



USAID
FROM THE AMERICAN PEOPLE

BASELINE SURVEY RESULTS

SALOHI Program

*« Strengthening and Accessing Livelihood
Opportunities for Household Impact »*

October – November 2009

Antananarivo, Madagascar



ACKNOWLEDGMENTS

The SALOHI team extends our sincere thanks to all of those who, directly or indirectly, contributed to the achievement of the SALOHI baseline survey.

We would especially like to express our deepest gratitude to the following people:

- Members of the SALOHI Program monitoring and evaluation team, who ensured the smooth progress of the baseline survey;
- Members of the SALOHI Program technical team, who actively participated in the design of data collection tools, training of interviewers, and analysis of results;
- Interviewers and supervisors who made possible the collection of data and information from the field;
- UNICEF (thanks Paola, Amal and Virginia!) for the loan of scales and MUAC tapes, and Conservation International (thanks James!), for the loan of GPS's,
- The CAPSULE team for the quality of data entry.

We would equally like to thank the entire logistics support staff for all four NGOs (especially the drivers), and most importantly the community members who welcomed us into their homes, and agreed to participate in the survey. Finally, we would like to thank USAID/Madagascar for their technical and financial support, and FANTA-2 (especially Vicky and Ellen) for their comments and suggestions to improve the baseline process.

We hope the data collected will prove useful not only for the monitoring and evaluation of program process and impacts, but also to deepen our understanding of the underlying causes of malnutrition and food insecurity in Madagascar.

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 - Anthropometric Data (French, Malagasy)
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 - Training of Trainers, Data Collectors Training Guide (French)
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 - Baseline Survey Data Collection Guide (French)
 - Baseline Guide – Focus Group Women (French)
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3. Baseline planning and logistics
 - Baseline Planning Calendar
 - Data collection logistics plan
 - List of Fokontany included in the Baseline Survey

Acronyms

ADRA	Adventist Development and Relief Agency
ANC	Anti-natal care
CARE	Cooperative for Assistance and Relief Everywhere
CP	Central Plateau
CPN (ANC)	Prenatal exam
CRS	Catholic Relief Services – United States Conference of Catholic Bishops
CSI	Coping Strategies Index
DPMP	Disaster Management and Mitigation Plans
DRR	Disaster Risk Reduction
ENA	Essential Nutrition Actions
EWS (SAP)	Early Warning System
FARN	Nutritional Rehabilitation of Moderately Malnourished Children at the Community Level (PD Hearth)
FARNG	Pregnant and Lactating Women’s Support Groups
FFS	Farmer Field Schools
FFT	Food for Training
FFW (FFA)	Food for Work (Food for Assets)
FHH	Female Headed Households
FSI	Food Security Index
GRC	Gestion des Risques et Catastrophes (Management of Risks and Disasters)
HAZ	Height for Age
IEC/BCC	Information, Education, Communication/Behavior Change Communication
IMCI-C	Integrated Management of Childhood Illnesses at the Community level
IPTT	Indicator Performance Tracking Table
IR	Intermediate Result
LOL	Land O’Lakes
MHH	Male Headed Households
MUAC	Middle Upper Arm Circumference
NGO	Non Governmental Organization
SALOHI	<i>Strengthening and Accessing Livelihood Opportunities for Household Impact</i>
SE	South East
SLUP	Sustainable Land Use Plans
SRA	System of Improved Rice culture
SRI	System of Intensive Rice culture
SO	Strategic Objective
VSL	Village Savings and Loan
WAZ	Weight for Age

Executive Summary

The *Strengthening and Accessing Livelihood Opportunities for Household Impact* (SALOHI) program is a five year, 85 million USD food security project funded primarily by USAID/Office of Food for Peace, and implemented by a consortium of four NGOs –Adventist Development and Relief Agency (ADRA), Cooperative for Assistance and Relief Everywhere (CARE), Catholic Relief Services – United States Conference of Catholic Bishops (CRS, as lead agency) and Land O’Lakes International Development Division (LOL) - in the East and South of Madagascar. In October and November 2009, baseline data was collected in program zones to permit program staff to measure and evaluate program progress over time. This report contains the results of the baseline survey.

Materials and Methods

1. The survey was designed and implemented by SALOHI staff, assisted by external data collectors. The survey included 2876 randomly selected households in 120 randomly selected rural communities (Fokontany) –24 households in 30 Fokontany in each NGO zone (4 NGO zones).
2. In addition to the four zones covered by each SALOHI partner (ADRA, CARE, CRS, and Land O’Lakes), four geographic zones were defined, which are relatively homogenous in terms of socio-economic and ecological characteristics: the Central Plateau (CP), the South, the South East (SE) and the East. The survey showed significant differences in baseline values between geographic zones, and between SALOHI partner zones.

Socio-economic characteristics of SALOHI households

3. The average household included six people. Eighteen percent of household were headed by women (82% by men). Most of these women were unmarried (48 %); 29 % are separated or divorced, and 20% were widows. Baseline data is disaggregated by Male Headed Households (MHH) and Female Headed Households (FHH).
4. Agriculture (practiced by 94% of households) and animal husbandry (practiced by 69% of households) are the two principal economic activities of SALOHI households. In the Central Plateau and the South East, occasional salaried work (day labor) is an important source of revenue for 30% of households. Almost 20% of households also make money from selling artisanal products. On average, households in SALOHI zones have 2.5 sources of revenue.
5. Almost all households own their homes and their land (93%). Seven households out of ten own poultry; 34% own cattle, and 20% own pigs. More households in the South and the Central Plateau own cattle than in other regions. Few households own goods or equipment: for example, only 40% of households possess a radio. An index of households owning goods and equipment, based on 15 types of possessions included in the baseline survey, indicates that 62% of SALOHI households are relatively poor (42%) or very poor (20%). Using this index, 82% of female headed households (FHH) are classified as poor or very poor.

Nutritional status of children, nutritional practices, and practices to prevent disease.

6. The results of the baseline indicate that 44% of children aged 6 – 59 months of age suffer from chronic malnutrition (stunting, HAZ -2) and 35% of children 0 – 59 months of age are underweight

(WAZ -2)¹. More boys than girls are malnourished. More children in the Central Plateau are stunted (64%), than in the South East (47%), the East (43%) or the South (28%). On the other hand, wasting affects more children in the South (10.2% vs. 8.9% in the East, 8.5% in the South East and 5.2% in the Central Plateau). The types of malnutrition which affect each zone will impact the types of activities designed to reduce malnutrition and household food insecurity.

7. Breastfeeding is practiced by 92% of mothers of children under two. 71% of children under two were breastfed within one hour of birth, and 55% of children under 6 months of age were exclusively breastfed since birth (in the 24 hours preceding the survey). Exclusive breastfeeding is practiced more in the South East (67%) and less in the South (26%). Immediate and exclusive breastfeeding will be a particular focus of health and nutrition activities in the South.
8. Mothers' nutritional knowledge is quite limited: only 39% can name at least one food rich in vitamin A, and 12% one food rich in iron. The level of knowledge is relatively better in the South and South East, vs. the Central Plateau and the East. Consumption of foods rich in vitamin A or iron is also low: 36% of mothers consumed at least one food rich in Vitamin A and 11% at least one food rich in iron in the seven days prior to the survey. Consumption of foods rich in vitamin A is highest in the South. Knowledge, production, and consumption of micronutrient rich foods will be a particular focus of the SALOHI program.
9. In contrast to nutritional practices, prenatal care practices are relatively good. More than 86% of mothers who had children in the last two years benefited from pre-natal visits, mostly from doctors and mid-wives. Women received counseling in tetanus vaccination (69%), use of mosquito nets (59%), and breastfeeding (51%). Less than 50% of mothers received counseling in pregnancy danger signs (29%), or in appropriate nutritional practices during pregnancy (consuming foods rich in vitamin A – 21% - and iron – 40%). The quality of and access to pre and post natal services for pregnant and lactating women will be a particular focus of the SALOHI program, using community health volunteers and pregnant and lactating women support groups.
10. Although 86% of mothers of children under two benefited from pre-natal consultations, only 32% gave birth with the assistance of trained health professionals. The majority of women (64%) gave birth with the assistance of a traditional birth attendant. Only 32% of mothers received postnatal care visits. This percentage is relatively higher in the East (47%) than in the South (20%). Relationships between pregnant women and health care providers will be strengthened through Pregnant Women's Support groups, to encourage increased use of health centers during deliveries. In addition, Community Health Volunteers will be encouraged to provide post natal care visits to new mothers, to improve care during critical post partum periods.
11. A little more than half of mothers who had children under two participated in growth monitoring sessions. More mothers in the East (70%) than in the other zones (around 51%) participated in growth monitoring. Most growth monitoring sessions occurred at the community level (62%), except in the Central Plateau where 71% of mothers took their children to a public health facility. Growth monitoring and promotion will be strengthened under the SALOHI program, using locally available tools, skills and personnel.
12. Ninety percent of children 7 – 59 months received a dose of Vitamin A within the past six months, and 89% of children 13 – 59 months received medicine to control parasites. Sixty one percent of children under five slept under a mosquito net the night before the survey. These levels show that

¹ These results are calculated using NCHS reference standards, to allow triangulation with past surveys. Data in the report is presented using both NCHS and WHO standards.

access to critical micronutrient supplements and disease prevention practices are relatively high. This is an opportunity the SALOHI team can exploit to promote other positive health behaviors.

13. Personal hygiene practices are very poor. Only 4% of mothers that they wash their hands at all five critical moments – (1) before preparing food, (2) before eating, (3) before giving food to children, (4) after using the toilet, and (5) after helping a child defecate. Only 9% of mothers practice appropriate food hygiene practices: (1) use one source of potable drinking water, (2) store cooking utensils in a safe place, (3) conserve leftover food in a safe place, and (4) reheat leftovers before eating them. Hygiene will be a particular focus of the SALOHI program, which will be reinforced by partnering with other USAID funded programs (RANO HP and SanteNet2) in SALOHI zones.

14. Among the responses to malnutrition and the poor health status of children under five, the SALOHI program proposes to promote (1) participation in growth monitoring and promotion activities, (2) the adoption of improved nutritional practices (consumption of foods rich in vitamin A and iron), and (3) improved hygiene practices. We tested the hypotheses that these practices would result in decreased malnutrition, using simple statistical methods (odds ratio). Results indicate that:

- There is no statistically significant association between participation in growth monitoring and malnutrition (any type);
- Children who were not breastfed are 1.5 times more likely to suffer from stunting;
- Children who were sick in the two weeks prior to the survey were more likely to suffer from underweight or emaciation than those who were not sick;
- Poor personal hygiene practices are significantly associated with disease incidence among children under five. However, poor food hygiene practices were not.

As a result of these findings, the SALOHI team will focus on integrating growth promotion into growth monitoring activities, on immediate and exclusive breastfeeding as well as breastfeeding for two full years, and on reducing disease incidence (morbidity).

Household Food Access and Availability

15. Title II programs measure food access by calculating the average number of months of adequate food access, and the dietary diversity score which is based on 12 standard food groups consumed within a 24 hour period. According to women surveyed, households have adequate access to food for 8 – 12 months. The average is 7 months in the South and 9 months in the Central Plateau. Households consumed on average five of the 12 standard food groups in the day prior to the survey. However, households in the South consumed only two types of food groups, whereas those in other regions consumed more than five types. The type of food most consumed by households included rice (80% of households), root crops (73%), vegetables (71%) and, in lesser degrees, drinks like tea or coffee (64%). Dietary diversification will be a particular focus of the SALOHI program, to promote resilience to shocks and to improve food access during hungry months.

16. A Food Security Index (FSI) was used to assess coping strategies households use when they lack food. The results of the survey indicate that during periods of food insecurity, 88% of households reduce their food rations, and 85% replace preferred foods with cheaper foods. In the South, households reduce the number of meals (90%) rather than reducing the size of each meal (ration). The Food Security Index, calculated using an abbreviated list of five coping strategies, is 24.9. It is higher in the South (29.7) and lower in the Central Plateau (15). The lack of dietary diversity and the type of coping strategies used in the South could contribute to the high rates of emaciation in that zone (or be indications of the underlying conditions that cause food insecurity in the South).

