomiting; no stool

Present international recommendations are that newborns be put on the breast within 1 hour after birth, be exclusively breastfed for the first 6 months, and breastfed along with complementary foods for an additional 18 months or longer. Suboptimal breastfeeding (< 6 months) has been associated with poor nutritional status, increased disease morbidity and neonatal mortality, and diminished cognitive development.

At both Baseline and Endline, a large proportion (92.5% and 89% respectively) of interviewees who identified themselves as being mothers, reported ever having breastfed their youngest child. Approximately 98% reported the initiation of breastfeeding immediately following delivery or later on the same day. The median length of time a mother reported breastfeeding her last child was 6 months, up from 4 months at Baseline (Table 17).

Table 17: Breastfeeding

	Baseline (n=3259)	Endline (n=3219)
Ever breastfed youngest child		
Missing, n (%)	113 (3.5%)	848 (26.3%)
No	7.4%	11.0%
Yes	92.5%	89.0%
Among women who breastfeed youngest child:		
How soon breastfed youngest child		
Immediately	71.5%	73.7%
Later on the day of birth	26.4%	24.7%
In first week	2.1%	1.6%
First mother's milk given to baby	89.2%	89.1%
Length of breastfeeding (months)	4 (3 - 6)	6 (4 - 6)
Child age at inclusion of other food (months)	5 (4 - 6)	6 (5 - 6)

a) Continuous variables are reported as weighted estimates of median (interquartile range), with each observation being weighted by the inverse of the household sampling probability.
b) Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability.

3.2.2 Reproduction Intent and Contraception

Of interviewees of reproductive age (16-49 years), the percentage ever reporting having used contraceptives to avoid or delay pregnancy was 32.1%, up from 24.3% at baseline. Thirty-three percent of interviewees reported a desire to limit or space their births with 46.8% of non-pregnant interviewees reporting they would feel unhappy about a new pregnancy.

Slightly more than 50% of women who reported having tried to delay or avoid pregnancy, reported they are currently using a contraceptive, with injectables, oral contraceptive pills, and traditional methods given as the most common responses (28.2%, 25.7%, and 18.9% respectively) (Table 18).

Table 18: Reproductive Intent and Contraceptive Use

Women of reproductive age (16-49 years)	Baseline (n=2,532)	Endline (n=2,780)
Ever used any method to delay or avoid pregnancy	24.3%	32.1%
Desire to limit or space births	38.3%	33.3%
If not pregnant, feelings toward an immediate pregnancy		
Missing, n (%)	133 (5.3%)	446 (16.0%)
Unhappy	53.8%	46.8%
Would not matter much	7.7%	13.5%
Happy	38.5%	39.7%
Among women with a desire to limit or space births:		
Currently using ANY modern contraceptive	59.3%	52.3%
Use natural (traditional) methods	15.8%	18.9%
Use condom	9.0%	4.6%
Use contraceptive pill	22.5%	25.7%
Use IUD	3.2%	4.6%
Use coitus interruptus	3.3%	0.4%
Use contraceptive injection	41.6%	28.2%
Use rhythm method	8.6%	2.9%
Use female condom	3.4%	0.7%
Sterilization	2.3%	0.8%

a) Continuous variables are reported as weighted estimates of median (interquartile range), with each observation being weighted by the inverse of the household sampling probability.
b) Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability.
c) Modern methods include sterilization, the pill, IUD, injectable contraceptives, the female condom, and the male condom.

Maternal health - Three Focus Districts

3.2.3 Maternal Health: Change since Baseline in 3 Focus Districts

In comparison to Baseline, the three Focus Districts showed improvements in most Maternal Health indicators (Table 19). Statistically significant improvements were seen for all antenatal care service indicators, number of deliveries performed at a health facility, as well as the respondent's knowledge of symptoms suggestive of an obstetrical emergency. A respondent at Endline had 2.5 times higher odds of receiving the full package of antenatal services during her last pregnancy ($p<0.001$). No significant changes are noted with regards to knowledge of newborn health risks nor with desire to limit or space births. Since Baseline, there is a 24% decrease odds of modern contraceptive use ($p=0.02$).

Table 19: Maternal Health Outcomes: Endline versus Baseline

	Number in model	OR (95% CI)	P-value
Received full package of antenatal services	3615	2.49 (1.84, 3.35)	< 0.001
Counseled and tested during last pregnancy	3168	2.40 (1.94, 2.98)	< 0.001
Received bed net during last pregnancy	3102	2.31 (1.88, 2.85)	< 0.001
If pregnant, sleeps under bed net	3116	2.17 (1.78, 2.64)	< 0.001
Number of antenatal visits (has increased)	2204	0.88 (0.72, 1.07)	0.202
Knowledge of emergency obstetrics	504	1.51 (1.01, 2.27)	0.046
Knowledge of newborn health risks	504	1.40 (0.92, 2.12)	0.112
Delivery performed in a health facility	3082	1.50 (1.24, 1.81)	< 0.001
Desire to limit or space births	4118	1.09 (0.92, 1.30)	0.320
Currently using any modern contraceptive	4462	0.76 (0.61, 0.96)	0.020

a] The odd ratio comparing endline survey with baseline survey ignoring intervention receipt.
b] Test of association between survey period and indicators. This does correspond to the odds ratio.
c] ANC/Pregnancy/Delivery indicators are subset to all women with at least one child under age 5 unless otherwise specified. Knowledge questions are for currently pregnant women. Family planning questions are for women aged 16-49 who are not currently pregnant.
1] Adjusted for: rural/urban; age; marital status; education; transportation; household size; Portuguese speaker
2] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker
3] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker; traditional healer use in past 12 months
4] Adjusted for: rural/urban; age; marital status; education; religion; household size

When we analyze these same Maternal Health indicators based on a minimum presence of Ogumaniha interventions in a particular EA (defined as a minimum Ogumaniha intervention score of > 15), changes are seen in a positive direction in 7 of 10 of the Maternal Health indicators, with statistically significant improvement being shown for receipt of counseling and testing for HIV during last pregnancy (Table 20).

Table 20: Maternal Health Outcomes in EA with Some Intervention Exposure (Score > 15)

	Number in model	Baseline OR (95% CI)	Endline OR (95% CI)	P-value
Received full package of antenatal services	3615	1.15 (0.67, 1.98)	1.85 (1.20, 2.85)	0.111
Counseled and tested during last pregnancy	3168	0.90 (0.64, 1.26)	1.40 (1.01, 1.93)	0.042
Received bed net during last pregnancy	3102	1.07 (0.79, 1.46)	1.55 (1.08, 2.23)	0.076
If pregnant, sleeps under bed net	3116	1.27 (0.94, 1.70)	1.70 (1.18, 2.45)	0.136
Number of antenatal visits (has increased)	2204	1.24 (0.89, 1.72)	1.60 (1.14, 2.25)	0.194
Knowledge of emergency obstetrics	504	1.51 (0.95, 2.41)	1.22 (0.70, 2.12)	0.563
Knowledge of newborn health risks	504	1.61 (0.99, 2.63)	1.46 (0.84, 2.55)	0.791
Delivery performed in a health facility	3082	1.27 (0.94, 1.71)	1.83 (1.26, 2.64)	0.063
Desire to limit or space births	4118	1.12 (0.85, 1.48)	0.94 (0.71, 1.25)	0.287
Currently using any modern contraceptive	4462	1.24 (0.86, 1.77)	1.79 (1.22, 2.63)	0.109

a] The odds ratio comparing intervention receipt versus no intervention receipt for the baseline and endline survey periods.
b] Test of interaction between survey period and intervention receipt. Interpreted as the contrast between the two odds ratios from baseline and endline. Result of testing whether indicators among respondents from EAs with intervention had a larger difference from baseline to endline than respondents from EAs with no recorded intervention.
c] ANC/Pregnancy/Delivery indicators are subset to all women with at least one child under age 5 unless otherwise specified. Knowledge questions are for currently pregnant women. Family planning questions are for women aged 16-49 who are not currently pregnant.
1] Adjusted for: rural/urban; age; marital status; education; transportation; household size; Portuguese speaker
2] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker
3] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker; traditional healer use in past 12 months
4] Adjusted for: rural/urban; age; marital status; education; religion; household size

In order to show the relationship between area specific programmatic interventions and the changes seen in indicator results since Baseline, we analyzed the Maternal Health indicators in relation to the intensity of intervention score (Table 21). For this analysis we developed a "health intervention specific" score comprised of intervention Areas 1 and 2 (see Methods section: Intervention Score).

As intensity of Ogumaniha health interventions increased in a given EA within the three focus districts, an increase in odds of improvement is seen for key Maternal Health indicators (namely, deliveries performed at a health facility, increasing number of antenatal care visits, receipt of a bed net at last pregnancy, and use of a bed net during pregnancy).

Table 21: Maternal Health Outcomes by Amount of HEALTH Intervention Exposure

	Number in model	Baseline OR (95% CI)	Endline OR (95% CI)	P-value
Received full package of antenatal services	3615			0.358
16.25 vs. 0		2.12 (0.52, 8.60)	1.78 (0.77, 4.12)	
24 vs. 0		3.54 (0.94, 13.39)	2.53 (1.16, 5.48)	
26 vs. 0		3.34 (0.91, 12.22)	2.75 (1.30, 5.82)	
Counseled and tested during last pregnancy	3168			0.155
16.25 vs. 0		2.43 (1.22, 4.82)	2.93 (1.22, 7.06)	
24 vs. 0		4.68 (2.59, 8.44)	4.35 (1.84, 10.29)	
26 vs. 0		4.46 (2.51, 7.92)	4.56 (1.97, 10.56)	
Received bed net during last pregnancy	3102			< 0.001
16.25 vs. 0		1.56 (0.76, 3.23)	0.98 (0.49, 1.94)	
24 vs. 0		1.85 (0.96, 3.57)	3.49 (1.76, 6.90)	
26 vs. 0		1.96 (1.03, 3.72)	4.68 (2.40, 9.13)	
If pregnant, sleeps under bed net	3116			< 0.001
16.25 vs. 0		1.03 (0.52, 2.02)	0.94 (0.47, 1.90)	
24 vs. 0		2.02 (1.09, 3.75)	4.60 (2.31, 9.17)	
26 vs. 0		2.27 (1.25, 4.15)	6.12 (3.11, 12.02)	
Number of antenatal visits (has increased)	2204			0.024
16.25 vs. 0		0.96 (0.42, 2.17)	0.95 (0.42, 2.13)	
24 vs. 0		1.38 (0.65, 2.91)	2.42 (1.11, 5.28)	
26 vs. 0		1.63 (0.79, 3.35)	2.76 (1.30, 5.88)	
Knowledge of emergency obstetrics	504			0.965
16.25 vs. 0		0.59 (0.17, 2.02)	0.68 (0.22, 2.11)	
24 vs. 0		0.59 (0.18, 1.96)	0.62 (0.22, 1.76)	
26 vs. 0		0.72 (0.23, 2.30)	0.71 (0.26, 1.94)	
Knowledge of newborn health risks	504			0.951
16.25 vs. 0		0.45 (0.14, 1.44)	0.62 (0.21, 1.85)	
24 vs. 0		0.48 (0.17, 1.35)	0.66 (0.22, 1.92)	
26 vs. 0		0.60 (0.22, 1.67)	0.79 (0.27, 2.26)	
Delivery performed in a health facility	3082			0.072
16.25 vs. 0		2.30 (1.02, 5.19)	1.84 (0.83, 4.05)	
24 vs. 0		5.03 (2.33, 10.86)	7.09 (3.17, 15.87)	
26 vs. 0		5.44 (2.57, 11.52)	7.95 (3.59, 17.58)	
Desire to limit or space births	4118			0.520
16.25 vs. 0		1.54 (0.87, 2.71)	2.20 (1.29, 3.75)	
24 vs. 0		1.90 (1.17, 3.11)	2.96 (1.84, 4.77)	
26 vs. 0		2.00 (1.25, 3.22)	3.06 (1.92, 4.90)	
Currently using any modern contraceptive	4462			0.579
16.25 vs. 0		0.87 (0.47, 1.63)	0.96 (0.49, 1.91)	
24 vs. 0		1.46 (0.87, 2.45)	1.16 (0.62, 2.17)	
26 vs. 0		1.67 (1.00, 2.77)	1.30 (0.71, 2.38)	

a] The odds ratio comparing corresponding intervention intensity versus no intervention receipt for the baseline and endline survey periods. The scores were selected as the 25th, 50th (median), and 75th percentiles.

b] Test of interaction between survey period and intervention intensity. Interpreted as the contrast between the two odds ratios from baseline and endline. Result of testing whether indicators among respondents from EAs with increasing intervention had a larger difference from baseline to endline than respondents from EAs with no intervention.

c] ANC/Pregnancy/Delivery indicators are subset to all women with at least one child under age 5 unless otherwise specified. Knowledge questions are for currently pregnant women. Family planning questions are for women aged 16-49 who are not currently pregnant.

1] Adjusted for: rural/urban; age; marital status; education; transportation; household size; Portuguese speaker

2] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker

3] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker; traditional healer use in past 12 months

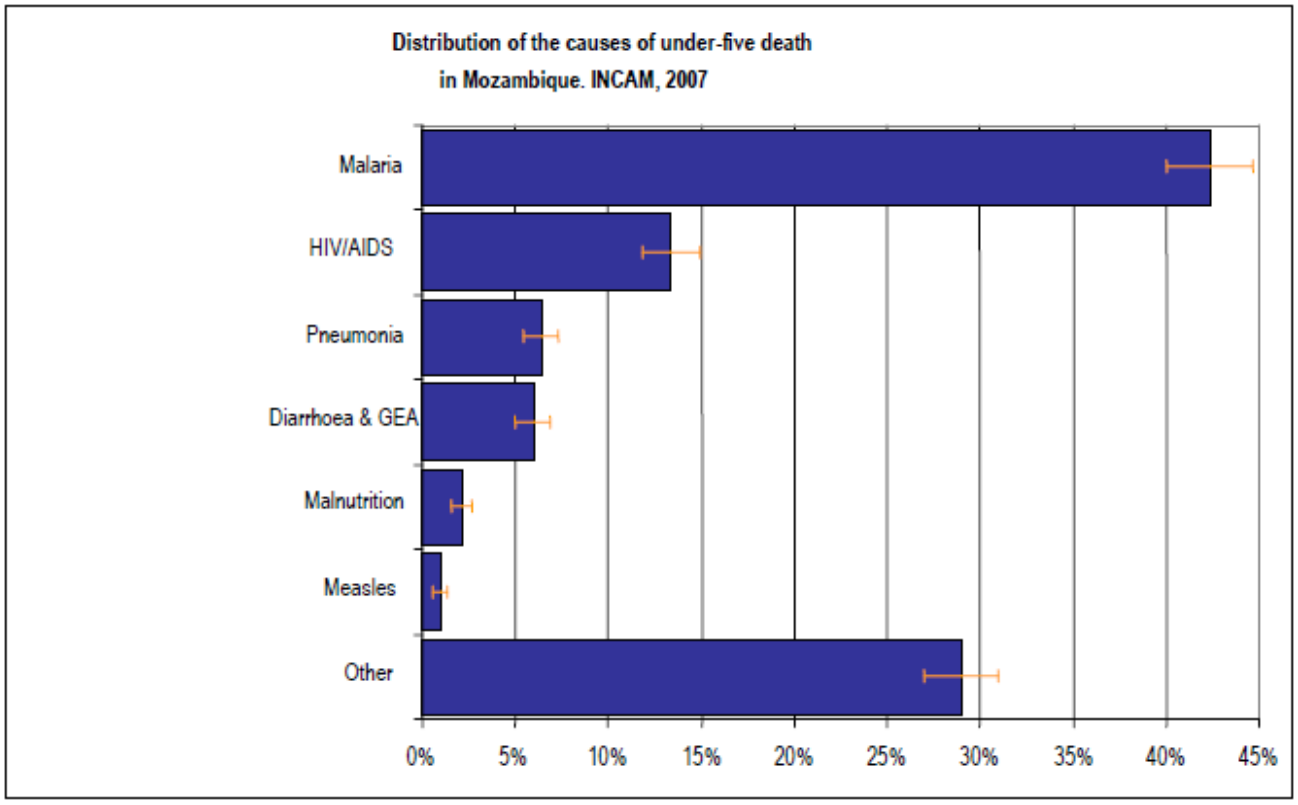
4] Adjusted for: rural/urban; age; marital status; education; religion; household size

3.3 Child Health

Similar to Maternal Health figures, Mozambique has seen a gradual decline in infant and under-five mortality rates over the last few decades. Under-five mortality rates decreased from 245/1,000 live births in 1997 to 154/1,000 live births in 2003 and continued declining to 147/1,000 live births by 2007. However, the pace of decrease has declined between 2003 and 2007 causing concern that Mozambique will not meet its Millennium Development Goal of 108/1,000 live births by 2015.