16. The results of the baseline indicate that 94% of households practice agriculture, but few benefit from irrigation (24%) and 65% were victims of floods during the last agricultural season. Few farmers benefited from technical assistance (10%), but more than 50% know of and practice modern production techniques. Access to irrigation and improved flood management and control techniques will be promoted using Food For Work (FFW) activities and during Farmer Field Schools (FFS), to contribute to improved agricultural production.
17. Five crops are proposed for focused extension efforts: rice, sorghum, maize, cassava and beans. Cassava is cultivated by 83% of households, especially households in the South and South East (88%). Rice is cultivated by 81% of households; more than 95% in the CP, SE and East, but by only 11% of households in the South. Maize is grown by 50% of households, especially in the South (89%), and in the CP (70%). Beans are grown by 28% of households, essentially by households in the CP (77%). Finally, sorghum is only grown by 6% of households, essentially in the South (21%). Key crops promoted will vary by region, taking into consideration local needs and priorities.
18. The area cultivated by households is less than 2 ha: the average size of family rice fields is 0.75 ha; for maize 0.49 ha; cassava 0.44 ha and beans 0.13 ha. Yields are low. The average rice yield is estimated by farmers to be 560 kg/ha, but it is much higher in the South (more than 1500 kg/ha) and lower in the South and East (less than 300 kg/ha). Average cassava yields are estimated at 1347 kg/ha. Cassava yields are higher in the SE and the East (more than 2000 kg/ha), compared to the South (less than 500 kg/ha). The average yield of maize is estimated at 344 kg/ha; more than 800 kg/ha in the center and less than 300 kg/ha in the South. Although yield potential varies considerably by crop and by zone, in all zones crop yields are less than ½ of their potential. Using existing technologies, yields in SALOHI zones can be significantly increased.
19. In general, households work individually. Few people participate in farmers' organizations which offer them technical or commercial support. Approximately 17% of households belong to an association or organization; 10% participate in agriculture production organizations and 3% in more formal agricultural cooperatives.
20. Strategies to improve food access proposed by the SALOHI program include (1) increased agricultural production by adopting new techniques and improving access to irrigation, (2) the development of agro-business activities and marketing/roads, and (3) the promotion of village savings and loans (VSL). A few hypotheses tested showed the following results:
- The use of new production techniques is associated with higher rice yields;
 - The risk to have a poor harvest is higher among rice farmers who don't have access to irrigation, but the difference is not statistically significant;
 - Rice farmers who don't have access to irrigation were more likely to have described their last rice harvest as poor (this difference is statistically significant);
 - There is a statistically significant association between the average household dietary diversity score and the average number of months of household food access;
 - There was no association between household dietary diversity and malnutrition in children under five (any type of malnutrition).

Natural disasters and community resilience

21. Almost all communities surveyed (97%) reported that they were victims of natural disasters at some point in the past: cyclones, floods, or droughts. Twenty communities out of 120 surveyed were affected by all three types of disasters. Nine households out of 10 (93%) were victims of cyclones, floods or drought in the last 12 months. Specifically, 57% of households were victims of cyclones, 54% by floods and 56% by drought. More than 84% of households in the South East and more than

60% of households in the CP were affected by cyclones or floods. Almost all households in the South (96%) and four out of five (79%) households in the East were affected by drought in the last 12 months. This data underlies the importance of activities to strengthen community capacity to withstand shocks in SALOHI communities.

22. The consequences of natural disasters are important: loss of harvest in 95% of communities affected, destruction of agricultural land in 57% of communities, loss of goods and equipment in 45% of communities, loss of livestock in 38% of communities and significant environmental damage in 35% of communities. SALOHI staff will help communities develop Disaster Management and Mitigation Plans (DPMP) and Sustainable Land Use Plans (SLUP) to reduce the impact of natural disasters.

23. More than half of communities surveyed (55%) don't have an early warning system. Community organizations to help families in need exist in 25% of communities. Forty four percent of existing early warning systems are considered non-operational. Given the high percentage of households and communities affected by natural disasters, SALOHI staff will work to establish functional early warning systems in all target communities.

71% of communities surveyed are accessible all year long; more so in the South (83%) than in the South East (65%). Food for Work activities will likely focus on improving year round access to SALOHI communities, especially in the South East (Land O'Lakes, ADRA and CRS zones).

24. The community vulnerability analysis conducted in the last section of the report provides an overview of risk and resilience factors in SALOHI zones, using indicators targeted by the program (nutritional status, agricultural production/livelihoods, types and impacts of shocks, and governance) as indicators of risk. The strengths and weakness of communities are defined in terms of the general situation in the intervention zone, rather than the situation nationally or in areas where the program will not intervene.

25. Table 93 shows that risk factors are numerous and the level of risk high in all Program zones: there are seven high risk factors out of 12 total risk factors identified in the South and South East, and six high risk factors out of 12 total risk factors in the Central Plateau and East. However, community capacity to respond to shocks (resilience) is low in the South and South East, where risks are relatively higher (four and five resilience factors out of 14). Community coping capacity is slightly higher in the Central Plateau and the East (8 resilience factors out of 14).

26. Specifically in the area of children's health and nutrition, risks are higher in the South East, the South and the Central Plateau. They are relatively lower in the East. Community capacity to respond to health risks is very low in the South, and relatively low in all zones.

27. In the area of livelihoods, risks are very high in the South, high in the South East and low in the Central Plateau (CP). Community capacity to respond to shocks to livelihoods is very low in the South and SE, relatively low in the East and relatively high in the CP.

28. In the area of natural disasters, risks are high in all zones, but relatively less in the South (in terms of the number of natural disasters encountered – not in terms of their intensity). Community capacity to cope with and respond to disasters is very low in the CP and SE, and somewhat low in the South and East.

Governance

29. In terms of governance, 92% of communities said that leaders and community associations consulted one another, and roughly the same amount said that leaders consulted directly with

community members. Most communities described these consultative mechanisms as functional (63%), or very functional (25%). 88 – 100% of communities believed their views were considered by leaders during the decision making process. These figures did not vary significantly by geographic zone. However, traditional leadership structures in Land O'Lakes zones (36%) in the South East (39%) were more frequently described as very functional. Communities in the East were more likely to describe a lack of participation of community leaders (39%) and community organizations (56%) in local government.

Gender

30. Gender roles vary, depending on the geographic zone and the types of livelihood activities practiced. Generally speaking, gender roles are shared in agricultural production activities (land clearing, planting, weeding and harvesting), depending on the physical force required for each task. Rice production activities, in particular, seem to be equally shared. Although men are more often responsible for cattle (zebu) herding and fishing, women are more often responsible for raising small stock (poultry and goats, sheep and pigs) and for the sale of fish products. Whereas women manage the sale of commodities for household food, men often manage the sale of cash crops for non-food items. 29% of communities said that women are well or very well represented in decision making bodies, but this varied considerably by geographic zone (lowest in the South – 8% and East – 13%). Women are less literate than men throughout SALOHI zones, and FHH are noticeably poorer than Male Headed Households.

Conclusions

31. In general, the baseline survey confirmed the underlying hypothesis inherent in the program framework. Malnutrition levels in target zones are quite high, and closely linked to health status and hygiene practices, nutritional practices, agricultural production practices, and shocks. Baseline data indicates that up to 90% of households suffer from food insecurity during some time during the year, and target zones are appropriately selected. Lack of physical access to some communities during the rainy season, the frequency and severity of shocks, lack of nutritional knowledge, poor hygiene practices, and very low crop yields are some of the specific challenges which SALOHI staff will need to address. Alternatively, high rates of immediate breastfeeding and continued breastfeeding, as well as access to land and productive resources are opportunities which can be exploited to facilitate program implementation.

32. SALOHI staff will take into consideration all of the information collected during the baseline study to improve program strategies, focus our activities, and to measure and evaluate program impact over time. The survey provided SALOHI staff with an excellent opportunity to get to know our target population, and each other (team building). The baseline survey was structured in such a way as to promote participation, both by technical and M&E staff in the design, implementation and analysis of data, as well as community members in the interpretation of that data. An innovative strategy will be used to disseminate data down and back to the community level, to contribute to the development of a community based, participatory M&E system. SALOHI staff will continue to monitor and evaluate the feasibility, effectiveness, sustainability and cultural acceptability of each strategy and activity, to improve program implementation.

Baseline Levels of Program Indicators: SALOHI

Indicators	Baseline Value	Error	Confidence Interval (95%)		Design Effect
			Lower Limit	Upper Limit	
SO1: Health and nutrition status of children under five years of age improved					
Impact indicators					
% of children 6-59 months of age stunted (Height/Age < - 2 SD)	44,4	1,487	41,4	47,5	3,104
% of children 0-59 months of age underweight (Weight/Age < - 2 SD)	34,5	1,316	31,8	37,2	2,937
% of children 0-59 months of age emaciated (Weight/Height < - 2 SD)	8,4	0,613	7,2	9,7	1,843
Effect indicators					
% of children 0-6 months breastfed within one hour of birth	71,2	2,914	65,2	77,2	2,030
% of children 0-6 months exclusively breastfed	55,8	3,598	48,0	62,7	2,568
% of women who consume foods rich in vitamin A	36,4	2,822	30,6	42,2	9,892
% of women who consume foods rich in iron r	11,2	1,125	8,9	13,5	3,661
% of mothers/caregivers who practice five key personal hygiene behaviors (hand washing at critical moments).	4,4	0,592	3,2	5,6	2,385
% of mothers/caregivers who practice four key food hygiene behaviors	8,6	1,011	6,5	10,6	3,760
SO2: Livelihoods of food insecure households improved					
Impact indicators					
Average number of months with adequate household food provisioning	7,7	0,112	7,5	7,9	
Average household dietary diversity score	4,8	0,163	4,4	5,1	
Effect indicators					
% of producer groups and cooperatives with agribusiness plans	24,9	3,691	17,3	32,4	3,821
% of households using credit in the last 12 months	54,9	2,056	50,7	59,1	4,905
SO3 : Community resiliency to food security shocks increased					
Impact indicators					
Community Vulnerability Index	TBD ²				
Effect indicators					
Number of communities with Early Warning Systems in place in the Fiscal Year/Total number of communities the CS plans to assist	53/119				
% of water systems which are protected from erosion	44,4				
% of communities who have a local development plan	43,3				

² The community vulnerability index is a composite index composed of several program indicators. It will be measured in each SALOHI community (in a census); thus, no baseline values are presented here.

Baseline Levels of Program Indicators: ADRA

Indicators	Baseline Value	Error	Confidence Interval (95%)		Design Effect
			Lower Limit	Upper Limit	
SO1: Health and nutrition status of children under five years of age improved					
Impact indicators					
Percentage of children 6-59 months of age stunted (Height/Age < - 2 SD)	56,6	3,006	50,4	62,7	2,726
Percentage of children 0-59 months of age underweight (Weight/Age < - 2 SD)	44,1	2,291	39,4	48,8	1,749
Percentage of children 0-59 months of age emaciated (Weight/Height < - 2 SD)	7,3	1,163	5,0	9,7	1,621
Effect indicators					
Percentage of children 0-6 months breastfed within one hour of birth	79,7	6,165	67,1	92,3	2,207
Percentage of children 0-6 months exclusively breastfed	64,5	5,532	53,2	75,9	1,257
Percentage of women who consume foods rich in vitamin A	30,3	3,665	22,8	37,8	4,571
Percentage of women who consume foods rich in iron	12,1	1,918	8,2	16,0	2,488
Percentage of mothers/caregivers who practice five key personal hygiene behaviors (hand washing at critical moments).	2,8	0,929	0,9	4,7	2,291
Percentage of mothers/caregivers who practice four key food hygiene behaviors	5,9	1,348	3,1	8,6	2,365
SO2: Livelihoods of food insecure households improved					
Impact indicators					
Number of months with adequate household food provisioning	8,4	0,152	8,1	8,7	
Average household dietary diversity score	5,5	0,106	5,3	5,7	
Effect indicators					
Percentage of producer groups and cooperatives with agribusiness plans	39,1	7,039	24,7	53,5	1,956
Percentage of households using credit in the last 12 months	54,3	3,499	47,2	61,5	3,548
SO3 : Community resiliency to food security shocks increased					
Impact indicators					
Community Vulnerability Index	TBD				
Effect indicators					
Number of communities with Early Warning Systems in place in the Fiscal Year/Total number of communities the CS plans to assist	2/30				
Percentage of water systems which are protected from erosion	28,3				
Percentage of communities who have a local development plan	26,7				

Baseline Levels of Program Indicators: CARE

Indicators	Baseline Value	Error	Confidence Interval (95%)		Design Effect
			Lower Limit	Upper Limit	
SO1: Health and nutrition status of children under five years of age improved					
Impact indicators					
Percentage of children 6-59 months of age stunted (Height/Age < - 2 SD)	44,4	2,731	38,8	50,0	2,740
Percentage of children 0-59 months of age underweight (Weight/Age < - 2 SD)	33,5	2,097	29,2	37,8	1,901
Percentage of children 0-59 months of age emaciated (Weight/Height < - 2 SD)	7,1	1,127	4,8	9,4	1,856
Effect indicators					
Percentage of children 0-6 months breastfed within one hour of birth	62,0	4,879	52,0	72,0	0,899
Percentage of children 0-6 months exclusively breastfed	52,4	6,260	39,6	65,2	1,398
Percentage of women who consume foods rich in vitamin A	48,3	4,320	39,4	57,1	5,374
Percentage of women who consume foods rich in iron	10,9	1,656	7,5	14,3	2,030
Percentage of mothers/caregivers who practice five key personal hygiene behaviors (hand washing at critical moments).	6,5	1,789	2,8	10,2	3,781
Percentage of mothers/caregivers who practice four key food hygiene behaviors	6,7	1,408	3,8	9,5	2,299
SO2: Livelihoods of food insecure households improved					
Impact indicators					
Number of months with adequate household food provisioning	6,2	0,404	5,4	7,0	
Average household dietary diversity score	4,8	0,163	4,4	5,1	
Effect indicators					
Percentage of producer groups and cooperatives with agribusiness plans	15,2	6,818	1,3	29,2	4,643
Percentage of households using credit in the last 12 months	56,0	4,605	46,5	65,4	6,178
SO3 : Community resiliency to food security shocks increased					
Impact indicators					
Community Vulnerability Index	TBD				
Effect indicators					
Number of communities with Early Warning Systems in place in the Fiscal Year/Total number of communities the CS plans to assist	16/29				
Percentage of water systems which are protected from erosion	69,2				
Percentage of communities who have a local development plan	36,7				

Baseline Levels of Program Indicators: CRS

Indicators	Baseline Value	Error	Confidence Interval (95%)		Design Effect
			Lower Limit	Upper Limit	
SO1: Health and nutrition status of children under five years of age improved					
Impact indicators					
Percentage of children 6-59 months of age stunted (Height/Age < - 2 SD)	35,6	2,873	29,8	41,5	3,336
Percentage of children 0-59 months of age underweight (Weight/Age < - 2 SD)	27,2	2,310	22,5	31,9	2,853
Percentage of children 0-59 months of age emaciated (Weight/Height < - 2 SD)	9,8	1,083	7,5	12,0	1,385
Effect indicators					
Percentage of children 0-6 months breastfed within one hour of birth	70,6	4,089	62,2	78,9	1,361
Percentage of children 0-6 months exclusively breastfed	52,2	5,719	40,5	63,9	2,215
Percentage of women who consume foods rich in vitamin A	40,5	4,615	31,1	50,0	6,353
Percentage of women who consume foods rich in iron	11,0	2,082	6,8	15,3	3,175
Percentage of mothers/caregivers who practice five key personal hygiene behaviors (hand washing at critical moments).	4,4	1,087	2,1	6,6	2,040
Percentage of mothers/caregivers who practice four key food hygiene behaviors	11,5	2,047	7,3	15,7	2,953
SO2: Livelihoods of food insecure households improved					
Impact indicators					
Number of months with adequate household food provisioning	7,8	0,175	7,4	8,1	
Average household dietary diversity score	4,4	0,327	3,7	5,0	
Effect indicators					
Percentage of producer groups and cooperatives with agribusiness plans	22,2	5,123	11,7	32,7	1,836
Percentage of households using credit in the last 12 months	52,9	3,774	45,2	60,4	4,111
SO3 : Community resiliency to food security shocks increased					
Impact indicators					
Community Vulnerability Index	TBD				
Effect indicators					
Number of communities with Early Warning Systems in place in the Fiscal Year/Total number of communities the CS plans to assist	17/30				
Percentage of water systems which are protected from erosion	58,7				
Percentage of communities who have a local development plan	40,0				

Baseline Levels of Program Indicators: Land O'Lakes

Indicators	Baseline Value	Error	Confidence Interval (95%)		Design Effect
			Lower Limit	Upper Limit	
SO1: Health and nutrition status of children under five years of age improved					
Impact indicators					
Percentage of children 6-59 months of age stunted (Height/Age < - 2 SD)	45,9	1,869	42,0	49,7	1,248
Percentage of children 0-59 months of age underweight (Weight/Age < - 2 SD)	39,8	1,514	36,6	42,9	0,941
Percentage of children 0-59 months of age emaciated (Weight/Height < - 2 SD)	7,5	0,929	5,6	9,4	1,204
Effect indicators					
Percentage of children 0-6 months breastfed within one hour of birth	60,3	3,685	52,7	67,8	0,766
Percentage of children 0-6 months exclusively breastfed	50,7	4,762	41,0	60,5	1,225
Percentage of women who consume foods rich in vitamin A	23,5	3,042	17,3	29,7	3,683
Percentage of women who consume foods rich in iron	8,8	1,353	6,0	11,5	1,636
Percentage of mothers/caregivers who practice five key personal hygiene behaviors (hand washing at critical moments).	8,2	1,371	5,4	11,0	1,781
Percentage of mothers/caregivers who practice four key food hygiene behaviors	8,6	1,591	5,3	11,8	2,312
SO2: Livelihoods of food insecure households improved					
Impact indicators					
Number of months with adequate household food provisioning	6,5	0,244	6,0	7,0	
Average household dietary diversity score	4,4	0,151	4,1	4,7	
Effect indicators					
Percentage of producer groups and cooperatives with agribusiness plans	14,5	4,106	6,1	22,9	2,408
Percentage of households using credit in the last 12 months	64,6	2,663	59,2	70,1	2,218
SO3 : Community resiliency to food security shocks increased					
Impact indicators					
Community Vulnerability Index	TBD				
Effect indicators					
Number of communities with Early Warning Systems in place in the Fiscal Year/Total number of communities the CS plans to assist	18/30				
Percentage of water systems which are protected from erosion	79,2				
Percentage of communities who have a local development plan	70,0				

Introduction

Madagascar is one of the poorest countries in the world. More than 60% of the 19 million people live below the poverty line, on less than 1 USD per day (INSTAT 2006). Malnutrition is pervasive: one child out of two under the age of five suffers from chronic malnutrition resulting in stunting, and 42% suffer from underweight (EDS 2003/2004). Seven households out of ten (70%) lack food at some point during the year (INSTAT 2006).

To respond to continuous and chronic food insecurity in the East and South of Madagascar, CRS, in partnership with ADRA, CARE and Land O'Lakes, established the *Strengthening and Accessing Livelihood Opportunities for Household Impact* (SALOHI) program, whose objective is to reduce food insecurity in vulnerable communities in 21 districts. The SALOHI program will be funded for five years by the United States Agency for International Development (USAID) Office of Food for Peace (FFP). The SALOHI program targets 98,000 vulnerable households (approximately 492,500 people) in 544 communities (Fokontany) in 120 rural communes and three urban centers, in the South and East of the country. The program started in May 2009 and will end June 30 2014.

This document presents the results of a baseline survey conducted in October - November 2009. The objectives of the baseline survey were to determine the level of key program indicators at the beginning of the program to permit the SALOHI team to monitor program progress and evaluate impacts, and to determine corrections and changes required to achieve program goals and objectives. The report is structured in eight sections. The first section describes the methodology used to collect and analyze data, including limits to the use of results. The second section of the report summarizes the Results Framework and the Performance Plan for the SALOHI program, and the objectives of the baseline survey. This information provides the framework through which baseline data is analyzed. The third section describes the socio-economic context in which the program will be implemented: the administrative structure and socio-economic characteristics of households. The fourth section of the report presents the health and nutritional status of children under five, and describes the nutrition and disease prevention practices, including personal hygiene and food hygiene practices. This section also includes the results of simple tests of program hypotheses, exploring the association between malnutrition and different nutrition and health practices. The fifth section presents household livelihood practices in terms of the availability and access to food. Three key indicators are calculated: the average number of months of adequate household food provisioning; the dietary diversity score and the food security coping strategies index. The area cultivated, the amount harvested and the yields of key crops are estimated, and their geographic variations are described. Certain key hypotheses are also tested, to explore the association between agricultural production practices, access to irrigation, household access to food and dietary diversity. The sixth section of the report focuses on natural disasters and household capacity to respond to them. A multi-disciplinary approach is used to understand community and household vulnerability in terms of level of exposure to risks and response capacity. Local governance is also evaluated, in terms of existing consultative mechanisms which exist between governance structures and those they govern. In Section 7, conclusions and key recommendations are made for the SALOHI team.

Section 1: Baseline justification, objectives and methodology

1.1 Justification, goal and objectives of the baseline

A baseline survey is required to measure annual program progress, and to help evaluate program results in terms of their contribution to reduced food insecurity over the life of the program. In order to evaluate program progress, it is necessary to know the situation at the beginning of the program. The goal of the baseline survey is to determine baseline levels for key program indicators, as well as to understand actual household knowledge, attitudes and practices in target zones, and to assess resources, capacities, opportunities and constraints which affect food security in target zones.

Fundamentally, the baseline survey serves as the point of reference from which anticipated program results will be measured, and against which mid-terms and final evaluations will be compared. The results of the survey could also be used to determine trigger indicators and thresholds, and to calculate values for monitoring and evaluating environmental impacts. Results should allow SALOHI staff and others to test hypotheses which underlay the results framework, and to improve targeting.

The survey results will be used by SALOHI staff to refine their implementation strategies, and also by USAID to assess the effectiveness of program activities. Results can also be used by community members to refine their understanding of the food security situation in their zone, and by other development partners to target interventions.

The baseline survey had six principal objectives:

1. To describe current knowledge, attitudes and practices in SALOHI target communities with respect to program interventions, and to establish trends in these areas (health and nutrition status and practices, agricultural productivity and production practices, market access, income generating activities and expenses, savings and access to credit, cooperative and group formation, access to training and services, vulnerability to disasters and responses, local governance capacity, food security and coping strategies, etc.);
2. To determine current adoption levels for practices that SALOHI plans to promote (health and nutrition practices, crop production practices, marketing practices, and disaster prevention and mitigation strategies);
3. To collect quantitative data to measure changes in key project indicators over the life of the project;
4. To collect qualitative data to help project staff identify opportunities to improve program design and implementation;
5. To promote team building among program staff, and
6. To share information on the project with target communities, and to begin the process of participatory planning, monitoring and evaluation.

The following outputs were expected³:

- Baseline values for each key program indicator (including environmental monitoring indicators);
- Baseline data sets for each NGO and its operation areas;
- A revised Indicator Performance Tracking Table (IPTT) with appropriate targets;
- A better understanding of the food security situation and relevant practices in SALOHI target zones, and the appropriate responses to reduce food insecurity.

1.2 Methodology

1.2.1 Survey type and methods

The survey included both qualitative and quantitative data collection instruments, to provide a clear picture of the food security situation in target zones at program start up. A Type I/Simple pre-post comparison (“Adequacy”) design was used for the study. This process involves collecting data before and after program implementation (pre and post test), to document baseline values for key indicators over the life of the program. The same survey will be repeated at the end of the program to document the evolution and level of key indicators. An attempt is made to account for and describe a limited number of determinants (infant feeding practices, child health status, hygiene practices, food access, and agricultural production practices) and known confounding factors (weather, economy, education) to strengthen plausible association of changes with program activities (Type III design).

a) Quantitative Survey

Quantitative data collection tools were used to collect quantitative (quantifiable, numerical) data related to anticipated impacts, effects and intermediate results. Quantitative survey data was collected from a representative sample of households in each NGO target zone. Four quantitative survey tools were used – a head of household questionnaire, a mother/caretaker questionnaire, an anthropometric questionnaire (to collect nutritional data from children under five years of age), and a community survey (to capture community level indicators).

Sampling

The sampling frame includes, for each NGO zone, an exhaustive list of all Fokontany in all communes where SALOHI partners will work. For each Fokontany, the name of the commune, district and region to which it is attached, and the estimated population from the most recent census was included.

³ Originally the SALOHI SOW called for the identification of trigger indicators and thresholds during the baseline survey. However, the qualitative information collected did not permit the development of a common set of trigger indicators and thresholds for the program. A workshop will be held in June 2010 to continue the development and refinement of these indicators, and will be followed up with field testing before they are finalized (prior to the next cyclone season).

An independent sample of households was selected in each NGO zone using the following formula:

$$n = D \times [(Z\alpha + Z\beta)^2 \times (P1(1 - P1) + P2(1 - P2)) / (P2 - P1)^2]$$

In which:

- **n** = is the minimum sample size required per NGO zone (strata)
- **D** = is a corrective factor used to correct for cluster and design effects
- **Z α** = is the level of statistical significance desired (the z score corresponding to the degree of confidence with which we want to measure and conclude that an observed difference (P2 – P1) is statistically significant)
- **Z β** = is the degree of confidence desired (the z score corresponding to the degree of confidence with which we desire to be sure to detect a difference (P2 – P1) if one exists)
- **P1** = the estimated level of an indicator at Time 1, measured in terms of a decimal proportion
- **P2** = the estimated level of the same indicator at Time 2, for which P2 – P1 is the minimum difference that the sample should detect.