Malaria, HIV/AIDS, Pneumonia, and Diarrhea are among the leading causes of under-five mortality in Mozambique (Figure 3). As such, estimates as to the prevalence of fever, difficulty breathing, and diarrhea in this age group can be useful metrics for monitoring the progress made towards achieving MDG 4.

Figure 3: Distribution of the Causes of Under-Five Mortality in Mozambique



3.3.1 Vaccination Coverage

One of the interventions that contribute most to the reduction in child mortality is vaccination. Table 22 describes the childhood vaccination schedule as recommended by Mozambican national guidelines. At birth, newborns receive both the Bacillus Calmette-Guérin (BCG) anti-tuberculosis vaccine and the first dose of oral polio vaccine (OPV). By age 4 months they should have received the next three vaccination doses for diphtheria, pertussis, tetanus (DPT), hepatitis B, polio, the pneumococcal conjugate vaccine (PCV 10), and the haemophilus influenza type b (HIB) vaccine. Of note, both the PCV 10 and HIB vaccines began roll-out in Zambézia Province in 2012 and were not routinely offered at baseline. At age 9 months, children should also receive the measles vaccine.

Table 22: Child Vaccination Schedule in Mozambique

Age	Visit	Antigen
Birth	1	BCG, OPV
6 weeks	2	DTP-HepB-HIB, OPV, PCV10
10 weeks	3	DTP-HepB-HIB, OPV, PCV10
14 weeks	4	DTP-HepB-HIB, OPV, PCV 10
9 months	5	Measles
6-59 months		Vitamin A Supplement

a) Source: MOH, EPI unit (The Government of Mozambique Ministry of Health: Expanded Program on Immunization) Comprehensive Multi-Year Plan (2007-2009).
b) HIB and PCV10 not offered and data not collected during time of baseline survey.

Child Health - All Province

Tables 23 and 24 describe vaccination rates for children aged 12 to 23 months of age, whose mothers could furnish an immunization card for inspection at the time of survey. Overall, 73.4% of mothers of children 12-23 months of age presented an immunization card to the interviewer. Nearly 52% of children had received the complete recommended number of vaccines for BCG, Polio, DTP, Hepatitis B, and Measles. While this proportion is relatively unchanged since Baseline, increased vaccine uptake was seen for both BCG and Polio, while remaining relatively unchanged for DTP+Hep B and Measles. The low vaccine uptake in Table 23 for both PCV 10 and HIB likely reflects that both of these vaccines are still in the process of being rolled-out province wide.

Table 23: Immunization comparison of Children Aged 12-23 months

	BCG	DTP 3	Polio 3	Measles	All
MICS 2008 (Zambézia)	75.1%	61.7%	60.2%	61.7&	46.8%
DHS 2011 (Zambézia)	84.0%	60.3%	56.8%	71.5%	47.3%
Ogumaniha Baseline	87.8%	60.9%	72.3%	71.8%	53.8%
Ogumaniha Endline	98.3%	62.5%	83.9%	68.9%	51.8%

Table 24: Immunization of Children Aged 12 to 23 Months

	Baseline (n=155)	Endline (n=519)
Head of household presents an immunization card	87.3%	73.4%
BCG		
Dose 1	87.8%	98.3%
Polio		
Dose 1	79.6%	93.1%
Dose 2	79.6%	86.2%
Dose 3	72.3%	83.9%
Dose 4	65.2%	73.1%
DPT+HepB		
Dose 1	70.6%	70.9%
Dose 2	69.9%	64.6%
Dose 3	60.9%	62.5%
Measles		
Dose 1	71.8%	68.9%
PCV10		
Dose 1		43.2%
Dose 2		42.4%
Dose 3		38.6%
HIB		
Dose 1		32.0%
Dose 2		30.5%
Dose 3		29.5%
Fully immunized from card (BCG+Polio+DPT+HepB+Measles)	53.8%	51.8%
Vitamin A Dose (from card)	67.2%	69.0%

b) Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the child sampling probability.

Table 25 describes vaccination rates for children aged 12 to 59 months of age, whose mothers could furnish an immunization card for inspection at the time of survey. Overall, 72.7% of mothers of children 12-59 months of age presented an immunization card. At baseline, 69.8% of children 12-59 months of age had received the complete recommended number of vaccines for BCG, Polio, DTP, Hepatitis B, and Measles, compared to only 49.4% in the current survey. While this represents a drop of roughly 20% between the two surveys, uptake for each individual dose of BCG and Polio remain relatively unchanged, with decreased proportions documented for DTP+Hep B and Measles. Again, the lesser vaccine uptake for both PCV 10 and HIB likely reflects that both of these vaccines are still in the process of being rolled-out and many children in this older age group may not have been seeking these vaccines as they were not offered during their routine health child visits.

Table 25: Immunization of Children Aged 12 to 59 Months

	Baseline (n=780)	Endline (n=1661)
Head of household presents an immunization card	74.6%	72.7%
BCG		
Dose 1	92.5%	96.8%
Polio		
Dose 1	87.9%	93.5%
Dose 2	85.8%	83.7%
Dose 3	81.2%	80.9%
Dose 4	76.0%	68.9%
DPT+HepB		
Dose 1	85.0%	76.5%
Dose 2	82.6%	67.4%
Dose 3	78.0%	65.1%
Measles		
Dose 1	83.7%	73.8%
PCV10		
Dose 1		37.9%
Dose 2		34.8%
Dose 3		30.8%
HIB		
Dose 1		32.0%
Dose 2		27.6%
Dose 3		26.3%
Fully immunized from card (BCG+Polio+DPT+HepB+Measles)	69.8%	49.4%
Vitamin A Dose (from card)	70.9%	58.1%

b) Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the child sampling probability.

3.3.2 Fever in Children

Though non-specific, fever is a hallmark symptom for suspected malaria in children less than five years of age. As described above, malaria remains the number one cause of mortality in this age group. According to the MICS 2008, the proportion of under-fives sleeping under a bed net in Zambézia Province was 22% (Figure 4).

Figure 4: Percentage of Under-Fives Sleeping Under a Bed Net by Province 2006-2008

Source: MICS 2008

Table 26 below shows that the prevalence of fever in the month preceding survey implementation in children 0-59 months was 43.6%, down from 53.2% as baseline. Greater than 70% of fever cases sought advice or treatment for the fever, of which greater than 90% sought that advice or treatment at a health facility. Rapid diagnostics tests for malaria and/or malaria blood smear were performed in 60% and 53.9% respectively, with 75.5% of tests performed being positive for malaria. Eighty-eight percent of children with positive malaria diagnostics received malaria treatment within 24hrs of diagnosis.

At Endline, 59.5% of children 0-59 months reported sleeping under a bed net in the previous night before survey implementation. This is up nearly 10% from 49.6% at baseline.

Table 26: Fever in Children Aged 0-59 Months

	Baseline (n=1982)	Endline (n=2391)
Child ill with fever in the last month	53.2%	43.6%
Sought advice or treatment for the fever	71.5%	71.4%
Source of advice or treatment for the fever		
Missing, n (%)	4 (0.6%)	7 (0.9%)
Health facility	89.7%	91.2%
Traditional healer	4.3%	4.7%
Family member	0.8%	2.9%
Pharmacy	1.7%	0.1%
Other	3.6%	1.1%
Malaria rapid diagnostic test (RDT) performed		60.0%
Malaria laboratory test (blood smear) performed		53.9%
If done, positive test result for malaria by RDT or blood smear		75.5%
If positive, antimalarial treatment taken the same day or the day after the onset of the fever		88.7%
Slept under an insecticide treated bed net last night	49.6%	59.5%

b) Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the child sampling probability.

Reports on fever in children 0-12 months show similar advances. Prevalence of fever in the month prior to survey implementation in children 0-12 months decreased from 52.9% at Baseline to 45.1% at Endline. Similarly, greater than 70% of children 0-12 months with fever sought advice or treatment for the fever, with greater than 92% seeking care at a health facility. Rapid diagnostics tests for malaria and/or malaria blood smear were performed in 65.9% and 56.4% respectively, with 64.9% of tests performed being positive for malaria and 81.2% of positives receiving treatment within 24hrs of diagnosis.

At Endline, 71.2% of children 0-12 months reported sleeping under a bed net in the previous night before survey implementation. This is up from 48.3% at Baseline, nearly a 23% increase.

Table 27: Fever in Children Aged 0-12 Months

	Baseline (n=1004)	Endline (n=761)
Child ill with fever in the last month	52.9%	45.1%
Sought advice or treatment for the fever	73.8%	70.7%
Source of advice or treatment for the fever		
Missing, n (%)	1 (0.3%)	1 (0.4%)
Health facility	90.6%	92.1%
Traditional healer	5.8%	4.2%
Family member	0.1%	2.8%
Pharmacy	1.5%	0.1%
Other	2.0%	0.8%
Malaria rapid diagnostic test performed		65.9%
Malaria laboratory test (blood smear) performed		56.4%
If done, positive test result for malaria by RDT or blood smear		64.9%
If positive, antimalarial treatment taken the same day or the day after the onset of the fever		81.2%
Slept under an insecticide treated bed net last night	48.3%	71.2%

b) Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the child sampling probability.

3.3.3 Diarrhea in Children

Similar to fever, Table 28 shows a decrease in the prevalence of reported diarrhea in the month prior to survey implementation, for children 0-59 months, from 30.9% at baseline to 22.4% at Endline. Approximately 70% sought advice or treatment for that diarrhea, with 82.2% seeking care at a health facility. Of those who sought treatment for the diarrhea, a majority (>66%) continue to utilize oral rehydration therapy (ORT) as the most predominant treatment, though at Endline a higher proportion reported having utilized either traditional remedies or “other” when compared to Baseline.

Table 28: Diarrhea in Children Aged 0-59 Months

	Baseline (n=1982)	Endline (n=2391)
Child ill with diarrhea in the last month	30.9%	22.4%
Sought advice or treatment for the diarrhea	71.4%	69.3%
Source of advice or treatment for the diarrhea		
Missing, n (%)	3 (0.8%)	0 (0.0%)
Health facility	88.7%	82.2%
Traditional healer	5.9%	7.0%
Family member	0.7%	6.3%
Pharmacy	1.5%	1.9%
Other	3.0%	2.6%
Treatment received for the diarrhea		
Missing, n (%)	6 (1.5%)	7 (1.8%)
Food	2.8%	3.9%
Oral Rehydration therapy	81.4%	66.4%
Traditional remedy	6.7%	15.4%
Other	9.1%	14.2%

Table 29 shows the prevalence of diarrhea in the month prior to survey implementation for children 0-12 months. Comparable to children 0-59 months, the prevalence of diarrhea decreased from 36.9 % at Baseline to 27.6% at Endline. Sixty-four percent of cases of diarrhea sought advice or treatment for the diarrhea, with 83% seeking that care at a health facility. ORT was equally reported as the predominant treatment utilized in this age category (>60%), though again larger proportions report having utilized traditional or other remedies when compared to Baseline.

Table 29: Diarrhea in Children Aged 0-12 Months

	Baseline (n=1004)	Endline (n=761)
Child ill with diarrhea in the last month	36.9%	27.6%
Sought advice or treatment for the diarrhea	73.8%	64.5%
Source of advice or treatment for the diarrhea		
Missing, n (%)	1 (0.4%)	0 (0.0%)
Health facility	89.7%	83.0%
Traditional healer	6.6%	5.8%
Family member	1.1%	5.2%
Pharmacy	0.5%	1.5%
Treatment received for the diarrhea		
Missing, n (%)	4 (1.7%)	3 (2.4%)
Food	0.3%	8.1%
Oral Rehydration therapy	83.7%	62.6%
Traditional remedy	7.8%	16.5%

3.3.4 Acute Respiratory Illness (ARI) in Children

In order to evaluate the prevalence of acute respiratory infection, mothers were asked about cough or difficulty breathing in the month prior to survey implementation. Table 30 shows that for children 0-59 months, the prevalence of cough or difficulty breathing declined by more than 12% from Baseline to Endline, with roughly 50% of children being taken to a health facility for care.

Table 30: Respiratory Illness in Children Aged 0-59 Months

	Baseline (n=1982)	Endline (n=2391)
Child had cough or difficulty breathing in last month	32.4%	19.5%
Child had fast or shallow breathing in last month	20.0%	12.9%
Sought advice for breathing problem	57.4%	60.9%
Child taken to health facility for breathing problem	58.1%	49.0%
Among children who received PCV10 (three doses) (n=434)[c]		
Child had cough or difficulty breathing in last month		19%

b) Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the child sampling probability
c) Considers only children with documentation by vaccination card

Table 31 shows that children 0-12 months had a similar decline in the prevalence of cough and difficulty breathing in the month prior to survey implementation from 31.7% at Baseline to 19.2% at Endline, with roughly 44% of children being taken to a health facility for care.

Table 31: Respiratory Illness in Children Aged 0-12 Months

	Baseline (n=1004)	Endline (n=761)
Child had cough or difficulty breathing in last month	31.7%	19.2%
Child had fast or shallow breathing in last month	15.8%	11.9%
Sought advice for breathing problem	51.0%	51.1%
Child taken to health facility for breathing problem	59.6%	43.9%
Among children who received PCV10 (three doses) (n=141)[c]		
Child had cough or difficulty breathing in last month		15.9%

b) Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the child sampling probability
c) Considers only children with documentation by vaccination card

Child Health - Three Focus Districts

3.3.5 Child Health: Change since Baseline in 3 Focus Districts

In comparison to Baseline, several key Child Health indicators such as being fully immunized, prevalence of diarrhea, prevalence of cough/difficulty breathing, prevalence of shallow breathing, and sleeping under a bed net in the previous night showed improvements in the three Focus Districts (Table 32). Statistically significant improvements were seen for being fully immunized (12-59 months), prevalence of diarrhea (0-12 months), and sleeping under a bed net. Seeking care for fever, diarrhea, and respiratory symptoms all showed a decline at Endline as compared to Baseline.

Table 32: Child Health Outcomes: Endline versus Baseline

	Number in model	OR (95% CI)	P-value
Fully immunized (by card) (12-23 months)	316	1.08 (0.48, 2.44)	0.850
Fully immunized (by card) (12-59 months)	1133	1.73 (1.12, 2.68)	0.013
Child ill with fever in last 30 days (0-12 months)	1080	1.10 (0.77, 1.57)	0.602
Child ill with fever in last 30 days (0-60 months)	3066	1.02 (0.81, 1.27)	0.881
Sought help for fever at HF (0-12 months)	347	0.24 (0.10, 0.59)	0.002
Sought help for fever at HF (0-60 months)	982	0.67 (0.38, 1.18)	0.162
Child had diarrhea in last 30 days (0-12 months)	1085	0.51 (0.34, 0.76)	< 0.001
Child had diarrhea in last 30 days (0-60 months)	3076	0.83 (0.66, 1.04)	0.104
Sought help for diarrhea at HF (0-12 months)	197	0.31 (0.11, 0.85)	0.024
Sought help for diarrhea at HF (0-60 months)	540	0.45 (0.23, 0.87)	0.017
Respondent would give "more" fluid to child with diarrhea	4208	1.14 (0.97, 1.34)	0.104
Child had cough/breathing difficulty in last 30 days (0-12 months)	1070	0.67 (0.44, 1.01)	0.056
Child had cough/breathing difficulty in last 30 days (0-60 months)	3060	0.86 (0.68, 1.07)	0.176
Child had shallow breathing last 30 days (0-12 months)	1073	0.69 (0.43, 1.10)	0.119
Child had shallow breathing last 30 days (0-60 months)	3069	0.94 (0.73, 1.22)	0.649
Sought help for cough/breathing at HF (0-12 months)	282	0.74 (0.37, 1.49)	0.403
Sought help for cough/breathing at HF (0-60 months)	648	1.04 (0.68, 1.58)	0.870
Child slept under bed net last night (0-12 months)	1064	3.72 (2.56, 5.39)	< 0.001
Child slept under bed net last night (0-60 months)	3005	3.48 (2.80, 4.33)	< 0.001
Knowledge of when child needs medical attention	3422	0.86 (0.70, 1.06)	0.149

a] The odd ratio comparing endline survey with baseline survey ignoring intervention receipt.
b] Test of association between survey period and indicators. This does correspond to the odds ratio.
1] Adjusted for: rural/urban; sex of child; maternal education; transportation; household size; traditional healer use in past 12 months
2] Adjusted for: rural/urban; age of child; sex of child; maternal education; household size; Portuguese speaker
3] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker
4] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker; traditional healer use in past 12 months

When we analyzed Child Health indicators for those EA with a minimum Ogumaniha intervention score of >15, positive changes are only seen in the Child Health indicators of being fully immunized (12-59 months) and seeking care for cough/difficulty breathing, though neither was statistically significant (Table 33).