To calculate the sample size for the baseline, we used the percentage of children under five who suffer from stunting as our key indicator. The initial level of this indicator was estimated at 50%, taking into account information furnished by different studies carried out in SALOHI zones. We used a standard value of 2 for the cluster effect, and following the recommendations of FANTA, $Z\alpha = 1,645$ and $Z\beta = 0,84$. The goal of the SALOHI team is to reduce stunting 8%, so the value of this indicator at the end of the project should be $P2=42\%$. Finally, we included an additional 10% for non-responses.

Taking into consideration all these factors we estimated a sample size of 557 children 6 – 59 months of age. The proportion of children in this age group in the general population is estimated at 17.4%; with an average household size of five people, 640 households must be sampled, plus 10% for non-responses, for a total of 704 households per NGO zone, or $704 \times 4 = 2815$ households total. Using a 30 cluster method per NGO zone, the average number of households to sample per cluster is 24.

In each NGO zone, 30 clusters (Fokontany) were selected, with probability proportional to size (PPS) of the population. At the second stage, 24 households were selected. Because of the relatively large size of certain Fokontany (especially in the South), some Fokontany were segmented, with each locality constituting one segment. Households were randomly selected in each segment. Household selection was done using a random walk method⁴. In each household, the head of the household, mothers/caretakers of children under two, and all children under five years of age were surveyed.

Table 1 provides a description of the final households surveyed, by NGO intervention zone and geographic zone. All data presented in the report is weighted.

⁴ For a detailed description of the Random Walk Method, see <http://www.ncbi.nlm.nih.gov/pubmed/6980735> or <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1894792/>.

Table 1: Distribution of households sampled (weighted and non weighted) by NGO intervention zone and geographic zone.

Zones	Number non weighted	Percent	Weighted	Percent
ADRA	720	25,0	1040	36,2
CARE	720	25,0	394	13,7
CRS	720	25,0	1188	41,3
LOL	716	24,9	254	8,8
Total	2876	100,0	2876	100,0
CENTRE	408	14,2	566	19,7
SUD	624	21,7	575	20,0
SUD-EST	1292	44,9	1176	40,9
EST	552	19,2	559	19,4
Total	2876	100,0	2876	100,0

Figure 1 shows NGO intervention zones and the precise locations of the 120 Fokontany from which baseline data were collected (next page).

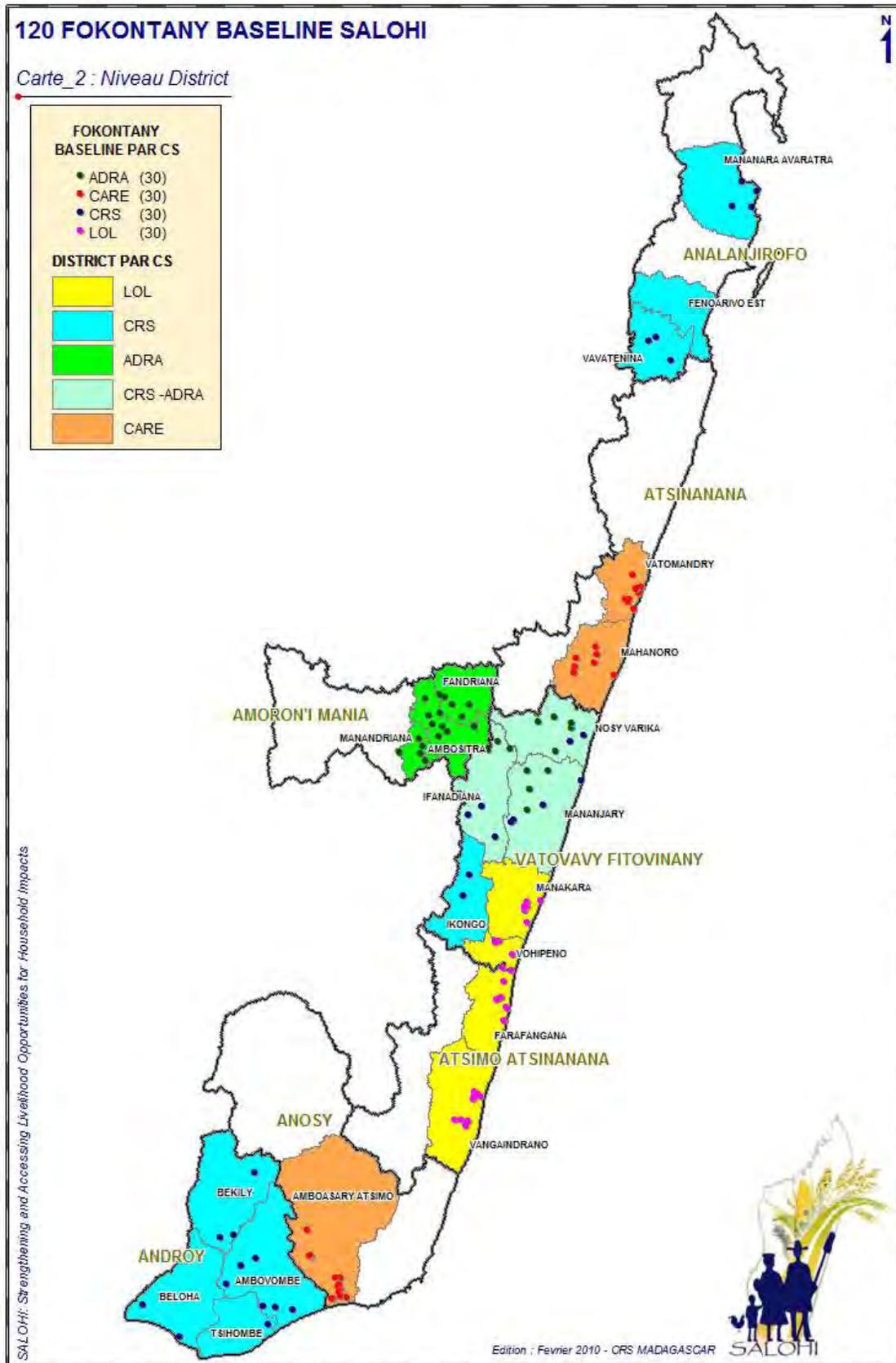
Quantitative survey tools

Four types of questionnaires were used for quantitative data collection: a head of household questionnaire, a mother/caretaker questionnaire, a community questionnaire, and an anthropometric data collection tool (to measure weight, height, age and middle upper arm circumference of children under five years of age). The head of household questionnaire and the mother/caretaker questionnaire are two sections of one household level questionnaire. The head of household and mother/caretaker for each household (in some cases these were the same people) were interviewed simultaneously, to save time. A copy of all survey tools used is included in Annex 1.

The household questionnaire included 10 sections:

- Section 1: Household socio-economic characteristics ;
- Section 2: Household food consumption practices;
- Section 3: Water sanitation;
- Section 4: Access to health services;
- Section 5: Health and nutrition practices of pregnant and lactating women;
- Section 6: Health and nutrition of children under two years of age;
- Section 7: HIV/AIDS
- Section 8: Agriculture and animal husbandry;
- Section 9: Farmers groups and community activities;
- Section 10: Resilience.

Figure 1: SALOHI intervention zones and the location of Fokontany from which baseline data was collected.



Sections 1, 7 - 10 were asked of the Head of Household. Sections 2 – 7 were asked of women and mothers of children under five. Sections 7 and 8 were asked of both men and women. It took approximately 30 minutes to interview the mothers/caretakers, and 45 minutes to interview the head of household (mostly due to the difficulty calculating cropping areas and yield).

The community questionnaire was composed of seven short sections including the following topics: markets, farmers' organizations, access to health services, access to water, road access, natural disasters and governance. It took approximately 1.5 hours to use this tool.

The anthropometric tool was a simple table to record data collected from children under the age of five – name, household, sex, date of birth, age in months, weight, height, middle upper arm circumference (MUAC) and signs of edema.

The household questionnaire was drafted in French, translated into Malagasy, and translated back into French to include the final version in the baseline report. The community questionnaire was not translated into Malagasy, but was used to guide focus group discussions. Because the type of Malagasy spoken in each region of the SALOHI program differs, some words had to be changed in the field to facilitate comprehension by local households. The community questionnaire was used by Survey Supervisors, whereas the household questionnaire was used by field data collectors.

The household and anthropometric data collection tools were tested (twice) in the field and refined prior to their use during the baseline. Quantitative data collection tools were developed based on questionnaires used during previous baseline and final evaluations of food security programs in Madagascar.

b) Qualitative Survey

The purpose of the qualitative data collection exercise was to improve our understanding and comprehension of quantitative results (the data collection exercises were carried out simultaneously). In addition, we asked household to identify the opportunities and constraints which could have an impact on the implementation of program activities. Group discussions were carried out with three types of key informants 1) women, focusing on questions relating to health and nutrition 2) men, focusing on agriculture and natural resource management practices, 3) community leaders, to discuss disaster risk reduction and local governance. Although it would have been preferable to collect health data from multiple types of key informants, and livelihood information from both men and women, time constraints (on the part of both the survey team and community participants) required that the team focus on one subject per focus group. It took almost three hours to conduct each focus group discussion.

Each CS organized at least three focus group discussions in at least three different communities in their intervention zone. A total of 63 focus group discussions were carried out, in four ADRA communities, three CARE communities, three LOL communities and 11 CRS communities.

Standard tools were used to collect qualitative information. A guide was elaborated and given to each qualitative survey team to facilitate the process. The guide and the tools were tested and refined during the Training of Trainers workshop. The guide and tools used are included in Annex 1.

1.2.2 Selection and training of data collectors

The training of data collectors was carried out in two stages – a five day Training of Trainers (TOT) was carried out in the CRS office in Antananarivo for survey supervisors, followed by a five day training for field teams in each of the four project zones (CRS/East, CARE/East, ADRA/Central and East, LOL/South East, CARE/South + CRS/South).

a) Training of Trainers (TOT)

The Training of Trainers was organized by the PCU to ensure that each partner had the same vision of the baseline process and the same understanding of the tools to be used. Each questionnaire and tool was discussed in detail, question by question, to improve the questionnaires and to facilitate the finalization of the data collection guide.

A total of 39 people participated in the five day TOT. At the beginning of the session, participants' experiences with previous surveys were discussed. It was discovered that more than half of the participants had already participated in similar surveys, 43% had used a GPS, and all had already used height boards and scales to collect anthropometric data. However, only 37% of the survey team had experience collecting MUAC data.

During the TOT, the questionnaires and discussion guides were finalized, translated and validated, the training modules and Data Collection Guide were finalized, and 32 survey supervisors were trained to fill out questionnaires, train data collectors, and monitor data collection quality and completeness. During part of the last day the team discussed logistical challenges and created a check list to facilitate data collection. Training modules are included in Annex 2.

b) Training of data collectors

Each NGO recruited and trained their data collection teams. A total of 94 people were trained in the use of SALOHI tools (62 men and 32 women). Qualitative data was collected by survey supervisors and NGO staff. The five day training took place from October 12 – 17 2009.

1.2.3 Organization of data collection

Each NGO organized data collection depending on the number of their data collectors, the number of survey teams, and their logistical capacity. Two groups were organized for each NGO – one group for quantitative data collection, and one group for qualitative data collection. These groups worked in parallel, at the same time in the same Fokontany. For quantitative data collection, 20 survey teams were deployed in the field. Each team included a supervisor and four data collectors. Each team used a 4 x 4 vehicle, and at times motorcycles, boats and long walks to facilitate access to remote communities. Data collection took 25 days, and occurred from 19 October – 20 November. The logistics plan and baseline calendar are included in Annex 3.

In the end, 2876 Heads of Household and 2876 women/mothers of children under five were surveyed, anthropometric data was collected from 2620 households (for 3876 children under five), and 120 community questionnaires were filled out.

1.2.4 Data exploitation and analysis

Data entry was carried out by a team of local consultants (Capsule) who were selected from a list of four companies that have experience carrying out similar surveys in Madagascar. The consulting company worked closely with the PCU to organize the data entry process, monitor data quality and collect and process completed forms as quickly as possible. ETHNOS 5.5 was used for data entry, and data was analyzed using SPSS.

The data entry team was trained from November 1- 3 2009. Data entry took place as completed questionnaires arrived from the field. Data was treated at the PCU level to facilitate use of the weighted coefficients required to compare program level data to NGO level data, as well as to calculate sampling errors and confidence intervals. The SALOHI team had hoped to use SPSS v.18 Complex Sample module to calculate sampling errors and confidence intervals, but due a delay in procuring the software, Epi Info 3.5.2 was used in place of SPSS.

Preliminary data analysis was conducted by a technical team composed of all SALOHI partners. Six groups were formed to analyze data over a 3.5 day period – health and nutrition, livelihoods, community resilience, gender, environment and governance. Each group received the complete package of data tables. Notes from their discussions were used to draft his report. This was the first time most staff members had been involved in baseline data analysis, and it allowed them to better understand the data collected and to start using it for program planning purposes.

All data was disaggregated first by NGO intervention zone (ADRA, CARE, CRS and Land O'Lakes), and then by geographic zone (South, East, South East and Center), and by sex of the head of household. It was then consolidated to give a clear picture for all SALOHI intervention zones, and results compared to other available sources of data (Demographic Health Surveys, Vulnerability Analysis Mapping, and previous DAP baseline and final evaluations) for triangulation and (rough) comparison.

Table 2: Description of geographic zones (by NGO intervention zone, region and district)

NGO	Number of geographic zones	Description of Geographic Zones
ADRA	2	South East, Cyclone prone zones (Mananjary, Nosy Varika, Manakara, Faranfangana, Vangaindrano, Vohipeno) Inaccessible Zones in the Central Plateau/Highlands (Amori Mania, Ifanadiana, Ikongo)
CARE	2	Eastern Cyclone Zone (Vatomandry, Mahanoro, Fenerive East, Mananara Nord, Vavatenena) Southern drought zone (Anosy, Androy)
CRS	4	Southern drought zone (Anosy, Androy) South East, Cyclone prone zones (Mananjary, Nosy Varika, Manakara, Farafangana, Vangaindrano, Vohipeno) Eastern Cyclone Zone (Vatomandry, Mahanoro, Fenerive East, Mananara Nord, Vavatenena) Inaccessible Zones in the Central Plateau/Highlands (Amori Mania, Ifanadiana, Ikongo)
LOL	1	South East, Cyclone prone zones (Mananjary, Nosy Varika, Manakara, Farafangana, Vangaindrano, Vohipeno)
TOTAL	4	

Why do we present data by NGO Intervention zone, in addition to geographic zone?

SALOHl is a consortium of four NGOs. Each NGO has specific outputs and targets which they will meet, to ensure the success of the overall program. Because most of SALOHl's partners operate in multiple geographic zones, it was critically important to provide each partner with accurate baseline data for their individual zones, so that they can revise their targets and monitor their individual progress. For most people, the data by geographic zone and household type (MHH and FHH) is sufficient to provide them with an overview of the food security situation in target communities and households.

Table 3: SALOHI Geographic Zones, NGO Intervention Zones, Districts and Communes

ZONE	ADRA		CARE		LOL		CRS	
	District	# Communes	District	# Communes	District	# Communes	District	# Communes
South			- Amboasary South	6			- Ambovombe - Bekily - Beloha - Tsihombe	16
South-East	- Nosy Varika - Mananjary - Manandriana	6 6 9			- Farafangana - Vangaindrano - Manakara - Vohipeno	12	- Mananjary - Nosy Varika	15
Center	- Ambositra - Fandriana - Ifanadiana	12 6 4					- Ifanadiana - Ikongo	8
East			- Vatomandry - Mahanoro	9			- Fenerive East - Vavatenina - Mananara Nord	11
TOTAL	6	43	3	15	4	12	11	50

Section 2: Results Framework and Program Performance Framework

2.1 Program Results Framework

The goal of the SALOHI Program is to reduce food insecurity. The program hopes to achieve this goal through three strategic objectives (SOs).

1. Health and nutritional status of children under five improved;
2. Livelihoods of food insecure households improved;
3. Community resilience to food security shocks improved.

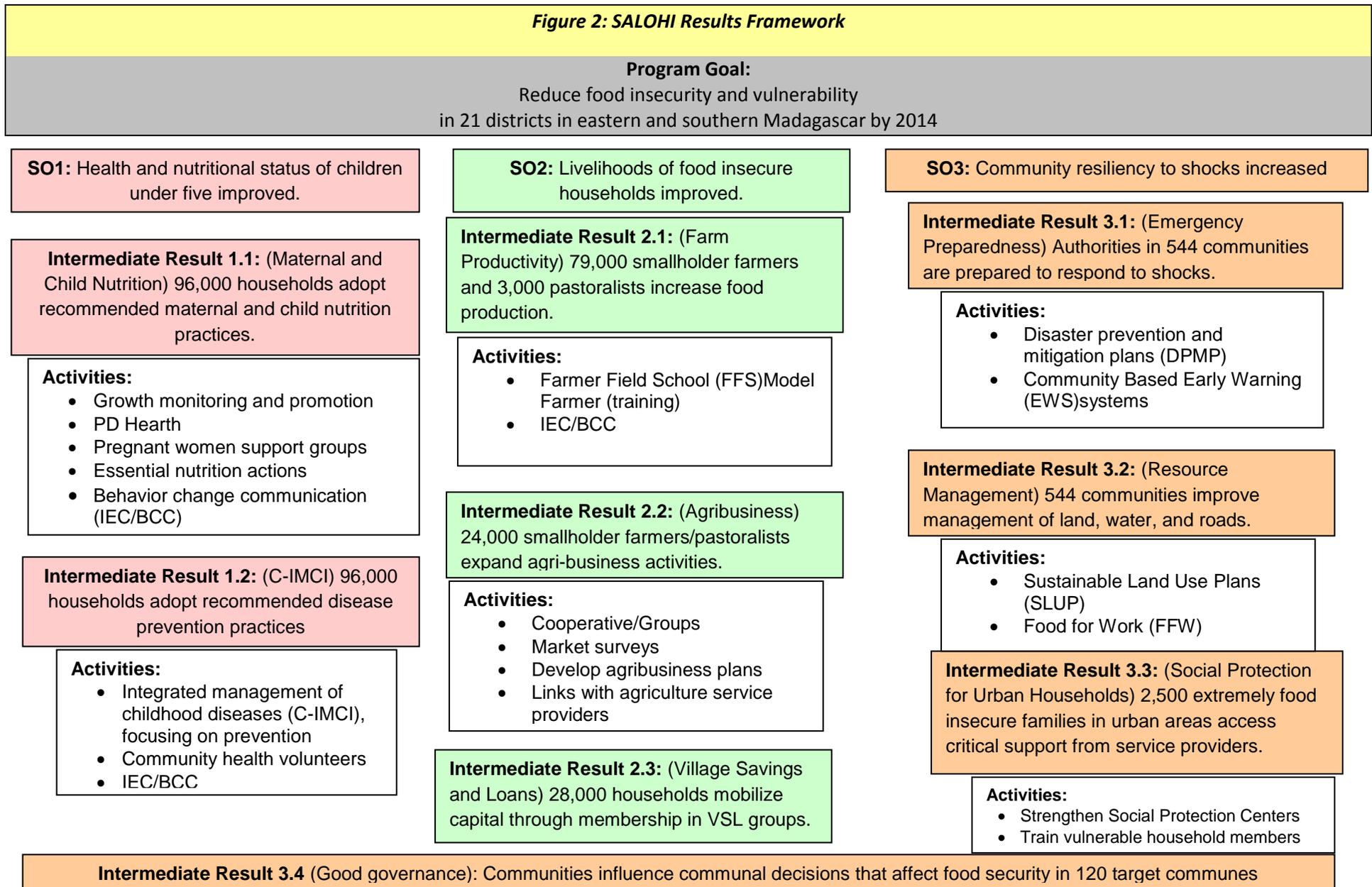
The program is based on the hypothesis that the health and nutrition status of children can be improved by household adoption of recommended nutrition practices for children and for their mothers (Intermediate Result 1.1), and by adoption of recommended practices to prevent childhood diseases (IR 1.2). As a result, the SALOHI team will (i) develop activities to support community based growth monitoring and promotion, (ii) develop support groups for pregnant and lactating mothers, and (iii) promote a package of Essential Nutrition Actions (ENA) using behavior change communication campaigns, to improve adoption of recommended nutrition practices, and (iv) support community health volunteers to improve household access to health services, and (v) promote the integrated management of childhood diseases, with an accent on disease prevention, to promote the adoption of recommended disease prevention practices.

The SALOHI program also supposes that improvements in agricultural production (IR 2.1), the development of agro-business skills (IR 2.2) and the mobilization of savings and credit (IR 2.3) will strengthen livelihoods of food insecure households. To achieve these results, SALOHI staff will train farmers using Farmer Field School techniques and Model Farmers (i), promote the evolution and strengthen existing farmers' associations (ii), support the development of agro-business skills and agro-business plans (iv), and develop community based village savings and credit groups.

The SALOHI program is also based on the assumption that helping communities prepare to respond to shocks (IR 3.1), improving community management of natural resources, roads and infrastructure (IR 3.2), integrating extremely vulnerable families into urban safety nets (IR 3.3) and improving community capacity to influence decisions that affect their food security (IR 3.4), will together increase community resilience to shocks. Thus, the SALOHI team developed a package of activities designed to promote the development of disaster preparation, management and mitigation plans (i), to put into place early warning systems (ii), to develop sustainable land use management plans (iii), to develop activities to strengthen social protection (iv), and to train household members, community groups and commune leaders to practice principles of good governance (v).

Figure 1 represents the Results Framework for the SALOHI program, and shows the causal linkages between the results of different activities which underlay SALOHI implementation strategies.

Figure 2: SALOHI Results Framework



One of the goals of the baseline survey was to test the assumptions underlying the Results Framework, to ensure that the activities and intermediate results selected will in fact lead to reduced food insecurity. Eleven hypotheses were formulated to facilitate this process:

1. Malnutrition is a hidden illness. Participation in growth monitoring and promotion programs will help mothers to identify and treat malnourished children early, and lead to lower levels of malnutrition in the target population (women whose children participate in growth monitoring activities will have lower levels of malnutrition than those who don't).
2. Children whose mothers'/caregivers practice Essential Nutrition Actions are less likely to be malnourished than children whose mothers do not adopt these practices.
3. Children whose mothers or caregivers practice good hygiene get sick less often; children who are frequently sick are more likely to be malnourished.
4. Farmers who have received training in or been exposed to improved agricultural production practices are more likely to practice them.
5. Farmers who use improved production practices have higher yields than farmers who use traditional practices.
6. Farmers with access to irrigation produce more food and are less vulnerable to shocks than farmers who lack access to irrigation.
7. Market access is limited by poor roads. Improving rural feeder roads will facilitate the marketing of local crops (farmers with year round road access produce and sell more produce)
8. Farmers don't make enough from the fruits of their labors. Organizing farmers into groups will help them to identify better marketing opportunities and strategies, and get better prices for their products (farmers who participate in farmers' groups or cooperatives get higher prices for their products, and/or pay less for inputs)
9. Dependence on rice and traditional dietary practices contribute to food insecurity. Households who eat more diversified diets are more food secure than those who don't (fewer hungry months, less malnutrition).
10. Households in communities with early warning systems and disaster management and mitigation plans are better prepared for disasters, and are better able to prepare for, reduce the effects of, and recover from them.
11. Governance is an important underlying factor that affects food security. Many community based groups and/or associations do not function effectively. Households whose members participate in functional groups are less likely to have malnourished children than households who do not participate in such groups. Communities where women and men have equal access to decision making bodies will be more resilient to shocks than communities without such access.

2.2 Program Performance Framework

For each program indicator, SALOHI staff defined annual targets. The targets for the life of the program (five years) are cumulative, and include the results of each preceding year. Table 4 is an extract of the Indicator Performance Tracking Table (IPTT), limited to effect and impact indicators (output indicators and targets are removed). Twelve impact indicators are the principal targets of the baseline survey. Some intermediate result indicators related to SO 2 and 3 are effectively output indicators related only to beneficiaries, and are directly linked to the implementation of program activities (thus, their baseline level cannot be measured by the baseline survey).

Table 4: Annual and End of Program Targets, in terms of percentage improvement in impact and effect indicators, SALOHI.

Indicators	Base	Y1	Y2	Y3	Y4	Y5	LOP
SO1: Health and nutrition status of children under five improved							
Impact Indicators							
Percentage of children 6-59 months of age stunted (Height/Age < - 2 SD)	TBD				-8		-8
Percentage of children 0-59 months of age underweight (Weight/Age < - 2 SD)	TBD		-5		-10		-10
Effect indicators							
Percentage of children 0-6 months breastfed within one hour of birth	TBD		+5	+10	+15	+20	+20
Percentage of children 0-6 months exclusively breastfed	TBD		+5	+10	+15	+20	+20
Percentage of women who consume foods rich in vitamin A	TBD		+10	+15	+20	+25	+25
Percentage of women who consume foods rich in iron	TBD		+10	+15	+20	+25	+25
Percentage of eligible children who participate in growth monitoring and promotion activities in target zones	TBD	+10	+20	+30	+35	+40	+40
Percentage of mothers/caregivers who practice five key personal hygiene behaviors (hand washing at critical moments).	TBD	+5	+10	+15	+20	+25	+25
Percentage of mothers/caregivers who practice four key food hygiene behaviors	TBD	+5	+10	+15	+20	+25	+25
SO2: Livelihoods of food insecure households improved							
Impact indicators							
Number of months with adequate household food provisioning	TBD			+1		+2	+2
Average household dietary diversity score	TBD			+1		+2	+2
SO3 : Community resilience to food security shocks improved							
Impact indicators							
Community vulnerability index	TBD						-20%

The principal objective of the baseline survey is to determine the baseline levels of these indicators, to evaluate the feasibility of targets, and to refine program implementation strategies.