Table 33: Child Health Outcomes with Some Intervention Exposure (Score > 15)

	Number in model	Baseline OR (95% CI)	Endline OR (95% CI)	P-value
Fully immunized (by card) (12-23 months)	316	1.85 (0.57, 6.04)	1.66 (0.72, 3.82)	0.885
Fully immunized (by card) (12-59 months)	1133	0.96 (0.55, 1.68)	1.62 (0.95, 2.79)	0.152
Child ill with fever in last 30 days (0-12 months)	1080	1.20 (0.81, 1.78)	1.18 (0.75, 1.85)	0.955
Child ill with fever in last 30 days (0-60 months)	3066	1.19 (0.89, 1.60)	1.22 (0.93, 1.60)	0.898
Sought help for fever at HF (0-12 months)	347	1.83 (0.51, 6.52)	1.57 (0.63, 3.89)	0.851
Sought help for fever at HF (0-60 months)	982	2.46 (1.06, 5.69)	1.06 (0.55, 2.03)	0.125
Child had diarrhea in last 30 days (0-12 months)	1085	0.83 (0.56, 1.24)	1.80 (1.09, 2.99)	0.019
Child had diarrhea in last 30 days (0-60 months)	3076	0.91 (0.69, 1.20)	1.55 (1.10, 2.18)	0.015
Sought help for diarrhea at HF (0-12 months)	197	1.67 (0.62, 4.44)	1.67 (0.45, 6.19)	0.996
Sought help for diarrhea at HF (0-60 months)	540	1.94 (0.82, 4.61)	1.14 (0.47, 2.78)	0.358
Respondent would give "more" fluid to child with diarrhea	4208	1.61 (1.29, 2.01)	0.83 (0.67, 1.04)	< 0.001
Child had cough/breathing difficulty in last 30 days (0-12 months)	1070	0.97 (0.63, 1.48)	1.76 (0.91, 3.42)	0.107
Child had cough/breathing difficulty in last 30 days (0-60 months)	3060	1.05 (0.77, 1.42)	1.54 (1.05, 2.27)	0.101
Child had shallow breathing last 30 days (0-12 months)	1073	0.81 (0.52, 1.26)	1.24 (0.63, 2.44)	0.255
Child had shallow breathing last 30 days (0-60 months)	3069	1.17 (0.84, 1.62)	1.20 (0.79, 1.84)	0.904
Sought help for cough/breathing at HF (0-12 months)	282	1.52 (0.74, 3.10)	2.42 (0.95, 6.17)	0.434
Sought help for cough/breathing at HF (0-60 months)	648	1.23 (0.76, 1.99)	2.74 (1.35, 5.57)	0.068
Child slept under bed net last night (0-12 months)	1064	1.49 (1.03, 2.17)	1.20 (0.70, 2.05)	0.475
Child slept under bed net last night (0-60 months)	3005	1.43 (1.08, 1.88)	1.25 (0.87, 1.79)	0.510
Knowledge of when child needs medical attention	3422	1.62 (1.25, 2.09)	1.50 (1.07, 2.10)	0.683

a] The odds ratio comparing intervention receipt versus no intervention receipt for the baseline and endline survey periods.
b] Test of interaction between survey period and intervention receipt. Interpreted as the contrast between the two odds ratios from baseline and endline. Result of testing whether indicators among respondents from EAs with intervention had a larger difference from baseline to endline than respondents from EAs with no recorded intervention.
1] Adjusted for: rural/urban; sex of child; maternal education; transportation; household size; traditional healer use in past 12 months
2] Adjusted for: rural/urban; age of child; sex of child; maternal education; household size; Portuguese speaker
3] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker
4] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker; traditional healer use in past 12 months

In order to show the relationship between area specific programmatic interventions and the changes seen in indicator results since Baseline, we analyzed the Child Health indicators in relation to the intensity of intervention score (Tables 34a, 34b, and 34c). For this analysis we developed a "Health intervention specific" score utilizing intervention Areas 1 and 2 for immunizations, fever, and respiratory indicators; and a "Health and Sanitation specific" score utilizing intervention Areas 2, 5-6 for diarrhea associated indicators (see Methods section: Intervention Score).

EA with higher intensity of Ogumaniha interventions showed statistically significant higher odds of children being fully immunized (12-23 months) and a decreased prevalence of respiratory symptoms (0-60 months). Additionally, decreasing trends in prevalence were seen for under-five fever and respiratory symptoms in the 12-23 month age group (though not statistically significant).

Table 34a: Child Health Outcomes by Amount of HEALTH and/or HEALTH AND SANITATION Intervention Exposure

	Number in model	Baseline OR (95% CI)	Endline OR (95% CI)	P-value
Fully immunized (by card) (12-23 months)	316			0.018
16.25 vs. 12		9.26 (0.13, 652.19)	0.80 (0.57, 1.11)	
24 vs. 12		13 (0.1, 3055)	6.09 (1.52, 24.40)	
26 vs. 12		7.88 (0.05, 1214.50)	11.2 (2.2, 57.4)	
Fully immunized (by card) (12-59 months)	1133			0.054
16.25 vs. 0		0.41 (0.14, 1.24)	0.10 (0.03, 0.27)	
24 vs. 0		0.79 (0.30, 2.09)	0.46 (0.19, 1.11)	
26 vs. 0		0.85 (0.33, 2.16)	0.71 (0.30, 1.68)	
Child ill with fever in last 30 days (0-12 months)	1080			0.089
16.25 vs. 0		0.64 (0.30, 1.39)	2.17 (0.87, 5.43)	
24 vs. 0		1.49 (0.75, 2.96)	2.08 (0.91, 4.75)	
26 vs. 0		1.76 (0.91, 3.40)	2.14 (0.96, 4.81)	
Child ill with fever in last 30 days (0-60 months)	3066			0.127
16.25 vs. 0		1.31 (0.73, 2.35)	1.63 (0.86, 3.10)	
24 vs. 0		2.20 (1.29, 3.78)	1.65 (0.90, 3.01)	
26 vs. 0		2.37 (1.42, 3.97)	1.72 (0.95, 3.10)	
Sought help for fever at HF (0-12 months)	347			0.114
16.25 vs. 0		1.73 (0.23, 12.70)	4.77 (0.63, 36.32)	
24 vs. 0		4.69 (0.71, 31.00)	17.3 (2.4, 127)	
26 vs. 0		28.4 (2.6, 305.9)	15.3 (2.1, 108.8)	
Sought help for fever at HF (0-60 months)	982			< 0.001
16.25 vs. 0		2.19 (0.41, 11.79)	0.78 (0.20, 2.96)	
24 vs. 0		3.92 (0.82, 18.78)	3.71 (0.97, 14.22)	
26 vs. 0		7.56 (1.61, 35.47)	3.65 (0.96, 13.92)	

The odds ratio comparing corresponding intervention intensity versus no intervention receipt for the baseline and endline survey periods. The scores were selected as the 25th, 50th (median), and 75th percentiles.

[b] Test of interaction between survey period and intervention intensity. Interpreted as the contrast between the two odds ratios from baseline and endline. Result of testing whether indicators among respondents from EAs with increasing intervention had a larger difference from baseline to endline than respondents from EAs with no intervention.

Diarrhea prevalence trended higher in EA with more intense Ogumaniha interventions. Health seeking behaviors for all three disease conditions (fever, diarrhea, and respiratory symptoms) were decreased compared to Baseline in EA with higher Ogumaniha interventions.

Table 34b: Child Health Outcomes by Amount of HEALTH and/or HEALTH AND SANITATION Intervention Exposure

	Number in model	Baseline OR (95% CI)	Endline OR (95% CI)	P-value
Child had diarrhea in last 30 days (0-12 months)	1085			0.311
5 vs. 0		0.84 (0.40, 1.74)	1.33 (0.53, 3.35)	
7 vs. 0		0.81 (0.32, 2.07)	1.49 (0.46, 4.85)	
27 vs. 0		1.24 (0.54, 2.85)	2.94 (1.12, 7.75)	
Child had diarrhea in last 30 days (0-60 months)	3076			0.637
5 vs. 0		0.86 (0.52, 1.43)	0.72 (0.44, 1.19)	
7 vs. 0		0.85 (0.44, 1.62)	0.68 (0.36, 1.30)	
27 vs. 0		1.42 (0.82, 2.46)	1.61 (0.91, 2.85)	
Sought help for diarrhea at HF (0-12 months)	197			0.890
9 vs. 0		0.61 (0.10, 3.76)	0.33 (0.06, 1.82)	
13 vs. 0		0.60 (0.06, 6.00)	0.29 (0.04, 2.33)	
31 vs. 0		1.49 (0.13, 17.80)	0.77 (0.11, 5.61)	
Sought help for diarrhea at HF (0-60 months)	540			0.019
9 vs. 0		6.57 (0.91, 47.19)	0.48 (0.17, 1.33)	
13 vs. 0		10.6 (0.9, 120)	0.43 (0.13, 1.48)	
31 vs. 0		10 (1.1, 87.3)	0.66 (0.19, 2.24)	
Respondent would give "more" fluid to child with diarrhea	4208			< 0.001
9 vs. 0		0.98 (0.67, 1.45)	1.41 (0.94, 2.11)	
13 vs. 0		1.09 (0.67, 1.77)	1.46 (0.89, 2.40)	
31 vs. 0		2.11 (1.32, 3.36)	1.02 (0.65, 1.59)	

The odds ratio comparing corresponding intervention intensity versus no intervention receipt for the baseline and endline survey periods. The scores were selected as the 25th, 50th (median), and 75th percentiles.

[b] Test of interaction between survey period and intervention intensity. Interpreted as the contrast between the two odds ratios from baseline and endline. Result of testing whether indicators among respondents from EAs with increasing intervention had a larger difference from baseline to endline than respondents from EAs with no intervention.

[1] Adjusted for: rural/urban; sex of child; maternal education; transportation; household size; traditional healer use in past 12 months

[2] Adjusted for: rural/urban; age of child; sex of child; maternal education; household size; Portuguese speaker

[3] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker

[4] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker; traditional healer use in past 12 months

Table 34c: Child Health Outcomes by Amount of HEALTH and/or HEALTH AND SANITATION Intervention Exposure

	Number in model	Baseline OR (95% CI)	Endline OR (95% CI)	P-value
Child had cough/breathing difficulty in last 30 days (0-12 months)	1070			0.122
16.25 vs. 0		1.37 (0.62, 3.02)	2.32 (0.69, 7.78)	
24 vs. 0		2.23 (1.08, 4.61)	1.53 (0.47, 5.02)	
26 vs. 0		2.19 (1.09, 4.40)	1.50 (0.47, 4.86)	
Child had cough/breathing difficulty in last 30 days (0-60 months)	3060			0.022
16.25 vs. 0		1.73 (0.89, 3.34)	0.98 (0.44, 2.21)	
24 vs. 0		2.26 (1.20, 4.26)	0.88 (0.41, 1.90)	
26 vs. 0		2.28 (1.23, 4.25)	0.96 (0.45, 2.06)	
Child had shallow breathing last 30 days (0-12 months)	1073			0.102
16.25 vs. 0		1.68 (0.64, 4.38)	3.62 (1.14, 11.46)	
24 vs. 0		1.22 (0.49, 3.06)	1.69 (0.56, 5.14)	
26 vs. 0		1.14 (0.47, 2.76)	1.73 (0.59, 5.06)	
Child had shallow breathing last 30 days (0-60 months)	3069			0.050
16.25 vs. 0		2.80 (1.44, 5.47)	1.49 (0.57, 3.90)	
24 vs. 0		2.14 (1.13, 4.06)	0.99 (0.39, 2.52)	
26 vs. 0		2.02 (1.09, 3.72)	1.06 (0.42, 2.64)	
Sought help for cough/breathing at HF (0-12 months)	282			0.535
16.25 vs. 0		1.96 (0.55, 7.03)	0.69 (0.10, 4.93)	
24 vs. 0		3.15 (0.96, 10.31)	3.31 (0.50, 22.06)	
26 vs. 0		3.07 (0.98, 9.60)	3.84 (0.59, 25.22)	
Sought help for cough/breathing at HF (0-60 months)	648			0.017
16.25 vs. 0		5.70 (1.90, 17.09)	0.67 (0.18, 2.56)	
24 vs. 0		6.79 (2.32, 19.84)	2.85 (0.80, 10.12)	
26 vs. 0		6.44 (2.27, 18.25)	3.92 (1.11, 13.82)	
Child slept under bed net last night (0-12 months)	1064			0.297
16.25 vs. 0		1.26 (0.52, 3.08)	0.51 (0.23, 1.14)	
24 vs. 0		2.03 (0.85, 4.83)	1.39 (0.67, 2.87)	
26 vs. 0		2.31 (0.99, 5.38)	1.66 (0.80, 3.43)	
Child slept under bed net last night (0-60 months)	3005			0.192
16.25 vs. 0		1.42 (0.72, 2.78)	0.67 (0.40, 1.11)	
24 vs. 0		2.37 (1.26, 4.49)	1.62 (1.01, 2.60)	
26 vs. 0		2.71 (1.46, 5.04)	1.961.22, 3.16)	

Child Anthropometrics - All Province

3.3.6 Child Anthropometrics

Nutritional status is in a complex interplay with both poverty and disease burden, especially in children under-five. Interventions aimed at alleviating poor nutritional status must therefore take into account one´s food security and caloric intake as well as social determinants of health and disease prevalence.

For children under-five the most common metrics used to monitor changes in nutritional status are anthropometric indices including weight-for-age (underweight), height-for-age (stunting), and weight-for-height (wasting).

Acute malnutrition is measured using the indices for underweight and wasting and is disaggregated by moderate (< 2 SD below the mean) and severe (< 3 SD below the mean). Wasting is characterized by a deficit of muscle mass compared to what would be expected for a child with the same height and results from a low level of food consumption. Chronic malnutrition is measured using the index of Stunting and is also disaggregated as moderate (< 2 SD below the mean) and severe (< 3 SD below the mean). Stunting is caused by a persistent state of food insecurity or chronic and repeated infections.

Table 35 shows that in Mozambique there has been a steady improvement in both moderate and severe acute malnutrition over time, however chronic malnutrition has persisted and in some age groups increased.

Table 35: Child Anthropometric Results from Multiple Surveys in Zambézia

	All children under 5 yrs					
	Weight-for-Age (underweight)		Height/Length-for-age (stunting)		Weight-for-length/height (wasting)	
	< -3 SD %	< -2 SD %	< -3 SD %	< -2 SD %	< -3 SD %	< -2 SD %
DHS 2003	8.9	26.9	24.6	47.3	0.8	5.2
MICS 2008	5.1	20.6	18.0	45.7	1.4	4.9
OCLUVELA 2008	4.6	23.7	17.3	36.3	2.0	8.7
Ogumaniha 2010	8.2	13.2	20.2	39.3	2.2	6.9
Ogumaniha 2014	3.1	13.4	31.3	50.8	1.7	4.9

Table 36 shows general anthropometric estimates at Endline vs Baseline in all children under-five disaggregated by age group. In general, improvements are seen for both of the acute malnutrition indices. The greatest improvements are seen in the reduction of severe underweight and severe wasting, with the most striking reductions seen in children 6-11 months old.

For all age groups, the percentage of children classified as having both moderate and severe stunting have increased since Baseline.

Table 36: Child Anthropometrics (6-59 months)

	Baseline					Endline				
	N	% < -3 SD	(95% CI)	% < -2 SD	(95% CI)	N	% < -3 SD	(95% CI)	% < -2 SD	(95% CI)
Weight-for-age (underweight)										
Total 6-59	667	8.2	(8.2, 8.3)	13.2	(13.2, 13.3)	1120	3.1	(3.1, 3.1)	13.4	(13.3, 13.5)
6-11	91	17.1	(16.9, 17.3)	17.4	(17.2, 17.6)	149	2.6	(2.5, 2.7)	9.2	(9, 9.4)
12-23	104	6.7	(6.6, 6.8)	12.9	(12.7, 13.1)	316	2.4	(2.3, 2.5)	11.1	(10.9, 11.2)
24-35	128	3.7	(3.6, 3.8)	7	(6.9, 7.1)	280	2.9	(2.8, 3)	11.2	(11.1, 11.4)
36-47	215	5.9	(5.9, 6)	12	(11.9, 12.1)	203	4.4	(4.2, 4.5)	17.9	(17.7, 18.1)
48-59	129	10.5	(10.3, 10.6)	17.4	(17.2, 17.5)	172	3.4	(3.3, 3.5)	19.5	(19.2, 19.7)
Weight-for-length/height (wasting)										
Total 6-59	667	2.2	(2.2, 2.3)	6.9	(6.9, 7)	1120	1.7	(1.6, 1.7)	4.9	(4.8, 4.9)
6-11	91	9	(8.9, 9.2)	13.6	(13.4, 13.8)	149	1.5	(1.5, 1.6)	4.2	(4, 4.3)
12-23	104	2.1	(2.1, 2.2)	6.1	(6, 6.2)	316	2.1	(2, 2.2)	5.2	(5.1, 5.3)
24-35	128	1	(1, 1.1)	5.9	(5.8, 6)	280	0	-	3.5	(3.4, 3.6)
36-47	215	1.3	(1.3, 1.3)	6.2	(6.1, 6.3)	203	2.5	(2.4, 2.6)	6.3	(6.2, 6.5)
48-59	129	0.5	(0.5, 0.5)	5.3	(5.2, 5.4)	172	2.8	(2.7, 2.9)	5.2	(5, 5.3)
Length/height-for-age (Stunting)										
Total 6-59	667	20.2	(20.1, 20.3)	39.3	(39.2, 39.4)	1120	31.3	(31.2, 31.4)	50.8	(50.7, 50.9)
6-11	91	7.7	(7.6, 7.8)	26.5	(26.3, 26.7)	149	24.7	(24.4, 25)	41	(40.7, 41.3)
12-23	104	16.7	(16.5, 16.9)	36.2	(36, 36.4)	316	24.2	(24, 24.4)	36.9	(36.7, 37.1)
24-35	128	22.6	(22.4, 22.7)	39	(38.8, 39.2)	280	31.4	(31.1, 31.6)	57.5	(57.3, 57.7)
36-47	215	15	(14.9, 15.2)	38.9	(38.8, 39.1)	203	37.2	(37, 37.5)	55.7	(55.4, 55.9)
48-59	129	35.4	(35.2, 35.6)	49.6	(49.4, 49.8)	172	42.8	(42.5, 43.1)	68.8	(68.5, 69.1)

a] Reference standards and analysis programs were developed by the World Health Organization in 2006. These programs perform weighted estimation, with each child being weighted by the inverse of its sampling probability.

Tables 37 and 38 respectively show under-five anthropometric measurements disaggregated by male or female. For males, reductions from Baseline are seen for both moderate and severe wasting especially in the younger age categories. Whereas reductions from Baseline in the percentage classified as underweight are seen in all age groups for those classified as severely underweight. No positive declines in stunting are noted in any age category.

Table 37: Male Child Anthropometrics

	Baseline					Endline				
	N	% < -3 SD	(95% CI)	% < -2 SD	(95% CI)	N	% < -3 SD	(95% CI)	% < -2 SD	(95% CI)
Weight-for-age (underweight)										
6-59	315	8.5	(8.4, 8.5)	12	(11.9, 12.1)	549	4.2	(4.2, 4.3)	16.1	(16, 16.3)
6-11	34	10.4	(10.1, 10.6)	11	(10.8, 11.3)	73	5.1	(4.9, 5.3)	11.5	(11.2, 11.8)
12-23	56	5.6	(5.5, 5.7)	9.6	(9.4, 9.8)	156	3.4	(3.3, 3.5)	15.9	(15.6, 16.1)
24-35	75	5.3	(5.2, 5.4)	5.7	(5.5, 5.8)	132	3.9	(3.7, 4)	14.8	(14.5, 15)
36-47	102	11.6	(11.4, 11.7)	16.6	(16.4, 16.7)	103	6.8	(6.6, 7)	21.5	(21.1, 21.8)
48-59	48	8.8	(8.6, 9)	14.7	(14.5, 14.9)	85	1.7	(1.6, 1.8)	15.8	(15.5, 16.2)
Weight-for-length/height (wasting)										
6-59	315	2.3	(2.3, 2.3)	7.7	(7.6, 7.8)	549	1.9	(1.8, 1.9)	5.3	(5.2, 5.3)
6-11	34	8.7	(8.5, 9)	9.3	(9.1, 9.5)	73	0.3	(0.3, 0.4)	0.3	(0.3, 0.4)
12-23	56	1.7	(1.6, 1.7)	5.7	(5.6, 5.9)	156	3	(2.9, 3.2)	8	(7.8, 8.1)
24-35	75	1.5	(1.4, 1.5)	7.6	(7.5, 7.7)	132	0	-	2.9	(2.8, 3)
36-47	102	2.5	(2.4, 2.6)	10.6	(10.5, 10.8)	103	3.1	(3, 3.3)	8.9	(8.7, 9.1)
48-59	48	0	-	3.8	(3.7, 4)	85	2.8	(2.7, 3)	4	(3.8, 4.2)
Length/height-for-age (Stunting)										
6-59	315	19.2	(19.1, 19.3)	37.7	(37.6, 37.8)	549	32.2	(32.1, 32.4)	53.1	(52.9, 53.2)
6-11	34	3.2	(3, 3.3)	26.7	(26.4, 27.1)	73	36.9	(36.4, 37.3)	54.4	(53.9, 54.8)
12-23	56	16.6	(16.4, 16.8)	32.1	(31.8, 32.4)	156	18.9	(18.6, 19.1)	35.3	(35, 35.6)
24-35	75	24.8	(24.6, 25)	40	(39.7, 40.2)	132	31.9	(31.6, 32.2)	62.6	(62.3, 63)
36-47	102	13.3	(13.1, 13.5)	37.5	(37.3, 37.7)	103	42.1	(41.7, 42.5)	55.1	(54.7, 55.4)
48-59	48	34	(33.7, 34.2)	47.3	(47, 47.6)	85	38.4	(37.9, 38.8)	65.3	(64.9, 65.8)

a] Reference standards and analysis programs were developed by the World Health Organization in 2006. These programs perform weighted estimation, with each child being weighted by the inverse of its sampling probability.

For females, sizeable reductions from Baseline are seen in both moderate and severe underweight and wasting in the 6-23 month age categories. Again, no positive declines in stunting are noted in any age category.

Table 38: Female Child Anthropometrics

	Baseline					Endline				
	N	% < -3 SD	(95% CI)	% < -2 SD	(95% CI)	N	% < -3 SD	(95% CI)	% < -2 SD	(95% CI)
Weight-for-age (underweight)										
6-59	352	7.9	(7.9, 8)	14.5	(14.4, 14.6)	571	2	(1.9, 2)	10.7	(10.6, 10.8)
6-11	57	21.1	(20.8, 21.3)	21.2	(20.9, 21.4)	76	0	-	6.8	(6.6, 7)
12-23	48	8.6	(8.3, 8.8)	18.6	(18.3, 18.9)	160	1.4	(1.4, 1.5)	6.5	(6.4, 6.7)
24-35	53	0.7	(0.6, 0.7)	9.5	(9.3, 9.7)	148	2	(1.9, 2.1)	7.8	(7.6, 8)
36-47	113	0	-	7.2	(7.1, 7.3)	100	1.9	(1.8, 2)	14.3	(14, 14.6)
48-59	81	11.6	(11.4, 11.7)	19.2	(19, 19.4)	87	5.1	(4.9, 5.3)	23.2	(22.8, 23.6)
Weight-for-length/height (wasting)										
6-59	352	2.2	(2.1, 2.2)	6.2	(6.1, 6.2)	571	1.5	(1.4, 1.5)	4.5	(4.4, 4.5)
6-11	57	9.2	(9, 9.4)	16.1	(15.9, 16.4)	76	2.8	(2.7, 3)	8.2	(8, 8.5)
12-23	48	2.9	(2.8, 3.1)	6.8	(6.6, 6.9)	160	1.2	(1.1, 1.3)	2.6	(2.5, 2.7)
24-35	53	0.2	(0.2, 0.2)	2.8	(2.7, 2.9)	148	0	-	4.1	(3.9, 4.2)
36-47	113	0	-	1.5	(1.4, 1.6)	100	1.8	(1.7, 1.9)	3.7	(3.5, 3.8)
48-59	81	0.8	(0.8, 0.9)	6.3	(6.2, 6.5)	87	2.7	(2.5, 2.9)	6.4	(6.2, 6.7)
Length/height-for-age (Stunting)										
6-59	352	21.3	(21.2, 21.4)	40.9	(40.8, 41)	571	30.3	(30.1, 30.5)	48.5	(48.4, 48.7)
6-11	57	10.4	(10.2, 10.6)	26.4	(26.1, 26.7)	76	12	(11.7, 12.3)	27	(26.5, 27.4)
12-23	48	16.8	(16.5, 17.1)	43.3	(42.9, 43.7)	160	29.3	(29, 29.6)	38.4	(38.1, 38.7)
24-35	53	18.4	(18.1, 18.7)	37.3	(36.9, 37.6)	148	30.8	(30.5, 31.2)	52.6	(52.2, 52.9)
36-47	113	16.9	(16.7, 17.1)	40.5	(40.2, 40.7)	100	32.3	(31.9, 32.7)	56.3	(55.9, 56.7)
48-59	81	36.3	(36.1, 36.6)	51.2	(50.9, 51.4)	87	47.4	(46.9, 47.8)	72.5	(72.1, 72.9)

a] Reference standards and analysis programs were developed by the World Health Organization in 2006. These programs perform weighted estimation, with each child being weighted by the inverse of its sampling probability.

Child Anthropometrics - Three Focus Districts

3.3.7 Child Anthropometrics: Changes since Baseline in 3 Focus Districts

In comparison to Baseline, anthropometric measurements for acute malnutrition (underweight and wasting) showed declines when looking at all EAs surveyed in the three Focus Districts, with statistically significant declines seen for severe underweight and moderate wasting in both the 6-23 month and 6-59 month age groups (Table 39). Chronic malnutrition (stunting) showed increases since Baseline, with this being statistically significant for the 6-59 month age group.

Table 39: Child Anthropometrics: Endline versus Baseline

	Number in model	OR (95% CI)	P-value
Underweight (weight-for-age less than -2 SD) (6-23 months)	646	0.58 (0.32, 1.04)	0.069
Severely Underweight (weight-for-age less than -3 SD) (6-23 months)	646	0.18 (0.08, 0.41)	< 0.001
Stunting (height/ length-for-age less than -2 SD) (6-23 months)	646	1.31 (0.82, 2.09)	0.257
Severe stunting (height/ length-for-age less than -3 SD) (6-23 months)	646	1.61 (0.94, 2.78)	0.085
Wasting (weight-for-length/height less than -2 SD) (6-23 months)	646	0.40 (0.19, 0.85)	0.018
Severe wasting (weight-for-length/height less than -3 SD) (6-23 months)	646	0.48 (0.17, 1.31)	0.151
Underweight (weight-for-age less than -2 SD) (6-60 months)	1767	0.94 (0.65, 1.37)	0.751
Severely Underweight (weight-for-age less than -3 SD) (6-60 months)	1767	0.46 (0.28, 0.74)	0.001
Stunting (height/ length-for-age less than -2 SD) (6-60 months)	1767	1.79 (1.39, 2.32)	< 0.001
Severe stunting (height/ length-for-age less than -3 SD) (6-60 months)	1767	1.73 (1.33, 2.26)	< 0.001
Wasting (weight-for-length/height less than -2 SD) (6-60 months)	1767	0.57 (0.35, 0.94)	0.029
Severe wasting (weight-for-length/height less than -3 SD) (6-60 months)	1767	0.62 (0.26, 1.48)	0.277

a] The odd ratio comparing endline survey with baseline survey ignoring intervention receipt.
b] Test of association between survey period and indicators. This does correspond to the odds ratio.
1] Adjusted for: rural/urban; child age; child sex; maternal education; household size; Portuguese speaking respondent

When assessing only those EAs in the three Focus Districts with either a minimum Ogumaniha score of >15 or by intensity of program specific interventions (Areas 1-2, 4-7; see Methods section: Intervention Score), no statistically significant trends towards improvements were observed (Table 40, 41).

Table 40: Child Anthropometrics with Some Intervention Exposure (Score > 15)

	Number in model	Baseline OR (95% CI)	Endline OR (95% CI)	P-value
Underweight (weight-for-age less than -2 SD) (6-23 months)	538	0.93 (0.37, 2.36)	0.53 (0.26, 1.08)	0.385
Severely Underweight (weight-for-age less than -3 SD) (6-23 months)	538	0.27 (0.08, 0.84)	0.53 (0.12, 2.45)	0.486
Chronic malnutrition (height/ length-for-age less than -2 SD) (6-23 months)	538	0.76 (0.36, 1.58)	0.84 (0.52, 1.37)	0.822
Severe chronic malnutrition (height/ length-for-age less than -3 SD) (6-23 months)	538	1.00 (0.36, 2.75)	1.06 (0.67, 1.69)	0.915
Acute malnutrition (weight-for-length/height less than -2 SD) (6-23 months)	538	0.54 (0.18, 1.61)	0.67 (0.21, 2.10)	0.809
Severe acute malnutrition (weight-for-length/height less than -3 SD) (6-23 months)	538	0.19 (0.02, 1.55)	0.19 (0.03, 1.41)	0.985
Underweight (weight-for-age less than -2 SD) (6-60 months)	1472	0.79 (0.44, 1.41)	1.02 (0.67, 1.54)	0.533
Severely Underweight (weight-for-age less than -3 SD) (6-60 months)	1472	0.35 (0.17, 0.71)	0.88 (0.43, 1.80)	0.093
Chronic malnutrition (height/ length-for-age less than -2 SD) (6-60 months)	1472	0.80 (0.54, 1.19)	1.18 (0.88, 1.58)	0.127
Severe chronic malnutrition (height/ length-for-age less than -3 SD) (6-60 months)	1472	0.95 (0.62, 1.45)	1.17 (0.83, 1.65)	0.450
Acute malnutrition (weight-for-length/height less than -2 SD) (6-60 months)	1472	0.42 (0.17, 1.01)	0.78 (0.39, 1.59)	0.271
Severe acute malnutrition (weight-for-length/height less than -3 SD) (6-60 months)	1472	0.33 (0.06, 1.79)	0.46 (0.10, 2.22)	0.788
		Effect (95% CI)	**Effect (95% CI)**	
Weight-for-age Z-score (6-23 months)	538	-0.04 (-0.67, 0.59)	0.38 (0.02, 0.74)	0.290
Height/length-for-age Z-score (6-23 months)	538	0.22 (-0.33, 0.77)	0.37 (-0.16, 0.90)	0.720
Weight-for-length/height Z-score (6-23 months)	538	-0.18 (-0.89, 0.53)	0.30 (-0.06, 0.66)	0.223
Weight-for-age Z-score (6-60 months)	1472	0.12 (-0.26, 0.49)	0.06 (-0.15, 0.26)	0.803
Height/length-for-age Z-score (6-60 months)	1472	0.14 (-0.19, 0.46)	-0.08 (-0.39, 0.23)	0.349
Weight-for-length/height Z-score (6-60 months)	1472	0.07 (-0.43, 0.57)	0.17 (-0.05, 0.39)	0.716

a] The odds ratio comparing intervention receipt versus no intervention receipt for the baseline and endline survey periods. Effect estimates are from linear regression and represent the average change in the indicator from baseline to endline ignoring intervention receipt.

b] Test of interaction between survey period and intervention receipt. Interpreted as the contrast between the two odds ratios from baseline and endline. Result of testing whether indicators among respondents from EAs with intervention had a larger difference from baseline to endline than respondents from EAs with no recorded intervention.