Section 3: Socio-Economic Context in SALOHI zones

Before presenting the results of the baseline, the general socio-economic context of the zone in which SALOHI activities will be implemented is presented, to facilitate a better understanding of data obtained.

3.1 Administrative Structure

The SALOHI program will operate in seven regions, 21 districts, 120 communes and 544 Fokontany in the South and East of Madagascar. The zone extends in a band approximately 100 km wide and 1250 km long, covering two thirds of the East coast, a small part of the Central Plateau bordering on the East coast, the South East and parts of the South (see Figure 1). The seven regions cover 145,870 km, with a population estimated at 1,500,000 people. The 21 districts which will be targeted by SALOHI cover 79,000 km, or 54% of the total area of the seven regions (see Table 5).

Table 5: Area and population of SALOHI zones

Regions	Area (km ²)	Area of SALOHI Districts (km ²)	SALOHI districts	Area (km ²)	Population SALOHI Communes 2009
Amaron'i Mania	16 540	6 204	Ambositra	2 912	133 845
			Fandriana	2 351	100 646
			Manandriana	941	89 431
Analanjirifo	21 682	10 416	Fenoarivo	3 000	18 742
			Manara Avatatra	4 492	80 077
			Vavatenina	2 924	61 256
Androy	18 721	18 721	Ambovombe	6 151	151 545
			Bekily	5 259	56 342
			Beloha	4 662	33 072
			Tsihombe	2 649	25 912
Anosy	29 588	10 169	Amboasary Atsimo	10 169	103 377
Atsimo Atsinanana	16 560	7 640	Farafangana	2 735	61 983
			Vangaindrano	4 905	33 282
Atsinanana	22 151	6 097	Mahanoro	3 742	78 380
			Vatomandry	2 355	33 344
Vatovavy Fitovinany	20 631	19 630	Ifanadiana	4 074	97 846
			Ikongo	3 129	34 308
			Manakara	2 068	22 509
			Mananjary	5 356	168 462
			Nosy Varika	3 799	133 045
			Vohipeno	1 204	14 782
Total	145 873	78 877		78 877	1 532 186

3.2 Socio-economic characteristics of SALOHI households

The baseline survey permitted the SALOHI team to collect data on household socio-economic characteristics in the zone. This information pertains to household size and composition, sources of income, household expenses, possession of goods and equipment (including animals and agricultural tools), etc. Other characteristics directly related to program Strategic Objectives (SO's) is analyzed separately.

3.2.1 Household size and composition

The sample size of the baseline, which included 2,876 households, is representative of all households in the SALOHI intervention zone. The average household size is 5.7 people; this varies little by NGO intervention zone (5.6 for ADRA and LOL, 5.8 in CARE and CRS zones). However, average household size varies considerably by geographic zone (6.6 people per household in the South, 5.8 in the Central Plateau, 5.5 in the South East and 5.1 in the East). Household size also varies by the sex of the head of the household: Female Headed Households (FHH) are smaller (4.7) than Male Headed Households (5.9).

Households are composed predominantly of children. One in four members of the household are children under the age of five, and those under 18 years of age represent between 58% and 66% (in the South) of the household.

Table 6: Proportion (%) of household members by age group, according to NGO intervention zone, geographic zone and sex of the household head (SALOHI intervention zone, Madagascar 2009).

Age group	Sex of Household Head		NGO intervention zone				Geographic Zones			
	MHH	FHH	ADRA	CARE	CRS	LOL	Center	South	South East	East
0-5 years	24	26	20	23	28	27	19	28	25	25
5-18 years	37	36	38	38	35	34	39	38	35	33
18-60 years	38	35	39	38	36	37	39	33	38	40
60 years +	01	02	03	01	01	02	03	01	01	02
TOTAL	100	100	100	100	100	100	100	100	100	100
Number	2321	527	1032	389	1175	254	564	566	1162	558

The SALOHI program targets in particular children 0 – 59 months of age, and activities are developed for various sub-groups within this age group (in particular targeting children 6 – 24 months of age). Data in Table 7 indicates that children 0 – 59 months of age represent, on average, 24% of the total population in the SALOHI intervention zone. Children under six months of age represent 2.8% of the population, and children 6 – 24 months of age 7.8%. These figures vary by NGO intervention zone and geographic zone. The proportion of children 0 – 59 months of age and sub-groups of children 0 – 6 months and 6 – 24 months of age is slightly less in the Central Plateau, and higher in the South East and East (0 – 6 months) and South (0 – 59 months and 6 – 24 months).

Table 7: Percentage of children 0 – 6 months of age, 6 – 24 months of age, and 0 - 59 months of age, in NGO intervention zones and SALOHI geographic zones.

	Absolute number				Percentage		
	0-6 month	6-24 month	0-59 month	Pop Tot	0-6 month	6-24 month	0-59 month
ADRA	118	374	1188	5831	2.0	6.4	20.4
CARE	43	165	528	2295	1.9	7.2	23.0
CRS	260	618	1901	6907	3.8	9.0	27.5
LOL	45	125	381	1410	3.2	8.9	27.0
TOTAL	466	1282	3999	16444	2.8	7.8	24.3
CENTER	60	197	630	3291	1.8	6.0	19.1
SOUTH	83	363	1061	3816	2.2	9.5	27.8
SOUTH EAST	219	496	1610	6494	3.4	7.6	24.8
EAST	105	227	698	2843	3.7	8.0	24.6
TOTAL	466	1282	3999	16444	2.8	7.8	24.3

Breastfeeding women, pregnant women and women who take care of children under five are another population targeted by SALOHI interventions. Questions regarding nutritional practices, health practices and hygiene practices were asked of these women. Data in Table 8 indicate the proportion of women in each category, in SALOHI target zones.

Table 8: Distribution (%) of women surveyed, by status (pregnant, breastfeeding, or both) in NGO intervention zones and SALOHI geographic zones.

Status	ADRA	CARE	CRS	LOL	CENTER	SOUTH	SOUTH EAST	EAST	TOTAL
					EAST				
Pregnant	7,1	7,4	5,9	9,1	9,1	5,3	7,0	5,6	6,8
Breastfeeding	45,3	46,7	60,9	60,9	42,2	64,4	55,5	48,4	53,3
Pregnant and breastfeeding	1,4	1,3	6,8	2,0	1,6	3,2	1,4	11,2	3,7
Neither pregnant nor breastfeeding	46,2	44,6	26,5	28,1	47,1	27,1	36,1	34,9	36,2
TOTAL	100,0								
Mother of children 0-6 months	11,5	11,0	21,0	18,1	10,6	13,5	19,0	17,5	16,0
Mother of children 6-24 months of age	34,5	40,9	49,9	46,6	34,6	62,6	39,1	39,0	42,8
Mother of children 24-59 months of age	53,6	73,7	63,6	55,1	54,9	63,6	66,4	68,0	62,0

On average, 7% of women surveyed were pregnant, 53% were breastfeeding and 4% were both pregnant and breastfeeding (36% were neither pregnant nor breastfeeding). The proportion of women who were pregnant is higher in the Center (9%), and lower in the South (5%). The proportion of women who were breastfeeding was higher in the South (64%) than other zones (42% - 55%), and the percentage of women who were both breastfeeding and pregnant was abnormally high in the East (11%).

Most household are headed by men (81.5 %); however, there are quite a few Female Headed Households (FHH) as well (533, or 18.5 %). The percentage of households headed by women varies considerably by NGO intervention zone: from 15 % in ADRA zones to 32% in LOL zones. It also varies by geographic zone (from 13 % in the Central Plateau to 21 % in the South East).

Household heads average 38 years of age; they are relatively younger in the LOL zone (35 years) and in the East and South East (36 years vs. 40 and 41 years, respectively, in the Central Plateau and the South).

Most household heads can read (61 %). In all zones except the South (35%), the percentage of household heads who can read is above 50%. The percentage of household heads who can read is particularly high in ADRA zones (72.8%), and in the Central Plateau (83.2%). Male household heads (63.6%) are more likely to be able to read than female household heads (51.8%).

Table 9: Head of household by Age, Sex, Intervention Zone and Geographic Zone (%), SALOHI baseline survey, Madagascar (2009)

Age	Sex		NGO Intervention Zone				Geographic Zone				Total
	MHH	FHH	ADRA	CARE	CRS	LOL	Center	South	South East	East	
15-19	2,0	6,2	2,3	1,5	3,5	4,0	1,1	2,6	3,4	3,8	2,9
20-24	9,0	16,5	7,9	12,0	11,8	11,9	6,0	9,9	12,1	12,0	10,4
25-29	14,6	11,6	14,0	11,7	14,4	16,6	13,5	11,0	14,9	16,1	14,1
30-34	16,7	16,7	19,3	13,8	15,1	18,6	20,0	12,0	17,5	16,6	16,7
35-39	15,5	10,7	14,9	13,5	14,8	15,0	14,5	14,4	14,1	15,9	14,7
40-44	13,5	10,5	11,4	12,8	14,6	11,9	11,3	12,3	13,4	14,1	12,9
45-49	9,7	10,3	10,8	10,7	8,8	8,7	9,6	9,9	10,9	7,7	9,8
50-54	7,6	7,3	7,3	9,4	7,6	5,1	8,3	8,9	6,8	7,0	7,5
55-59	4,4	4,5	5,0	5,4	3,7	4,3	6,2	5,9	3,4	3,2	4,5
60 et +	6,8	5,6	7,1	9,2	5,8	4,0	9,4	13,0	3,5	3,6	6,6
TOTAL	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0
Number	2342	533	1039	392	1189	253	564	575	1175	559	2873
Avg	38,5	36,1	38,7	39,8	37,3	35,8	40,3	41,1	36,4	36,0	38,0

Table 10: Percentage of Household Heads that can read, by Sex of Household Head, Intervention Zone and Geographic Zone

Sex		Intervention Zone				Geographic Zone				Total
MHH	FHH	ADRA	CARE	CRS	LOL	Center	South	South East	East	
63,6	51,8	72,8	53,0	55,6	55,6	83,2	35,0	60,5	68,7	61,6
N = 2341	531	1040	394	1183	254	566	575	1176	557	2874

Household heads are generally married. However, the marital status of the head of household varies considerably by sex of the head of household and by geographic zone. Data from Table 11 shows that 97% of household heads from MHH are married, legally (18%) or traditionally (79%). However, 97% of women from FHH are not married. They are generally separated or divorced (29%), widowed (20%) or never married (48%). More women who head households are widowed in the Center (30%) than in other zones, and more are unmarried in the South (57%) than in other zones.

Table 11: Marital Status of Household Heads (%) by sex, intervention zone and geographic zone

Marital Status	MHH	FHH								Total
		ADRA	CARE	CRS	LOL	Center	South	South East	East	
Legally married	17,9	1,1	0,0	0,8	0,0	0,0	0,0	0,7	1,7	14,8
Traditionally married	79,3	0,9	1,2	1,6	0,4	0,8	0,9	0,8	1,7	65,1
Separated/Divorced	0,6	40,1	35,5	21,0	27,3	29,6	26,7	30,6	28,9	5,8
Widow	1,0	31,3	21,9	14,5	12,8	30,1	13,6	22,3	13,2	4,4
Never married	0,6	26,6	40,8	59,8	59,0	38,5	57,1	44,7	52,2	9,1
Other	0,7	-	0,6	2,4	0,5	-	1,8	0,8	2,2	0,8
TOTAL	100,0									

3.2.2 Economic Activities of SALOHI Households

Households in SALOHI zones live principally in rural areas and are essentially farmers and herders. Data in Table 12 shows that the principal economic activity of SALOHI households is agriculture. 94% of households practice some agricultural activities, and it is the primary economic activity for 35% of household heads. Livestock raising and herding is practiced by 69% of households. 44% of households receive occasional salaried employment (26%) or day labor (18%). Artisanal production is practiced by 18% of households.

Overall, 2876 households cited 7,632 principal economic activities practiced, which shows that many households practice more than one economic activity. On average, SALOHI households practice at least two economic activities (2.6).

The structure of economic activities practiced by SALOHI households does not vary much by the sex of the household head, but it does by geographic zone. Agriculture and livestock are the principal activities in all zones. However, agriculture is relatively more important in the Central Plateau and the East, where it is the principal activity of 97% of households, compared to the South (88%). Animal husbandry is practiced in the Central Plateau, and fishing in the East. Occasional salaried work and day labor are important in all zones, except in the South. Forty three percent of households in the Central Plateau and 56% in the South East mentioned these strategies as an important source of income. In the South, only 5% of households benefit from occasional salaried work.