1] Adjusted for: rural/urban

Table 41 - Child Anthropometrics by Amount of AREA SPECIFIC Intervention Exposure

	Number in model	Baseline OR (95% CI)	Endline OR (95% CI)	P-value
Underweight (weight-for-age less than -2 SD) (6-23 months)	538			0.108
10 vs. 0		0.24 (0.05, 1.10)	2.52 (0.97, 6.52)	
17 vs. 0		0.21 (0.04, 0.98)	1.92 (0.71, 5.20)	
30 vs. 0		0.30 (0.07, 1.28)	0.90 (0.33, 2.45)	
Severely Underweight (weight-for-age less than -3 SD) (6-23 months)	538			0.384
10 vs. 0		0.23 (0.05, 1.09)	1.37 (0.21, 9.09)	
17 vs. 0		0.16 (0.03, 0.85)	1.62 (0.24, 11.11)	
30 vs. 0		0.09 (0.02, 0.49)	0.56 (0.07, 4.71)	
Chronic malnutrition (height/ length-for-age less than -2 SD) (6-23 months)	538			0.106
10 vs. 0		0.48 (0.16, 1.40)	1.78 (0.85, 3.72)	
17 vs. 0		0.40 (0.13, 1.22)	2.09 (0.98, 4.46)	
30 vs. 0		0.33 (0.12, 0.92)	1.39 (0.68, 2.84)	
Severe chronic malnutrition (height/ length-for-age less than -3 SD) (6-23 months)	538			0.426
10 vs. 0		0.50 (0.13, 1.93)	1.47 (0.61, 3.54)	
17 vs. 0		0.45 (0.10, 2.00)	1.62 (0.65, 4.00)	
30 vs. 0		0.44 (0.10, 1.92)	1.42 (0.63, 3.22)	
Acute malnutrition (weight-for-length/height less than -2 SD) (6-23 months)	538			0.809
10 vs. 0		0.38 (0.08, 1.89)	0.93 (0.32, 2.72)	
17 vs. 0		0.31 (0.06, 1.73)	0.91 (0.32, 2.61)	
30 vs. 0		0.26 (0.05, 1.26)	0.45 (0.13, 1.56)	
Severe acute malnutrition (weight-for-length/height less than -3 SD) (6-23 months)	538			0.515
10 vs. 0		0.35 (0.04, 3.11)	2.52 (0.41, 15.40)	
17 vs. 0		0.20 (0.02, 2.21)	1.68 (0.23, 12.35)	
30 vs. 0		0.14 (0.01, 1.34)	0.36 (0.04, 3.55)	
Underweight (weight-for-age less than -2 SD) (6-60 months)	1472			0.069
10 vs. 0		0.28 (0.12, 0.69)	1.17 (0.69, 1.98)	
17 vs. 0		0.29 (0.12, 0.72)	1.11 (0.66, 1.88)	
30 vs. 0		0.33 (0.14, 0.77)	1.06 (0.63, 1.81)	
Severely Underweight (weight-for-age less than -3 SD) (6-60 months)	1472			0.257
10 vs. 0		0.44 (0.18, 1.06)	1.00 (0.36, 2.77)	
17 vs. 0		0.37 (0.15, 0.94)	0.83 (0.27, 2.50)	

30 vs. 0		0.20 (0.08, 0.54)	0.78 (0.27, 2.25)	
Chronic malnutrition (height/ length-for-age less than -2 SD) (6-60 months)	1472			0.039
10 vs. 0		0.56 (0.27, 1.15)	1.23 (0.74, 2.06)	
17 vs. 0		0.53 (0.24, 1.16)	1.55 (0.89, 2.68)	
30 vs. 0		0.45 (0.23, 0.90)	1.56 (0.94, 2.58)	
Severe chronic malnutrition (height/ length-for-age less than -3 SD) (6-60 months)	1472			0.248
10 vs. 0		0.50 (0.28, 0.91)	1.03 (0.55, 1.91)	
17 vs. 0		0.55 (0.30, 1.03)	1.18 (0.59, 2.35)	
30 vs. 0		0.55 (0.31, 0.97)	1.32 (0.72, 2.45)	
Acute malnutrition (weight-for-length/height less than -2 SD) (6-60 months)	1472			0.963
10 vs. 0		0.59 (0.20, 1.74)	0.56 (0.25, 1.27)	
17 vs. 0		0.47 (0.15, 1.53)	0.44 (0.19, 0.99)	
30 vs. 0		0.33 (0.10, 1.04)	0.40 (0.17, 0.97)	
Severe acute malnutrition (weight-for-length/height less than -3 SD) (6-60 months)	1472			0.803
10 vs. 0		0.63 (0.10, 3.95)	1.75 (0.49, 6.28)	
17 vs. 0		0.45 (0.07, 3.07)	0.92 (0.23, 3.68)	
30 vs. 0		0.30 (0.04, 2.09)	0.44 (0.07, 2.68)	
		Effect (95% CI)	**Effect (95% CI)**	
Weight-for-age Z-score (6-23 months)	538			0.123
10 vs. 0		1.25 (-0.09, 2.59)	-0.37 (-0.76, 0.02)	
17 vs. 0		1.29 (-0.19, 2.77)	-0.25 (-0.66, 0.15)	
30 vs. 0		1.03 (-0.30, 2.36)	0.20 (-0.24, 0.64)	
Height/length-for-age Z-score (6-23 months)	538			0.251
10 vs. 0		0.58 (-0.27, 1.42)	-0.40 (-0.98, 0.17)	
17 vs. 0		0.65 (-0.24, 1.55)	-0.61 (-1.17, -0.04)	
30 vs. 0		0.77 (-0.06, 1.60)	-0.08 (-0.67, 0.52)	
Weight-for-length/height Z-score (6-23 months)	538			0.184
10 vs. 0		1.06 (-0.45, 2.58)	-0.22 (-0.63, 0.19)	
17 vs. 0		1.05 (-0.60, 2.70)	0.07 (-0.36, 0.50)	
30 vs. 0		0.69 (-0.79, 2.16)	0.35 (-0.10, 0.81)	
Weight-for-age Z-score (6-60 months)	1472			0.170
10 vs. 0		0.63 (0.00, 1.26)	-0.25 (-0.57, 0.06)	
17 vs. 0		0.78 (0.09, 1.47)	-0.20 (-0.54, 0.15)	
30 vs. 0		0.69 (0.05, 1.33)	-0.08 (-0.41, 0.25)	
Height/length-for-age Z-score (6-60 months)	1472			0.090

10 vs. 0		0.44 (-0.16, 1.03)	-0.28 (-0.84, 0.27)	
17 vs. 0		0.52 (-0.12, 1.17)	-0.48 (-1.09, 0.13)	
30 vs. 0		0.60 (0.02, 1.18)	-0.43 (-0.99, 0.13)	
Weight-for-length/height Z-score (6-60 months)	1472			0.439
10 vs. 0		0.44 (-0.31, 1.18)	-0.13 (-0.40, 0.13)	
17 vs. 0		0.57 (-0.23, 1.37)	0.09 (-0.19, 0.38)	
30 vs. 0		0.41 (-0.32, 1.14)	0.25 (-0.04, 0.55)	

a]The odds ratio comparing corresponding intervention intensity versus no intervention receipt for the baseline and endline survey periods. Effect estimates are from linear regression and represent the average change in the indicator for corresponding intervention intensity versus no intervention receipt. The scores were selected as the 25th, 50th (median), and 75th percentiles.

b]Test of interaction between survey period and intervention intensity. Interpreted as the contrast between the two odds ratios from baseline and endline. Result of testing whether indicators among respondents from EAs with increasing intervention had a larger difference from baseline to endline than respondents from EAs with no intervention.

[1]Adjusted for: rural/urban

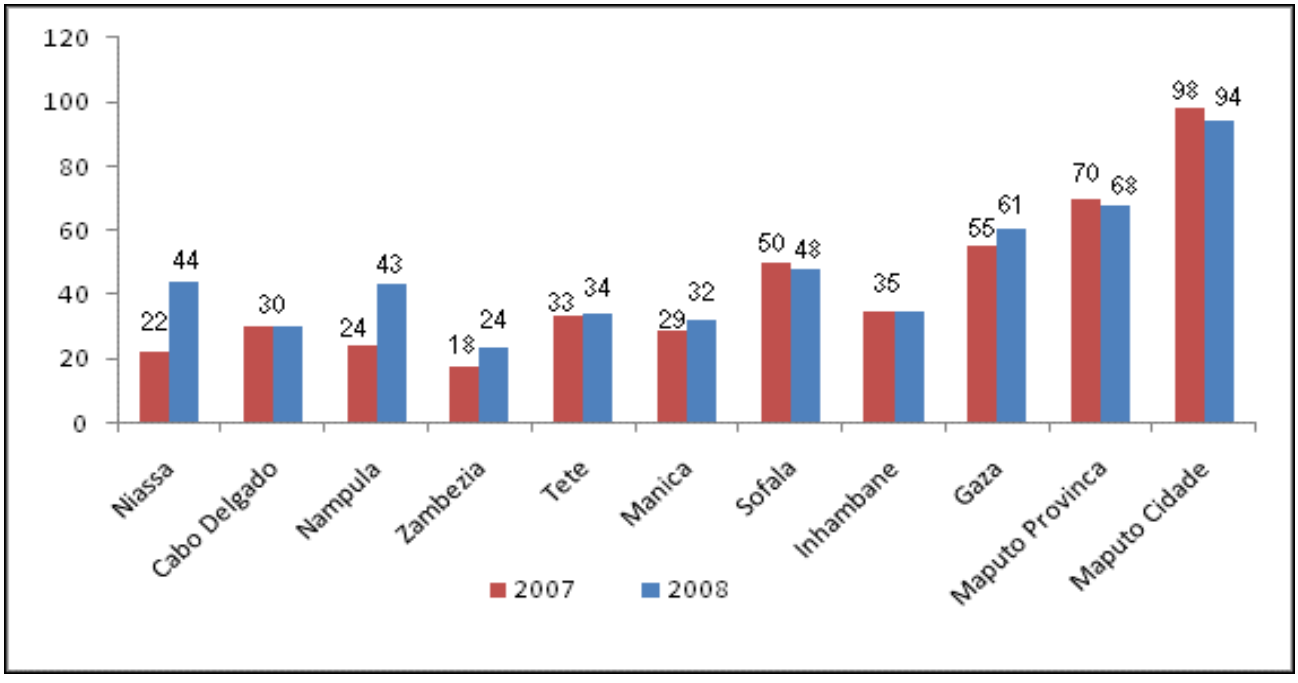
4. Objective 2: Hygiene practices and use of clean water and sanitation facilities increased

4.1 Water and Sanitation

4.1.1 Water and Sanitation

According to the MICS 2008, the overall national rate of consumption of safe drinking water in Mozambique was 36% in 2004 and 43% in 2008, representing a growth of 1.75% per year. When evaluated by province, Zambézia Province had the lowest consumption (24%) of safe drinking water in 2008 (Figure 5).

Figure 5: Percentage of Consumption of Safe Drinking Water by Province in Mozambique, MICS 2008



Additionally, the national rate of use of improved sanitation has equally improved from 12% in 2004 to 19.3% in 2008. However with the exception of Maputo, no province had a rate of use of improved sanitation of more than 50%. The rate of use of improved sanitation in Zambézia Province in 2008 was 7.6% (MICS, 2008)

Water & Sanitation - All Province

When asked at Endline the main source(s) of the household´s drinking water, the main responses were "Well (51.9%), River (18.9%), Public faucet (13.6%), and Own individual faucet (4.9%)", respectively. Relatively unchanged since Baseline, 15.2% of respondents state that their Household treats its drinking water. The vast majority of respondents report their mode of transport to get water is "on foot" (98.5%) and the median time it takes to reach their main source of drinking water is 3 minutes. Nearly 9% of households report owning a water filter which is up from 1% at Baseline.

Forty-three percent of households report using a latrine; however, 73.7% report the latrine used is not the improved design being encouraged through interventions, and 33.7% report they share this latrine with other households (Table 42)

Table 42: Water and Sanitation

	Baseline (n=3749)	Endline (n=3892)
Main source(s) of drinking water		
Own faucet	4.5%	4.9%
Public faucet	19.4%	13.6%
Rain	1.7%	1.3%
River	21.4%	18.9%
Bottled	0.2%	1.9%
Well	56.4%	51.9%
Other	4.0%	2.1%
Household treats drinking water	15.0%	15.2%
Methods used to make water safer to drink		
Missing, n(%)	10 (2.7%)	62 (14.8%)
Bleach	53.7%	71.7%
Boiling	40.1%	20.8%
Tablets	0.0%	0.8%
Water filter	4.9%	3.6%
Time to water source (minutes)	8.1 (2 - 30)	3 (1 - 15)
Mode of transport to water source		
Missing, n(%)	372 (9.9%)	116 (3.0%)
Bicycle	2.4%	1.4%
Car	0.0%	0.0%
Motorcycle	0.0%	0.0%
On foot	97.5%	98.5%
Household has a water filter	1.0%	8.6%
Situations for hand washing:		

After using latrine	64.6%	61.4%
After cleaning feces	49.4%	42.9%
Before food preparation	58.9%	44.5%
Before feeding children	47.5%	39.7%
Before eating	41.1%	48.8%
Household uses a latrine	36.2%	43.5%
Among those households using a latrine: Latrine type		
Missing, n(%)	13 (1.3%)	7 (0.8%)
Improved Latrine (with support structure)	5.0%	4.1%
Traditional Improved Latrine	17.2%	18.7%
Unimproved latrine	75.6%	73.7%
Household shares latrine	23.3%	33.7%
Number of households sharing latrine	3 (2 - 3)	3 (2 - 5)

a]Continuous variables are reported as weighted estimates of median (interquartile range), with each observation being weighted by the inverse of the household sampling probability.
b]Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering. [c] Percentages may sum to greater than 100%.

Water & Sanitation - Three Focus Districts

4.1.2 Water and Sanitation: Changes since Baseline in 3 Focus Districts

In comparison to Baseline, access to a safe source of drinking water and washing ones hands after using a latrine declined significantly. In contrast, the odds of a household having an improved latrine and washing hands prior to food preparation trended towards improvement, though was not statistically significant. Washing hands after cleaning up the feces of one´s children did show a statistically significant improvement since Baseline.

Table 43: Water and Sanitation Outcomes: Endline versus Baseline

	Number in model	OR (95% CI)	P-value
Safe source for drinking water	5844	0.50 (0.41, 0.62)	< 0.001
Household treats drinking water	5844	0.99 (0.73, 1.34)	0.968
Household uses latrine	5043	0.99 (0.83, 1.19)	0.947
Household has improved latrine	5943	1.24 (0.85, 1.80)	0.273
Washed hands yesterday	5795	0.86 (0.66, 1.12)	0.268
Washed hand after using latrine	5795	0.73 (0.62, 0.87)	< 0.001
Washed hand after cleaning up feces of children	5795	1.27 (1.02, 1.57)	0.030
Washed hands before preparing food	5795	1.10 (0.90, 1.34)	0.357

a] The odd ratio comparing endline survey with baseline survey ignoring intervention receipt.
b] Test of association between survey period and indicators. This does correspond to the odds ratio.
1] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker

When we analyzed Water and Sanitation indicators for those EA with a minimum Ogumaniha intervention score of >15, a statistically significant increase in the odds of a household having access to a safe source of drinking water was seen. For all indicators related to Washing of Hands, there was a decrease in the odds since Baseline, with a statistically significant decrease for both washing hands after cleaning up feces of children and prior to food preparation.