Table 12: Sources of revenue for SALOHI households and percentage of households which practice each activity

Economic Activities	Response		Percentage of households
	Number	%	
Agriculture	2694	35,3	93,7
Animal husbandry	1980	25,9	68,9
Fishing	252	3,3	8,7
Mining	166	2,2	5,8
Artisanal production	522	6,8	18,2
Butcher	39	0,5	1,4
Commerce	487	6,4	16,9
Day labor	516	6,8	17,9
Occasional salary	740	9,7	25,7
Permanent salary	149	2,0	5,2
Other	87	1,1	3,0
TOTAL	7632	100,0	
Number de ménages	2876		

Table 13: Percentage of households which practice each type of activity, by intervention zone and geographic zone.

Economic Activity	Intervention Zone				Geographic Zone				Total
	ADRA	CARE	CRS	LOL	Center	South	SE	East	
Agriculture	95,6	86,8	96,5	83,0	97,9	88,5	92,4	97,3	93,7
Animal husbandry	73,1	64,9	69,3	55,3	86,4	66,4	62,7	66,6	68,9
Fishing	0,8	24,1	8,7	17,9	--	8,7	8,6	18,1	8,7
Mining	7,7	3,1	6,2	0,1	0,5	0,5	10,7	6,2	5,8
Artisanal production	16,7	20,1	15,9	32,1	24,5	18,7	14,8	18,3	18,2
Bucheron	1,8	2,2	0,5	2,3	3,1	0,7	0,8	1,6	1,4
Commerce	15,2	21,7	14,6	28,0	17,1	24,7	14,7	13,4	16,9
Day labor	13,2	20,6	20,7	20,4	12,9	3,0	26,8	19,8	17,9

Economic Activity	Intervention Zone				Geographic Zone				Total
	ADRA	CARE	CRS	LOL	Center	South	SE	East	
Occasional Salary	41,8	21,0	11,1	35,7	43,5	1,8	32,9	17,2	25,7
Permanent salary	4,9	11,4	3,5	4,6	8,2	8,8	3,3	2,5	5,2
Other	2,9	4,2	2,7	3,4	4,2	4,7	1,5	3,3	3,0
Avg. No. Activities	2,7	2,8	2,5	2,8	3,0	2,3	2,7	2,6	2,6

Principal household expenses include, in descending order, food (97.6% of households), clothes (67.9%), school (47.7%) and health (44.5% of households). 30% of households said they invested and 10% saved part of their income.

Table 14: Responses of Household Heads regarding the use of household revenue.

Type of expense	Responses		Percentage of Households
	Number	Percent	
Food	2805	27,0	97,6
Health	1304	12,6	45,4
School	1372	13,2	47,7
Clothes	1951	18,8	67,9
Housing	134	1,3	4,6
Social	1027	9,9	35,7
Investment	861	8,3	30,0
Savings	280	2,7	9,7
Other	646	0,2	22,5
TOTAL	10380	100,0	
Number de ménages	2876		

3.2.3 Possession of goods, equipment, productive inputs and livestock

A number of items were listed to identify which ones were owned by SALOHI households. This type of information is often used by Demographic Health Surveys and the World Bank to classify households into quintiles of economic well being. Macro and the World Bank have published reports which show that an index calculated using this method allows them to classify households into economic classes. In the present study we found that the use of this technique did not adequately separate households in SALOHI zones into classes based on their economic well being. We used a simplified version, which proved more robust given the rural and generally impoverished nature of SALOHI households. We developed an asset ownership score, which involved simply adding together the number of different types of goods owned, and classifying households based on this information.

Data in Table 15 indicates that, on average, SALOHI households possess at least four of the assets listed. Ownership structure varied little by zone – most households possessed land and a house (80%+), at least one radio, livestock and poultry. There was some specificity based on economic activities – more

households own canoes and fish nets in the East, and pigs and poultry in the Center. More households in the South own cattle (65%), and a much higher percentage own ox carts (37%) and plows (39%).

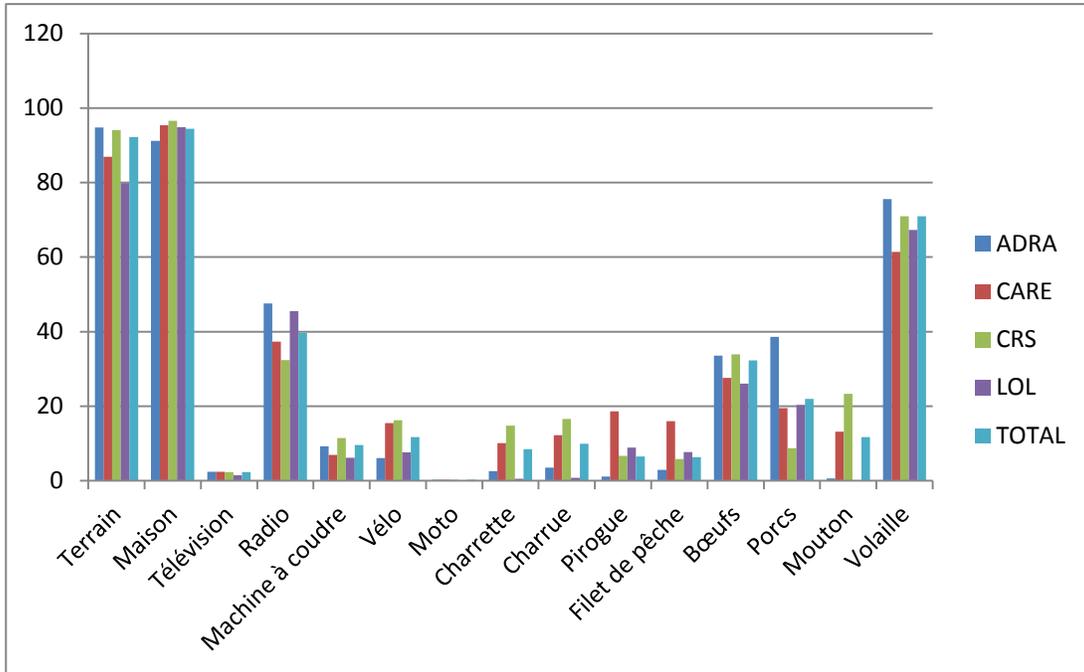
The Household Asset Ownership Score didn't vary much by NGO intervention zone. However, the box plots in Figure 4 show a greater variability in household ownership in CRS and LOL zones, indicating a greater disparity of wealth in these zones. The average number of goods owned per household does vary significantly by geographic zone. The median score is three items for the South East, four items for the East, five for the Central zone and six in the South. The two zones with the highest scores (South and Center) also have more individual household variability (disparity of wealth).

Table 15: Percentage of households who possess various goods, by intervention zone and by geographic zone (Madagascar, 2009).

Goods	Intervention Zone				Geographic Zone				Total
	ADRA	CARE	CRS	LOL	Center	South	SE	East	
Land	94,8	86,9	94,1	79,8	95,5	91,3	90,1	94,0	92,2
House	91,2	95,4	96,6	94,9	88,4	98,4	95,0	94,8	94,4
TV	2,4	2,4	2,3	1,5	3,5	1,7	1,7	3,0	2,3
Radio	47,6	37,3	32,4	45,5	58,9	29,5	37,0	36,4	39,7
Sewing machine	9,2	6,9	11,5	6,2	9,8	9,6	7,3	14,0	9,6
Bicycle	6,1	15,5	16,2	7,6	8,9	27,4	4,6	13,4	11,7
Motorcycle le	0,3	0,3	0,3	0,1	0,5	0,1	0,2	0,5	0,3
Ox cart	2,6	10,1	14,8	0,5	4,8	37,1	0,2	--	8,5
Plow	3,5	12,2	16,6	0,8	6,2	38,8	0,6	3,1	9,9
Canoe	1,1	18,6	6,7	8,9	1,1	4,8	6,4	13,8	6,5
Fish net	2,9	16,0	5,8	7,7	0,3	3,4	8,0	11,7	6,3
Cattle	33,6	27,6	33,9	26,1	47,5	65,5	17,3	14,0	32,3
Pigs	38,6	19,5	8,7	20,3	47,2	3,5	22,3	15,1	22,0
Sheep	0,6	13,2	23,3	--	0,5	56,8	0,4	--	11,7
Poultry	75,6	61,4	71,0	67,3	82,1	68,7	70,2	63,8	71,0
Avg Nbr of goods	4,1	4,2	4,3	3,7	4,6	5,4	3,6	3,8	4,2

Figure 3: Profile of asset ownership by intervention zone (percentage of households who own different types of assets).

a) By NGO



b) By Geographic Zone

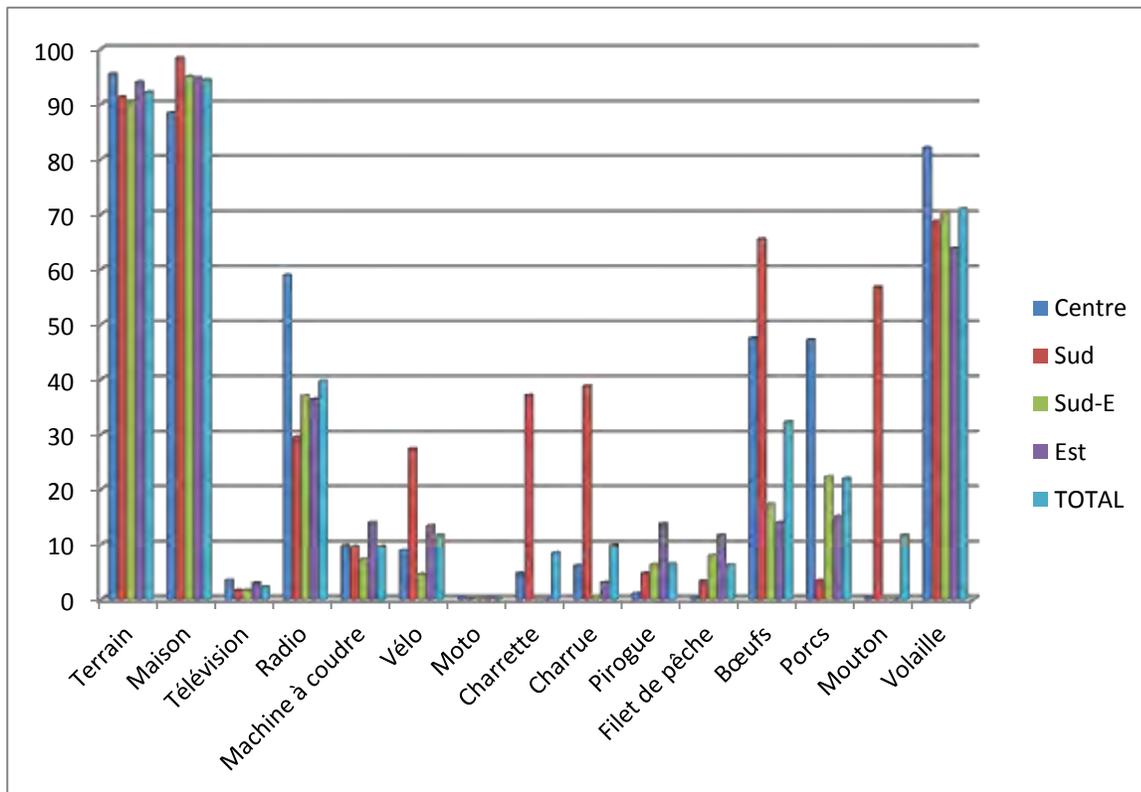
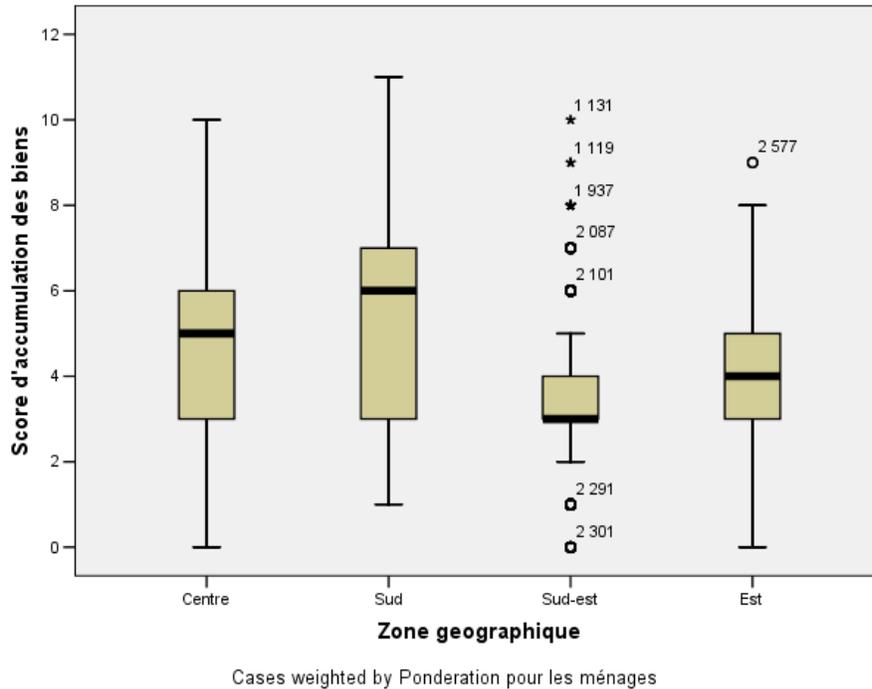
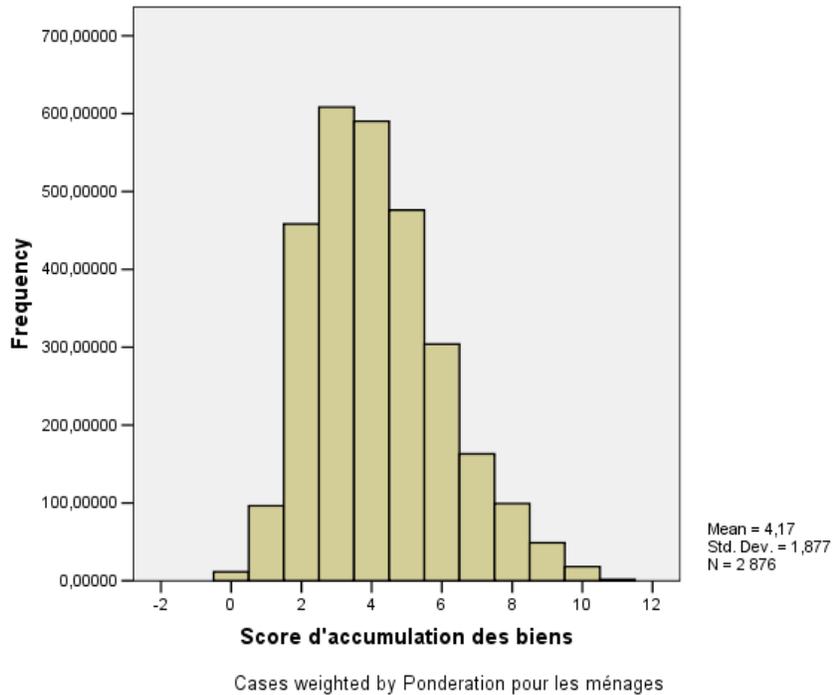