Table 44: Water and Sanitation Outcomes with Some Intervention Exposure (Score > 15)

	Number in model	Baseline OR (95% CI)	Endline OR (95% CI)	P-value
Safe source for drinking water	5844	0.81 (0.54, 1.23)	1.22 (0.89, 1.68)	0.050
Household treats drinking water	5844	0.88 (0.57, 1.34)	1.21 (0.79, 1.85)	0.292
Household uses latrine	5043	2.01 (1.50, 2.70)	1.42 (0.99, 2.04)	0.060
Household has improved latrine	5943	1.24 (0.69, 2.22)	1.23 (0.77, 1.97)	0.990
Washed hands yesterday	5795	1.05 (0.74, 1.49)	0.95 (0.63, 1.44)	0.692
Washed hand after using latrine	5795	1.14 (0.89, 1.48)	1.02 (0.79, 1.32)	0.501
Washed hand after cleaning up feces of children	5795	1.40 (1.06, 1.85)	0.69 (0.52, 0.93)	< 0.001
Washed hands before preparing food	5795	1.14 (0.87, 1.49)	0.69 (0.55, 0.88)	0.005

a] The odds ratio comparing intervention receipt versus no intervention receipt for the baseline and endline survey periods.
b] Test of interaction between survey period and intervention receipt. Interpreted as the contrast between the two odds ratios from baseline and endline. Result of testing whether indicators among respondents from EAs with intervention had a larger difference from baseline to endline than respondents from EAs with no recorded intervention.
1] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker

For this analysis, we developed a "WASH intervention specific" score and utilized intervention Area 5 for analysis of drinking water indicators and utilized intervention Area 6 for sanitation and hand washing indictors. Table 45 shows that as Ogumaniha WASH interventions increased in intensity there were statistically significant increased odds in having a safe source of drinking water and treated drinking water. Again, for all indicators related to Hand washing, there was a decrease in odds when compared to Baseline.

Table 45: Hygiene and Sanitation Outcomes by Amount of WASH Intervention Exposure

	Number in model	Baseline OR (95% CI)	Endline OR (95% CI)	P-value
Safe source for drinking water	5844			0.029
1 vs. 0		0.94 (0.91, 0.97)	0.99 (0.96, 1.02)	
19 vs. 0		0.49 (0.32, 0.75)	0.92 (0.63, 1.32)	
40 vs. 0		1.66 (0.78, 3.55)	1.71 (1.08, 2.70)	
Household treats drinking water	5844			< 0.001
1 vs. 0		0.96 (0.93, 0.99)	1.03 (0.99, 1.08)	
19 vs. 0		0.59 (0.38, 0.90)	1.50 (0.88, 2.56)	
40 vs. 0		1.33 (0.83, 2.11)	0.81 (0.49, 1.33)	
Household uses latrine	5043			0.035
45 vs. 0		2.50 (1.69, 3.68)	2.63 (1.75, 3.96)	
75 vs. 0		1.54 (1.04, 2.28)	0.87 (0.55, 1.36)	
80 vs. 0		0.93 (0.48, 1.81)	0.37 (0.19, 0.70)	
Household has improved latrine	5943			0.006
45 vs. 0		0.83 (0.44, 1.56)	1.61 (0.93, 2.77)	
75 vs. 0		1.51 (0.75, 3.04)	0.86 (0.45, 1.62)	
80 vs. 0		2.21 (1.18, 4.13)	0.53 (0.21, 1.36)	
Washed hand after using latrine	5795			0.387
45 vs. 0		0.89 (0.69, 1.17)	0.90 (0.68, 1.18)	
75 vs. 0		1.33 (1.00, 1.75)	1.11 (0.82, 1.50)	
80 vs. 0		1.70 (1.25, 2.31)	1.29 (0.91, 1.81)	
Washed hand after cleaning up feces of children	5795			< 0.001
45 vs. 0		1.66 (1.26, 2.19)	0.67 (0.49, 0.92)	
75 vs. 0		1.47 (1.06, 2.04)	0.70 (0.50, 0.97)	
80 vs. 0		1.21 (0.85, 1.71)	0.79 (0.56, 1.10)	
Washed hands before preparing food	5795			< 0.001
45 vs. 0		1.31 (0.99, 1.75)	0.64 (0.49, 0.83)	
75 vs. 0		1.24 (0.91, 1.70)	0.70 (0.54, 0.90)	
80 vs. 0		1.13 (0.81, 1.57)	0.82 (0.63, 1.06)	

a] The odds ratio comparing corresponding intervention intensity versus no intervention receipt for the baseline and endline survey periods. The scores were selected as the 25th, 50th (median), and 75th percentiles.

b] Test of interaction between survey period and intervention intensity. Interpreted as the contrast between the two odds ratios from baseline and endline. Result of testing whether indicators among respondents from EAs with increasing intervention had a larger difference from baseline to endline than respondents from EAs with no intervention.

1] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker

5 Objective 3: Livelihood capabilities protected and enhanced

Mozambique currently ranks 178 of 187 countries on the United Nations Human Development Index (HDI). Millennium Development Goal #1 (MDG 1) has as its goal to eradicate extreme poverty and hunger and is built upon the following targets: 1) halve the number of people who suffer from hunger; 2) achieve full and productive employment for all, including women and young people; and 3) halve the number of persons living on less than $1 per day.

5.1 Food and Nutrition

Hunger is a complex and multifaceted phenomenon that is not completely understood through analysis malnourishment prevalence alone (see Child Anthropometrics above). Food security is defined as a state in which "all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life" (USAID, 1992). As such, we have adapted the Household Food Insecurity Access Scale (HFIAS) to look at changes in access to food over time and constructed a Household dietary diversity score (HDDS) calculated by summing the number of food groups consumed in the household over a 7 day recall period (Food and Agricultural Organization (FAO) of the United Nations). For the household dietary diversity score, 12 food groups are summed:

1. Maize or Cereals [survey items 1 and 2]
2. Roots and Tubers [3]
3. Vegetables [4 and 8]
4. Sugar or sugar products [5]
5. Beans [6]
6. Nuts [7]
7. Fruits [9]
8. Meat [10]
9. Poultry and Eggs [11]
10. Fish [12]
11. Oils and fats [13]
12. Milk and milk products [14]

Food and Nutrition - All Province

The FAO defines "low" dietary diversity as a Household Dietary Diversity score of < 4. Dietary diversity of households has only slightly improved since Baseline from a median score of 7 to 8. Despite a relatively consistent diversity in diet between Baseline and Endline, greater than 30% of households continue to report periods where they had no food to eat in the 30 days prior to survey implementation (Table 46).

Table 46: Household Dietary Access

	Baseline (n=3749)	Endline (n=3892)
Household Dietary Diversity Score (HDDS)	7 (5 - 9)	8 (5 - 10)
HDDS categorized		
HDDS 0 - 3	13.6%	11.0%
HDDS 4 - 6	33.3%	27.6%
HDDS 7 - 9	29.6%	35.2%
HDDS 10 - 12	23.4%	26.2%
In the past four weeks, there was ever no food to eat of any kind in your household because of lack of resources to get food	35.5%	31.0%
How often did this happen?		
Often	15.4%	13.7%
Sometimes	50.2%	55.4%
Rarely	34.4%	30.9%

5.2 Livelihood and Income

Traditional standards for measuring poverty are based on uni-dimensional measures that categorize a person as poor if their income falls below a particular "poverty line", frequently defined as less than $1.25 a day. Based on current exchange rates, $1.25 per day is roughly equivalent to 1,162 meticais (Mts) per month.

Livelihood & Income - All Province

Table 47 provides information as to a respondent´s source and quantity of monthly household income, as well as primary occupation. Most households reported receiving income through the sale of agricultural products (52.2%) or other natural resources (9.5%) (Firewood, grass, charcoal, etc.), both representing a decrease in proportion to what was reported at Baseline. Additionally, a much larger proportion reported their household income as "other" (16%), a response category scarcely selected at baseline.

While the vast majority of households continue to report a monthly income below the 1,162 Mts ($1.25 per day) "poverty line", the proportion of households reporting "no income" dropped from 33.3% at Baseline to 23.8% at Endline.

We asked our female heads of households what their primary occupation was. As compared to Baseline, the proportion reporting a primary occupation as "farming" dropped from 66.6% to 37.9%, with an increasing proportion of females reporting "homemaker" (38.4%), "business" (10.2%), and/or "wage labor" (4.6%).

Table 47: Livelihood and Income

	Baseline (n=3749)	Endline (n=3892)
Source(s) of income:		
Selling local natural resources	13.8%	9.5%
Selling agriculture products	62.9%	52.2%
Selling animals	7.1%	5.3%
Wage labor	11.9%	8.3%
Remittances	2.7%	1.3%
Other	0.7%	16.0%
Household income (sum of all members' monthly earnings)		
Missing, n (%)	295 (7.9%)	971 (24.9%)
No income	33.3%	23.8%
Up to Mts 200	19.3%	25.1%
Mts 200-400	12.7%	13.6%
Mts 400-600	9.2%	8.9%
Mts 600-800	4.3%	5.9%
Mts 800-1000	5.9%	6.8%
Mts 1000-1500	6.1%	3.2%
Mts 1500-2000	3.9%	4.7%
Mts 2000-4000	3.8%	3.3%
Mts 4000-7000	0.9%	3.0%
More than Mts 7000	0.6%	1.7%
Primary occupation (female head of household)		
None	4.4%	8.0%
Farming	66.6%	37.9%
Homemaker	22.7%	38.4%
Business	3.1%	10.2%
Wage labor	2.7%	4.6%
Other	0.6%	1.0%

Livelihood Capabilities - Three Focus Districts

5.3 Livelihood Capabilities: Changes since Baseline in 3 Focus Districts

In comparison to Baseline, the three Focus Districts showed statistically significant improvements in many of the Livelihood indicators (Table 48). Respondents had 2.5 times higher odds of selling their crops than Baseline and Food Insecurity (having periods of no food in the household in the previous four-weeks) showed a statistically

significant decline. Respondents in the three Focus Districts had an average increase in household income of 378 meticais per month from Baseline.

Table 48: Livelihood Capability Outcomes: Endline versus Baseline

	Number in model	OR (95% CI)	P-value
Sell crops	3266	2.56 (2.12, 3.09)	< 0.001
Own livestock	5841	1.08 (0.94, 1.25)	0.271
Food insecurity in past four weeks	5860	0.81 (0.67, 0.97)	0.019
		Effect (95% CI)	
Household dietary diversity score	5943	0.04 (-0.27, 0.34)	0.821
Household income	5943	378 (254, 502)	< 0.001

a] The odd ratio comparing endline survey with baseline survey ignoring intervention receipt. Effect estimates are from linear regression and represent the average change in the indicator from baseline to endline ignoring intervention receipt.
b] Test of association between survey period and indicators. This does correspond to the odds ratio.
1] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker; transport
2] Adjusted for: rural/urban; education; household size; Portuguese speaker
3] Adjusted for: rural/urban
4] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker

In EA with an Ogumaniha intervention score of > 15, the odds of food insecurity showed a statistically significant increase which is a negative trend. Household income shows a trend towards higher income, though is not statistically significant (Table 49).

Table 49: Livelihood Capability Outcomes with Some Intervention Exposure (Score > 15)

	Number in model	Baseline OR (95% CI)	Endline OR (95% CI)	P-value
Sell crops	3266	1.46 (1.08, 1.97)	1.20 (0.84, 1.70)	0.313
Own livestock	5841	1.26 (1.02, 1.57)	0.93 (0.76, 1.15)	0.028
Food insecurity in past four weeks	5860	0.67 (0.54, 0.85)	1.25 (0.96, 1.62)	< 0.001
		Effect (95% CI)	**Effect (95% CI)**	
Household dietary diversity score	5943	0.55 (0.16, 0.94)	-0.61 (-1.08, -0.13)	< 0.001
Household income	5943	-65.13 (-161.55, 31.3)	189 (-56.51, 434)	0.066

a] The odds ratio comparing intervention receipt versus no intervention receipt for the baseline and endline survey periods. Effect estimates are from linear regression and represent the average change in the indicator from baseline to endline ignoring intervention receipt.
b] Test of interaction between survey period and intervention receipt. Interpreted as the contrast between the two odds ratios from baseline and endline. Result of testing whether indicators among respondents from EAs with intervention had a larger difference from baseline to endline than respondents from EAs with no recorded intervention.

In order to show the relationship between Ogumaniha intervention implementation and the changes seen in indicator results since Baseline, we analyzed the livelihood indicators in relation to the intensity of area specific intervention score (Table 50). For this analysis we developed a “Food insecurity” score utilizing intervention Areas 1, 4 and 7; a “livelihood” score utilizing intervention Areas 4 and 7; and a “multidimensional poverty index” score utilizing intervention Areas 1-2 and 4-7 (see Methods section: Intervention Score). As intensity of Ogumaniha health interventions increased in a given EA within the three focus districts, an increase in odds of improvement was seen for selling one´s crops and in monthly household income.

For EA with the largest intensity of Ogumaniha interventions derived by the "livelihood" score, the average change in household income was 1,756 meticais per month, exceeding the $1.25 per day cut off to describe extreme income poverty.

Table 50: Livelihood Capability Outcomes by Amount of AREA SPECIFIC Intervention Exposure

	Number in model	Baseline OR (95% CI)	Endline OR (95% CI)	P-value
Sell crops	3266			0.010
1 vs. 0		0.78 (0.57, 1.07)	1.09 (0.77, 1.53)	
5 vs. 0		1.34 (0.94, 1.92)	3.37 (1.95, 5.82)	
6 vs. 0		2.26 (1.53, 3.32)	5.47 (2.78, 10.74)	
Own livestock	5841			0.399
1 vs. 0		0.98 (0.74, 1.31)	1.04 (0.80, 1.35)	
5 vs. 0		1.57 (1.08, 2.27)	1.26 (0.88, 1.80)	
6 vs. 0		2.01 (1.32, 3.07)	1.34 (0.88, 2.05)	
Food insecurity in past four weeks	5860			< 0.001
6 vs. 0		1.42 (0.81, 2.50)	0.81 (0.50, 1.31)	
11 vs. 0		1.56 (0.93, 2.62)	1.38 (0.86, 2.22)	
		Effect (95% CI)	**Effect (95% CI)**	
Household dietary diversity score	5943			0.001
9 vs. 0		0.12 (-0.93, 1.16)	-0.52 (-1.14, 0.09)	
16 vs. 0		-0.38 (-1.37, 0.61)	-1.72 (-2.31, -1.14)	
17 vs. 0		-0.43 (-1.39, 0.53)	-1.82 (-2.41, -1.23)	
Household income	5943			< 0.001
1 vs. 0		-89.82 (-235.19, 55.55)	-34.15 (-314.51, 246.21)	
5 vs. 0		-2.83 (-199.17, 193.50)	1137 (571, 1702)	
6 vs. 0		130 (-106, 366)	1756 (1092, 2420)	

a] The odds ratio comparing corresponding intervention intensity versus no intervention receipt for the baseline and endline survey periods. Effect estimates are from linear regression and represent the average change in the indicator for corresponding intervention intensity versus no intervention receipt. The scores were selected as the 25th, 50th (median), and 75th percentiles.
b] Test of interaction between survey period and intervention intensity. Interpreted as the contrast between the two odds ratios from baseline and endline. Result of testing whether indicators among respondents from EAs with increasing intervention had a larger difference from baseline to endline than respondents from EAs with no intervention.
1] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker; transport
2] Adjusted for: rural/urban; education; household size; Portuguese speaker
3] Adjusted for: rural/urban
4] Adjusted for: rural/urban; age; marital status; education; household size; Portuguese speaker
c] Specific intervention area: Food insecurity (Areas 1, 4, 7), Livelihood (Areas 4, 7); MPI (Areas 1-2, 4-7)

5.4 Housing Materials

Table 51 provides information as to the housing materials used by respondents in their current dwelling. As part of the Multidimensional Poverty Index (MPI) developed by the Oxford Poverty and Human Development Initiative and further adapted by Ogumaniha, the type of roofing material used in one´s housing represents an indicator utilized when calculating the MPI. Greater than 80% of respondents reported that the roofing material of their home was made from grass, cane, leaves, or straw and greater than 90% reported that their dwelling´s flooring consists of earth or sand. Only slightly more than 50% of respondents reported having access to adequate

building materials, with 92.8% reporting “cost” as the main impediment to access.

Table 51: Housing Materials

	Baseline (n=3749)	Endline (n=3892)
Roofing material (largest dwelling)		
Missing, n (%)	57 (1.5%)	1087 (27.9%)
Aluminum	0.1%	0.6%
Cement	0.4%	0.0%
Grass/Cane/Leaves/Straw	83.4%	80.5%
Other	0.0%	0.8%
Plastic	0.0%	0.0%
Tile	0.4%	2.3%
Zinc	15.7%	15.8%
Flooring material (largest dwelling)		
Missing, n (%)		1126 (28.9%)
Carpet		0.1%
Cement		6.0%
Cermaic tiles		0.4%
Dung		0.6%
Earth/sand		91.8%
Palm/bamboo		0.6%
Wood planks		0.5%
Number of structures/rooms in household	2 (2 - 3)	3 (2 - 3)
Adequate access to building materials	59.7%	51.2%
If no, then primary reason for poor access:		
Missing, n (%)	5 (0.3%)	25 (2.0%)
Cost	63.8%	92.8%
Environmental degradation	14.4%	2.1%
Other	12.4%	3.1%
Overuse	9.4%	2.0%

a) Continuous variables are reported as weighted estimates of median (interquartile range), with each observation being weighted by the inverse of the household sampling probability.
b) Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability.

5.5 Agricultural Practices

Zambézia Province is a highly rural province that relies heavily on agricultural production as one of the main drivers of its economic state. Table 52 provides information related to agricultural practices. In most households (84.6%), there is a garden or small farm and household members sell crops from that farm (46.5%), up from 30.9% at baseline. Among households with small farms, 73.7% report the soil is adequate for food production. The farm productivity was reported to be limited by several conditions including soil quality, water, land area, time, and money. The most frequently cited conditions affecting farm productivity were soil quality and water (28.7% and 18%, respectively).

Regarding farming practices, 43.4% of households report regularly burning their fields, down from 57.7% at Baseline. As compared to Baseline, a slightly increased number of respondents reported use of chemical products such as fertilizers (7.4%) and pesticides (8.3%).

Table 52: Agricultural Practices

	Baseline (n=3749)	Endline (n=3892)
Total area of land (hectares)	2 (1 - 3)	1 (1 - 3)
Household member has a farm	91.7%	84.6%
Sell crops	30.9%	46.5%
Own livestock	49.0%	45.2%
Among households with small farms:		
Soil is adequate for food production	62.4%	73.7%
Garden productivity is limited by:		
Water	28.0%	18.0%
Soil quality	33.1%	28.7%
Land area	24.8%	17.2%
Time	18.1%	11.2%
Money	27.3%	7.7%
Drought	9.8%	8.0%
Other	3.0%	1.5%
Not limited	6.9%	12.7%
Regularly burn fields	57.7%	43.4%
Use chemical fertilizers	3.9%	7.4%
Use pesticides	2.7%	8.3%
Irrigate	4.8%	9.8%
Among those who irrigate:		
Drip irrigation	27.3%	19.2%
Bucket or watering can	71.2%	39.0%
Gasoline pump	3.1%	3.2%
Manual pump	3.1%	13.6%
Gravity or canal	2.9%	19.0%
Use conservation farming	9.3%	21.8%
Conservation farming technique usage:		
Permanent planting holes	4.0%	4.7%
Plant lines	3.8%	6.7%
Rotate crops	2.3%	6.3%
Fertilizer/manure	1.4%	1.8%
Mulching	1.0%	3.9%
Other	0.2%	1.0%

a) Continuous variables are reported as weighted estimates of median (interquartile range), with each observation being weighted by the inverse of the household sampling probability.
b) Categorical variables are reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.
c) Percentages may sum to greater than 100%.

The vast majority of households do not irrigate their farms (90.2%). Of those that do irrigate, there was a decrease in the proportion of respondents who reported use of a "bucket" or "watering can", from 71.2% at Baseline to 39% at Endline. Concurrently, increased proportions of respondents at Endline reported using a "manual pump" or "gravity/canal" (13.6% and 19% respectively) for irrigation. Compared to Baseline, respondents reported an increased utilization of "conservation farming" from 9.3% at baseline to 21.8% at Endline.

5.6 Multidimensional Poverty

Methods to identify and aggregate the poor using multiple dimensions have mathematical properties that allow for decomposition of poverty indices by subgroups or by indicators. The Alkire and Foster method was used to construct three key poverty indices: headcount, average poverty gap, and adjusted headcount (called the *Ogumaniha* MPI). Application of this method is detailed elsewhere (Victor, 2014); briefly, the steps for identification and aggregation of households include:

1) Creation of a listing of **dimensions** and corresponding **indicators** collected from the household survey.
2) Setting **poverty lines** at values where a person is identified as deprived or non-deprived for each indicator.
3) Setting **weights** for contribution of each indicator to the overall metric.
4) Determining the poverty cut-off for **identification.**
5) Performing **robustness** checks of the cut-off.
6) Estimating across group or dimension using **aggregation:**
    a. Headcount (H): proportion of households that are identified as poor.
    b. Average Poverty Gap (A): weighted average deprivation experienced by poor.
    c. **Adjusted Headcount (called the *Ogumaniha* MPI)**: multiply headcount by average poverty gap to reflect the breadth of deprivations. Thus, MPI=HxA.

Building upon the OPHI MPI, we maintained the same 3 dimensions (education, health, and living standard), but defined 11 indicators rather than the 10 utilized in the OPHI model. When possible, the same OPHI indicators were used; however, some were adapted for best fit based on the questions asked in the baseline survey. Table 53 shows the OPHI Model in comparison to our adapted Ogumaniha MPI with the "weight" column representing the contribution of each indicator to multidimensional poverty. The rightmost column reports the proportion of households that are deprived in each indicator.

Choosing to maintain the same OPHI poverty definition cut-off, in which the "poor" must be deprived in at least 33.3% of the indicators, a headcount of 59.6% of households interviewed compared to 67.3% at Baseline met that definition and were identified as poor at Endline (Table 54).

Table 53: Ogumaniha Multidimensional Poverty Index (MPI) adapted from the Oxford Poverty and Human Development Initiative

OPHI Model		*Ogumaniha* MPI			Districts of Alto Molócuè, Morrumbala and Namacurra	
Dimension	Indicator (n=4988)	Deprivation cut-off	Weight	Deprivation	Baseline % deprived	Endline
Education						
	Literacy	litscore < 16 and numscore < 5	1/6	Low literacy	14.5%	12.5%
	School Enrollment	pd_fam = 6-10 and pf_fam < 1; pd_fam=11 & pf_fam<2; pd_fam=12 & pf_fam<3; pd_fam=13 & pf_fam<4; pd_fam=14 & pf_fam<5	1/6	School-age child has lower than expected schooling	20.1%	21.1%
Health						
	Child Mortality	fiber1="Yes", ort1="Yes", or ri3="Yes"	1/6	Child with acute illness	20.6%	20.8%
	Nutrition	hdds < 4	1/12	Low dietary diversity	15.5%	15.0%
		hfias7="Yes"	1/12	Lack of food episode during last month	30.4%	23.2%
Standard of living						
	Electricity	cdcg1="No"	1/18	No electricity	95.1%	95.8%
	Drinking Water	wt1_river=TRUE OR wt4t > 30 AND wt4m="On_foot"	1/18	Water source is river or > 30 min. away on foot	29.7%	26.4% (21.4, 31.3)
	Sanitation	lusd1="No"	1/18	No access to latrine	75.7%	76.1%
	Roof	sdh1="grass/cane/ leaves/straw"	1/18	Poor housing material (roof)	92.4%	89.2%
	Cooking Fuel	cfegs1="Wood"	1/18	Poor cooking fuel (wood)	95.8%	95.0%
	Assets	sum of cdcg2="Yes", cdcg3="Yes", cdcg11="Yes" < 1	1/18	Low assets (radio, television, bike)	43.3%	48.6%

a] Reported as weighted percentages, with each observation being weighted by the inverse of the household sampling probability. The 95% confidence intervals include precision estimates that incorporate the effects of stratification and clustering.

Table 54: Multidimensional Poverty Distributions – Zambézia-Wide

Poverty cut-off	Baseline Headcount (95% CI) (n=3653)	Endline Headcount (95% CI) (n=2729)
5.5%	98.6%	95.7%
11.1%	97.5%	93.9%
16.7%	96.1%	91.5%
19.4%	90.6%	84.8%
22.2%	89.4%	83.9%
25%	81.8%	77.1%
27.8%	79.8%	75.1%
30.6%	72.3%	63.9%
33.3%	67.3%	59.6%
36.1%	61.2%	53.1%
38.9%	56.9%	47.7%
41.7%	46.7%	38.1%
44.4%	43.4%	34.9%
47.2%	35.4%	27.1%
50%	30.2%	21.8%
52.8%	25.5%	18.7%
55.5%	18.5%	13.6%
58.3%	14.8%	10.6%
61.1%	12.0%	7.9%
63.9%	8.4%	5.4%

Table 55 shows the percentage change from Baseline to Endline for headcount, average deprivation, and adjusted headcount (Ogumaniha multidimensional poverty index [MPI] value). On the whole, Zambézia Province decreased by 10% in the percentage of households that are deprived in more than 33.3% of the selected MDP indicators (67.3% to 57.9%), yet the intensity of deprivation remained relatively constant. When factored together, this resulted in a decreased MPI for the province as a whole from 32.9 at Baseline to 27.0 at Endline.

Table 55: Multidimensional Poverty Estimates for Province and 3 Focus Districts

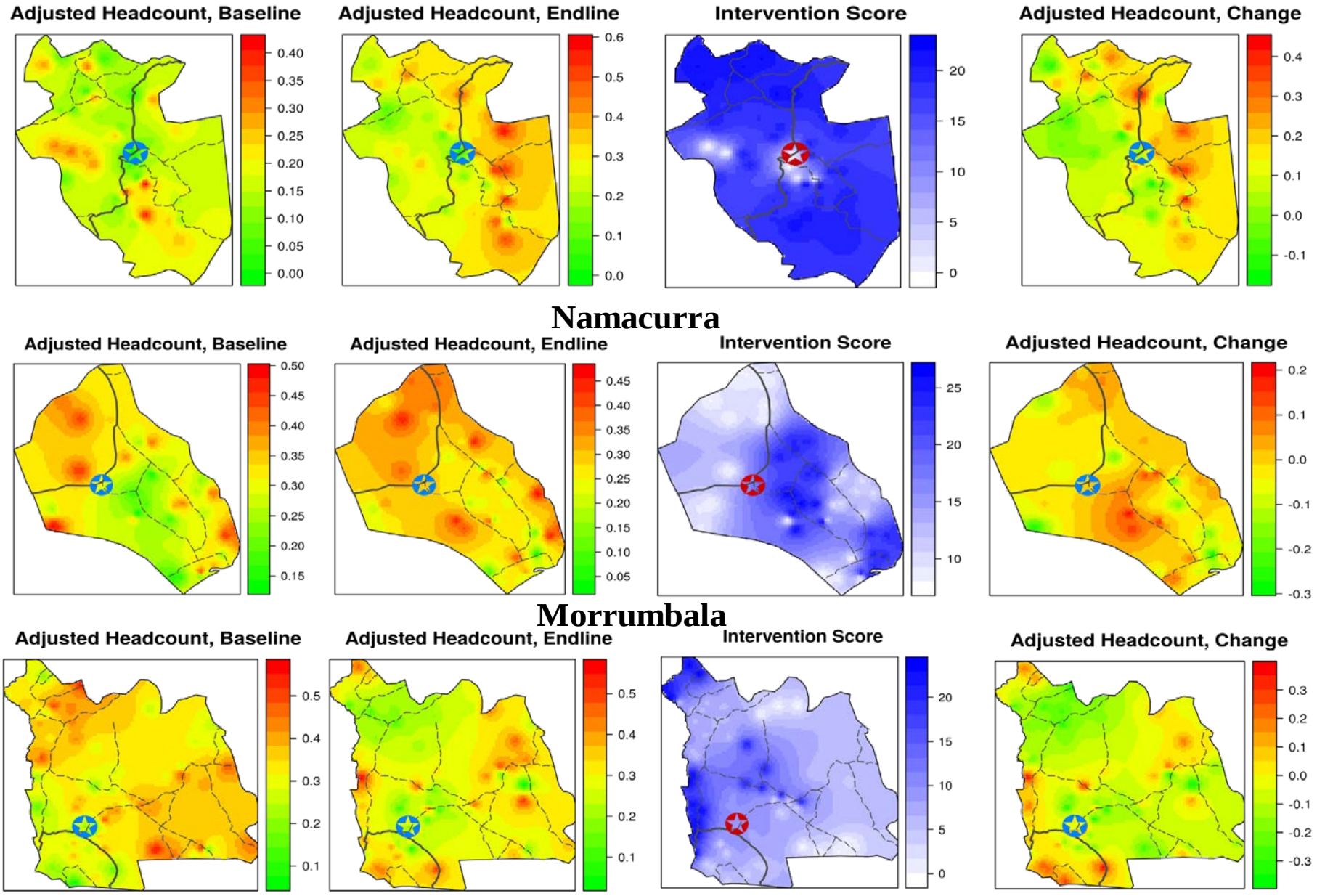
	N	Headcount (95% CI)	Average Deprivation (95% CI)	Adjusted Headcount (95% CI)
Baseline				
Zambézia	3653	67.3 (60.2, 74.5)	48.8 (47.7, 50.0)	32.9 (29.2, 36.6)
3 Districts combined	2867	59.2 (56.0, 62.5)	46.4 (45.6, 47.1)	27.5 (25.8, 29.2)
Morrumbala	1265	67.2 (62.9, 71.5)	47.5 (46.6, 48.5)	31.9 (29.6, 34.3)
Alto Molócuè	792	43.4 (36.4, 50.5)	42.0 (41.1, 43.0)	18.3 (15.3, 21.3)
Namacurra	810	61.9 (57.3, 66.5)	47.3 (46.3, 48.3)	29.3 (26.8, 31.8)
Endline				
Zambézia	2729	57.9 (51.3, 64.4)	46.7 (45.5, 48.0)	27.0 (23.9, 30.2)
3 Districts combined	2121	58.6 (53.3, 63.9)	45.4 (44.7, 46.0)	26.6 (24.0, 29.1)
Morrumbala	966	56.5 (47.1, 65.9)	45.4 (44.4, 46.3)	25.6 (21.1, 30.1)
Alto Molócuè	491	57.1 (49.9, 64.3)	46.3 (44.5, 48.0)	26.4 (22.6, 30.2)
Namacurra	664	63.4 (58.6, 68.2)	44.7 (43.5, 45.9)	28.4 (26.0, 30.8)

b] Figures are weighted estimates, with each observation being weighted by the inverse of the household sampling probability. The 95% confidence intervals (CI) include precision estimates that incorporate the effects of stratification and clustering.

Of our three Focus Districts, Namacurra´s MPI indices remain constant with little change since Baseline, giving the district an MPI of 28.4 at Endline. Alto Molócuè, which had been the highest performing district of our three Focus Districts in terms of multidimensional poverty indices at Baseline, increased by 13.7% in the percentage of households deprived in more than 33.3% of indicators. Average intensity of deprivations remained constant giving the district an MPI of 26.4, up from 18.3 at Baseline. In contrast, Morrumbala decreased in the percentage of deprived households by 10.7%, from 67.2% at Baseline to 56.5% at Endline. Again, the intensity of deprivations remained relatively unchanged, giving Morrumbala an Endline MPI of 25.6, down from 31.9 at Baseline.

Figure 6 below shows heat map geographic representations of MPI between Baseline and Endline, in comparison to Ogumaniha intervention implementation. Green represents geographic areas of less multidimensional poverty and red represents more poor. From left to right, the maps show the following: 1) the geographic distribution of high to low MPI at Baseline, 2) the geographic distribution of high to low MPI at Endline, 3) the geographic distribution of Ogumaniha interventions, with the darker the blue representing geographic areas receiving more intense quantity/time of intervention, and 4) the change in MPI between Baseline and Endline. In this rightmost column of maps, areas that are more green represent geographic areas with diminished multidimensional poverty as compared to Baseline, whereas areas that are more red represent increases in poverty.

Figure 6


Alto Molócuè
Adjusted Headcount, Baseline
Adjusted Headcount, Endline
Intervention Score
Adjusted Headcount, Change
Namacurra
Adjusted Headcount, Baseline
Adjusted Headcount, Endline
Intervention Score
Adjusted Headcount, Change
Morrumbala
Adjusted Headcount, Baseline
Adjusted Headcount, Endline
Intervention Score
Adjusted Headcount, Change

Limitations

Several limitations exist in the survey data. First, the random selection of enumeration areas resulted in a province-wide sample that did not include all districts; the districts of Pebane, Namarroi and Nicoadala were not included in the sample drawn. The enumeration areas were chosen with a selection probability proportional to population size, and it just so happens that no enumeration areas were selected for those three districts. Since the sample was not designed to provide estimates at a district level, only at the provincial level, this was expected to happen. For the Focus Districts, the districts chosen were Namacurra, Alto Molócuè and Morrumbala. These districts were chosen deliberately with partner input because many communities in those districts were recipients of Ogumaniha program activities, and because of their size, also provided a good spread of the quantity of program activities. The Ogumaniha consortium felt that the three districts were located in settings representative of the coast, the Zambéze valley, and the highlands, providing enough variation in climate and geography. An unintended limitation is that the three chosen Focus Districts were all areas where World Vision serves as the main coordinating partner for the district, and none are where ADRA serves as the district coordinator.

Despite every effort to adapt questions to the local context during the pilot phase of the study, certain questions were still difficult to obtain reliable, valuable information. Social desirability bias, or the interest in survey participants to provide the answers they believe surveyors wish to hear rather than the ones that reflect their actual knowledge, attitudes, beliefs and access to services, likely led to the over-reporting of satisfaction with services and underreporting of problems at health facilities. For example, survey teams reported that participants were reluctant to provide negative information about health service provision for fear of potential repercussions the next time they attend a health facility. Also, teams reported that participants were reticent in providing information on the availability of income, fearing that it might negatively impact their access to external support.

Interviewers reported that in many cases the women did not know the exact age of their children. Where possible, age of children under-five years of age was determined using vaccination cards. In other cases, ages were estimated based on information provided by the women interviewed, such as “the child was born at the time of the bean crop". Estimations of child age will affect the sensitivity of anthropometric measures, particularly for younger children.

Questions on sources of advice sought for a child displaying febrile, diarrheal, and respiratory symptoms showed a very high proportion seeking advice from hospitals and health centers. Upon investigation, survey teams reported that individuals in the community with ties to health facilities, such as volunteers and APEs (basic polyvalent agents), were frequently reported as sources of information but were not a response option and therefore coded as either hospital or health facility. The information on sources of advice therefore overestimates the proportion seeking advice at health facilities. Response categories for certain questions related to households did not sufficiently capture response possibilities. For example, questions on water source listed “well", but not whether the well was open or capped; sources of light included flashlights but not oil and kerosene lamps. These limitations reduce the quality of information available on households.

Discussion

When interpreting the results of the Ogumaniha Endline survey it´s important to remember that not all indicators reported here have a direct association with the interventions implemented in the particular thematic area. Additionally, not all geographic areas received the same interventions in terms of both the number of interventions and/or length of time implemented. This was done in part to find a balance between showing the impact of Ogumaniha on specific indicators and creating compatibility between the Ogumaniha surveys and other surveys implemented in the province. When possible we attempted to show correlation between the interventions implemented and the particular health or development outcome.

I. Malaria, HIV Care and Treatment Services, Healthcare Access:

Ogumaniha interventions in these three areas focused on utilization of CHC volunteers for 1) community to health facility referrals for suspected malaria cases and for persons testing HIV positive through community based counseling and testing, 2) active case follow-up for persons with HIV either lost-to-follow up or who abandoned care and treatment, 3) dissemination of community education messages and behavior change communications promoting health seeking behaviors, 4) logistical and financial coordination with other Malaria partners for distribution of bed nets, and 5) facilitation of community health management meetings between health facilities and community members to encourage health system responsiveness to community needs.

As intensity of Ogumaniha health interventions specifically related to these program areas increased in a given EA, an increasingly larger odds of improvement was seen for the following: sleeping under a bed net, having ever received counseling and testing for HIV, having visited a health facility for a health problem, having a positive experience at the health facility, and a striking reduction in attitudes and behaviors that endorse social exclusion stigma towards an HIV-infected individual.

The Ogumaniha consortium has structured its interventions through a mixture of training and capacity building of local community volunteer groups called community health committees (CHC), as well as direct implementation of activities by consortium partners. In general, as a result of Ogumaniha activities, health care access has improved in Zambézia Province. Through training and supervision of CHC volunteers who are engaged in household level advocacy we have been able to encourage and promote facility-based health seeking behaviors as well as strengthened community linkages to health facilities through the establishment of referral systems from the community to health facilities. Additionally, activities targeting raised awareness about HIV risk factors and ways to prevent infection, as well as increased access to HIV testing at a community level have positively affected community perceptions towards persons infected with HIV and reduced HIV stigma.

Summary of key Malaria, HIV, and Healthcare Access indicators that showed overall improvement in the province since Baseline:

Improved since Baseline	Attributable to Ogumaniha Interventions
Malaria:	
• Decreased self-reported Malaria prevalence	-
• Female head of household slept under a bed net in the night prior to the interview	-
HIV Care and Treatment Services	
• **Knowledge of HIV Counseling and Testing**	**X**
• Received HIV Counseling and Testing in the last 6 months	-
• **Ever Received HIV Counseling and Testing**	**X**
Healthcare Access	
• **Ever visited a health facility**	**X**
• **Satisfaction with care at the health facility**	**X**
• **Decreased HIV stigma (Social Exclusion)**	**X**

*Areas highlighted in green represent those interventions reported where improvements were attributable to Ogumaniha interventions

II. Maternal Health:

Ogumaniha´s interventions targeting Maternal health/family planning/reproductive health focused on building

capacity of community volunteers to provide educational message to raise awareness, increase linkages to care through referrals, and distribute oral contraceptives to those women taking them. Additionally, Ogumaniha worked with provincial and district health authorities to build and equip several pregnant women waiting houses and worked with other malaria partners to coordinate distribution of bed nets. When comparing Baseline to Endline results, statistically significant improvements were seen for most antenatal care facility-based service indicators, the number of deliveries performed at a health facility, as well as the respondent´s knowledge of symptoms suggestive of an obstetrical emergency.

When assessing against exposure to health specific interventions (Ogumaniha intervention score) related to maternal health; results for increasing number of antenatal care visits, receipt of a bed net at last pregnancy and use of a bed net during pregnancy were all statistically significant and attributable to Ogumaniha´s interventions. Institutional deliveries, though trended towards improvement since Baseline did not reach statistical significance with increasing Ogumaniha intervention intensity (p=0.072). Efforts from the National Health System as well as other non-governmental organizations (NGO) implementing programs with similar objectives throughout the province may have introduced a confounding effect on outcomes that we were not able to account for in our intervention score, such that observed temporal differences were difficult to attribute to Ogumaniha.

While improvements were seen in some facility-based antenatal care activities such as receiving the full package of antenatal services and receiving an HIV test at antenatal care or at delivery, it is expected that these results would not be affected by Ogumaniha intervention intensity as Ogumaniha staff do notinterventions were not focused on working within the health facility. However, Ogumaniha provided logistic support towards the transportation of needed supplies and materials between the provincial and districts stock warehouses, thereby making commodities available for use at the health facilities.

Mobile brigades in all districts of the projects catchment area could not have happened without the logistic and technical assistance of Ogumaniha. The Mobile Brigades have been valuable in the achievements of provincial targets regarding vaccination and other Maternal Child health activities. Participation of Ogumaniha in health fairs, vaccination campaigns, and other health campaigns were also key to reaching large numbers of both women and children.

Summary of key Maternal Health indicators that showed overall improvement in the province since Baseline:

Improved since Baseline	Attributable to Ogumaniha Interventions
Facility based:	
• Receipt of full package of antenatal services	-
• **Increased number of antenatal visits**	**X**
• HIV testing during last pregnancy	-
• **Institutional deliveries**	**X**
Malaria control during pregnancy	
• **Receipt of bed net**	**X**
• **Pregnant woman sleeps under bed net**	**X**
Breastfeeding	
• Median duration increased from 4-6 month	

*Areas highlighted in green represent those interventions reported where improvements were attributable to Ogumaniha interventions

Summary of key Maternal Health indicators that showed little or no improvement in the province since Baseline that could be attributed to Ogumaniha:

Knowledge of Maternal Health issues

- Knowledge of obstetrics emergencies
- Knowledge of newborn health risks

Use of Modern Contraceptives

- Decreased use of modern contraceptives
- No change in desire to limit or space pregnancies

III. Child Health:

Ogumaniha interventions in the area of child health mainly focused on building capacity amongst CHC volunteers to identify malnourished children and refer if necessary to the health facility, promote healthy behaviors amongst community members related to proper hand washing and food preparation, promote exclusive breastfeeding for 6 months, and identifying children less than five years old with fever and respiratory symptoms for referral to the health facility. Indirect support was also provided through financing and logistic coordination of routine and mass vaccine campaigns.

Ogumaniha was able to implement large scale outreach activities by incorporating nutritional components into a variety of different interventions. Mother and father groups (MFGs) implemented demonstration sessions on breastfeeding and other nutritional aspects and involved both female and male engagement. Additionally, WASH interventions included integration of nutritional trainings as part of its educational activities. This included trainings on how to prepare foods and on the selection of foods that could provide essential supplements to children, mothers, and persons living with chronic diseases. Finally, the Women´s First initiative incorporated nutritional trainings to members of its 30 groups.

From Baseline to Endline, the all province prevalence of fever, diarrhea, and respiratory symptoms in children 6-59 months in the previous month decreased by 10%, 8%, and 13% respectively. Of note, the Baseline survey was implemented at the end of the dry season in August/September and the Endline survey was implemented at the end of the rainy season in May/June. Based on seasonal disease trends, this decrease in the percentages reported may be an underestimation of the true decrease in prevalence, as it would be expected to have higher rates of each of these disease conditions following the rainy season. When assessed in the three focus districts, statistically significant improvements were seen for being fully immunized (12-59 months), prevalence of diarrhea (0-12 months), and sleeping under a bed net for children less than five years of age.

When assessing the association of results against exposure to health specific interventions related to child health, EA with a higher intensity of Ogumaniha interventions showed a statistically significant higher odds of children being fully immunized (12-23 months) and a decreased prevalence of respiratory symptoms (6-59 months). Additionally, decreasing trends were seen in the prevalence of fever and respiratory symptoms in the 12-23 month age group as well (though not statistically significant).

Child anthropometrics:

Addressing malnutrition in the under-five age group has highlighted the importance of maintaining a good nutritional state in the first 1,000 days from conception to a child´s second birthday. Malnutrition, as characterized by underweight (weight for age) and wasting (weight for length) represent acute conditions resulting from poor caloric intake and are most amenable to short term interventions such as those implemented by Ogumaniha: promotion of breastfeeding, identifying malnourished children and referring for treatment, and demonstrations of appropriate feeding practices.

Stunting (height for age) represents a more chronic condition and is associated with a variety of contributing factors such as socioeconomic status, parental education level, disease state, sanitation conditions, as well as dietary deficiencies. Additionally, once stunting begins, even if caloric intake is improved and other factors are addressed, the child likely will not regain their full height potential. As a result, changes in stunting metrics for under-fives may be delayed by 3-5 years.

Between Baseline and Endline, which represents a 3.6 year period of analysis, we see only modest improvements in underweight and wasting for the under-five cohort as a whole and either no improvement or worsening in stunting. However, what is most striking are the fairly sizable decreases in percentages for those at the extremes, severely underweight (< -3 SD) at all age disaggregations and the sizeable decreases in percentages for those with both moderate (< -2 SD) and severe wasting (< -3 SD) in the 6-11 month age group (Table 36). We feel that the increasing number of months of exclusive breastfeeding, as well as interventions to identify malnourished children in the community and refer them to the health facility for treatment, are likely contributing to these changes.

Stunting is a much more complex condition to impact, and the fact we see no changes in stunting metrics is not surprising and likely due to 1) a lack of interventions targeting the multidimensional complexities of chronic malnutrition and 2) not enough time between Baseline and Endline to see an effect, if present.

Summary of key Child Health indicators that showed overall improvement in the province since Baseline:

Improved since Baseline	Attributable to Ogumaniha Interventions
Child Health:	
• Fully immunized by card (6-59 mths)	-
• Fully immunized by card (12-23 mths)	X
• Decreased prevalence of diarrhea	-
• Decreased prevalence of ARI	X
Malaria control during childhood	
• Child 0-12 mths sleeps under bed net	-
• Child 0-59 mths sleeps under bed net	-
Anthropometrics	
• Decrease in severe underweight	-
• Decrease in wasting	-

*Areas highlighted in green represent those interventions reported where improvements were attributable to Ogumaniha interventions

Summary of key Child Health indicators that showed little or no improvement in the province since Baseline:

- Health Seeking behaviors for fever, diarrhea, and respiratory symptoms
- Home management of diarrhea in children
- Chronic Malnutrition (stunting)

Water & Sanitation:

When comparing Baseline to Endline results, washing hands after cleaning up the feces of one´s children did show a statistically significant improvement since Baseline. When factoring in exposure to some Ogumaniha intervention, a statistically significant increase in the odds of a household having access to a safe source of drinking water was seen, but there was a statistically significant decrease for both washing hands after cleaning up feces of children and prior to food preparation. When factoring in the intensity of Ogumaniha health interventions specifically related to this program area, there were statistically significant increased odds in having a safe source of drinking water and, again, a decrease in odds for both washing hands after cleaning up feces of children and prior to food preparation when compared to Baseline.

Livelihood Capabilities/Economic Development:

Dietary diversity of households has only slightly changed since Baseline from a median score of 7 to 8. Despite a relatively consistent diversity in diet between Baseline and Endline, greater than 30% of households continue to report periods where they had no food to eat in the 30 days prior to survey implementation. Respondents had 2.5 times higher odds of selling their crops when compared to Baseline and Food Insecurity (having periods of no food in the household in the previous four-weeks) was 19% less likely to be present (OR 0.81, p= 0.019).

On the whole, Zambézia Province decreased by 10% in the percentage of households that were deprived in more than 33% of the selected multidimensional poverty indicators (67.3% to 57.9%), yet the intensity of deprivation remained relatively constant for those who continued as poor. When factored together, this resulted in a decreased MPI for the province as a whole from 32.9 at Baseline to 27.0 at Endline. Respondents in the three Focus Districts had an average increase in household income of 378 meticais per month over income earned at Baseline. When considering just those EA with the largest intensity of Ogumaniha interventions derived by the "livelihood" score, the average change in household income was 1,756 meticais per month, exceeding the $1.25 per day cut off to describe extreme income poverty.

Conclusions/Recommendations:

In general, consortium partners feel that the diversity of interventions and their integration (HIV prevention, health literacy, OVCs, income generation, nutrition, malaria, WASH etc) has contributed to positive outcomes in the province, as shown in this report. However it would be advantageous to select fewer activities than was required for Ogumaniha. It is felt that Ogumaniha was spread to thinly across the province, resulting in limiting its reach to approximately only 25% of the total population of the province. The consequence of this is that Ogumaniha was unable therefore to have the depth and time to bring about behavior change on a wider scale. For the design of future projects of this nature, we would recommend being more geographically focused (fewer districts) and then going to scale with intervention implementation, thus ensuring greater population coverage in the designated area.

Better pre-planning is needed to define who will be the direct beneficiaries of the project, in order to focus resources and better determine the capital expenditures of the project. The result of this would be of benefit to the current project and future projects by addressing the often encountered tension between providing services to the "most disadvantageous" populations that may be harder to identify and access versus implementation of activities where there is easier access and potentially larger population groups.

The key philosophy of this project is integration. However, there was never an agreed upon definition of what "integration" meant by either the donor or the consortium partners. Additionally, while we felt the need to show how we were integrating, we did not have an appropriate measure or indicator from which to evaluate this aspect of the program. In the future, something this important needs to be clearly defined and agreed upon by all stakeholders at the outset of implementation. Internally, it would be better if consortium members came under one command structure and conditions of service. All project staff should be seconded to the lead partner so they can work as one unit/team.

Additionally, we would recommend a smaller consortium, with a maximum of five partner organizations. By projects end, we felt that partners had done extraordinary work to complement each other and be conscious of integration of their activities. However, this took substantial time and made management of the various partners challenging throughout the life of the project.

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