Figure 4: Profile of asset ownership by intervention zone (percentage of households who own different types of assets).



A natural typology into three classes depending on the Household Asset Ownership Score lumps together households in the South East and the East, and separates households in the South and Center. The first group (South East and East) are the poorest, in general; the Center is average, and households in the South the richest (they have more things!). Using the histogram below (Figure 5) we created four groups: the poorest group is composed of households who scored two points out of 15; the second poorest group is composed of households who scored three or four points; the third group is composed of households who scored five or six points, and the richest group includes households who scored seven to 11 points.

Figure 5: Repartition of households by asset ownership (number of types of assets possessed by SALOHI households)



Using the Asset Ownership Score, Female Headed Households are noticeably poorer than those headed by men: 38% of FHH are classified as in the very poor category, vs. 16% of MHH (Table 16). In terms of geographic zones, 75% of households in the South East are classified as very poor or poor (the highest percentage of FHH are also located in the South East). Similarly, 69% of households in the East are also classified as poor or very poor. Paradoxically, although the Southern part of Madagascar is usually considered the poorest part of the country (especially when evaluated in terms of the health and nutrition status of the population), using the ownership of assets as a criteria or indicator of wealth, 63% of households in the South are classified as well off or richest. This might indicate that households in the South are more willing to invest in productive resources, or have access to productive resources that could be mobilized to support program objectives.

Table 16: Profiles of household economic well being, by Head of Household, NGO intervention zone and geographic zone.

	Very poor	Poor	Well off	Most well off	TOTAL	Number of Households
Head of HH						
MHH	15,5	41,1	29,6	13,8	100,0	2341
FHH	38,1	44,3	16,1	1,5	100,0	533
NGO Zone						
ADRA	19,0	42,3	31,0	7,7	100,0	1040
CARE	20,3	39,3	27,2	13,2	100,0	394
CRS	18,5	41,4	24,1	16,0	100,0	1188
LOL	26,9	43,9	26,1	3,2	100,0	253
Geographic Zone						
Center	11,0	38,2	39,8	11,1	100,0	566
South	13,4	23,5	29,2	33,9	100,0	575
South East	24,6	50,9	20,9	3,7	100,0	1176
East	24,7	44,7	25,2	5,4	100,0	559
Total	19,7	41,7	27,2	11,5	100,0	2875

Section 4: Nutritional Status of Children Under Five

The first Strategic Objective (SO) of SALOHI is to improve the health and nutritional status of children under five, through the adoption of improved nutrition and disease prevention practices. Two impact indicators will be used to measure this objective – the percentage of children 6 – 59 months of age who suffer from stunting (chronic malnutrition), and the percentage of children 0 – 59 months of age who are underweight. In this section we will present the current levels for these two key indicators, and analyze their differences by zone and by HH type. We will also present information collected regarding nutritional and disease prevention knowledge, attitudes and practices. Finally, we will explore the relationship between these two groups of indicators: the nutritional status of children (as a dependent variable) and nutritional practices and disease prevention practices of mothers and care givers (as an independent variable, or explanatory variable).

4.1. Sample of children under five, calculation of nutrition parameters and references used.

The baseline survey includes data on the sex, age, height, weight and middle upper arm circumference (MUAC) of all children aged 0 – 59 months of age in households surveyed. A total of 3876 children under five were included in the survey.

Table 17: Total number of children under five included in the anthropometric survey (non weighted).

Zones	NGO intervention zone				Geographic Zone				Total
	ADRA	CARE	CRS	LOL	Center	South	South-East	East	
Total (non weighted)	823	981	1076	996	453	1041	1746	634	3876
Total (weighted)	1202	519	1797	358	635	978	1584	678	3876

We used WHO Anthro software to calculate nutritional parameters of children in households surveyed. This software allowed us to calculate values using the NCHS 1978 standards as well as the new WHO growth standards. The new growth standards were developed using a reference population of breastfed (not bottle fed) children from six countries (Ghana, India, Brazil, Oman, Norway and the USA). In general, using the new growth standards results in slightly higher malnutrition rates than the NCHS standards⁵. Using both standards allowed the SALOHI team to compare results to previous surveys (using NCHS) and to future surveys (using WHO). To calculate sampling errors and confidence intervals in a complex sample, nutritional data was analyzed using CSample in Epi Info. As a result, the values in our IPTT are based on NCHS standards. Values using both standards are included in Table 18.

⁵ In the case of the SALOHI baseline, using the new WHO growth standards resulted in lower rates of underweight (29% vs. 34.5% for NCHS) and higher rates of stunting (50.2% vs. 44.4% for NCHS).

4.2. Chronic malnutrition (stunting) in children 6-59 months of age

Data in Table 18 indicates that 44% of children aged 6 – 59 months of age in the target zone suffer from chronic malnutrition (height/age > -2 SD). Stunting levels vary by target zones and geographic zones. Stunting rates are higher in the Central Plateau (64%; NCHS). However, it is difficult to compare this result to other geographic zones because the number of children sampled is much smaller than the other zones, especially when we separate boys from girls (218 boys and 192 girls). As a result, the confidence interval is larger, indicating that the value can vary from 56% to 72% (in any case, it is higher than all other zones surveyed). After the Central Plateau, the area with the highest percentage of children suffering from stunting is the South East (48%) followed by the East (43%). Children in the South are the least affected (28%).

Table 18: Percentage of children 6 – 59 months suffering from stunting (Height/Age < - 2 SD), by sex, intervention zone, and geographic zone, using a 95% Confidence Interval (CI) (SALOH zones, Madagascar, 2009).

Zones	Sex	Height/Age<-2 SD (NCHS)			Height/Age<-2 SD (WHO 2005)		
		Value	CI 95 %		Value	CI 95 %	
			Lower limit	Upper limit		Lower Limit	Upper limit
ADRA (n = 742)	Girls	53,6	46,5	60,8	58,1	50,9	65,3
	Boys	59,3	51,9	66,7	65,7	59,3	72,2
	Total	56,6	50,4	62,7	62,1	56,6	67,6
CARE (n = 908)	Girls	41,3	34,9	47,7	46,8	39,7	53,9
	Boys	47,5	41,0	53,9	55,4	48,6	62,3
	Total	44,4	38,8	50,0	51,2	45,1	57,3
CRS (n = 928)	Girls	32,9	27,7	38,2	36,7	31,4	41,9
	Boys	38,1	30,2	45,9	44,9	37,0	52,8
	Total	35,6	29,8	41,5	41,0	35,1	46,8
LOL (n = 888)	Girls	43,3	38,3	48,3	50,7	45,4	56,0
	Boys	48,2	43,7	52,7	56,0	51,7	60,4
	Total	45,9	42,0	49,7	53,5	49,7	57,2
Center (n = 410)	Girls	61,7	53,5	69,9	66,6	59,1	74,1
	Boys	66,6	56,3	76,9	70,9	61,6	80,1
	Total	64,2	56,4	72,1	68,9	61,8	75,9
South (n = 976)	Girls	27,3	22,1	32,5	30,9	26,0	35,8
	Boys	29,0	21,6	36,4	36,4	28,2	44,6
	Total	28,2	23,0	33,3	33,8	28,6	39,0
South East (n = 1528)	Girls	43,0	38,0	48,1	47,7	41,9	53,5
	Boys	51,9	47,5	56,2	59,1	54,9	63,3
	Total	47,6	43,9	51,2	53,5	49,9	57,2

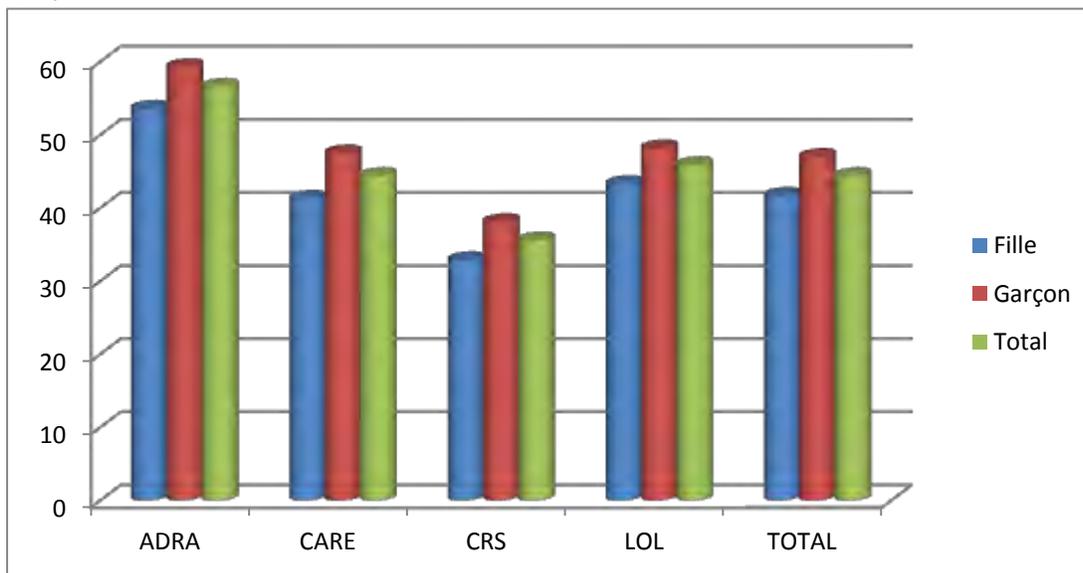
Zones	Sex	Height/Age<-2 SD (NCHS)			Height/Age<-2 SD (WHO 2005)		
		Value	CI 95 %		Value	CI 95 %	
			Lower limit	Upper limit		Lower Limit	Upper limit
East (n = 552)	Girl	41,5	36,1	47,0	46,8	39,9	53,7
	Boy	44,4	35,2	53,6	52,6	44,3	61,0
	Total	43,0	36,3	49,8	49,9	43,2	56,6
TOTAL	Girl	41,7	38,7	44,6	46,2	43,1	49,3
	Boy	47,0	42,3	51,6	53,9	49,3	58,4
	Total	44,4	41,4	47,5	50,2	47,3	53,2

* Levels calculated from a limited sample: 218 Boys and 192 Girls.

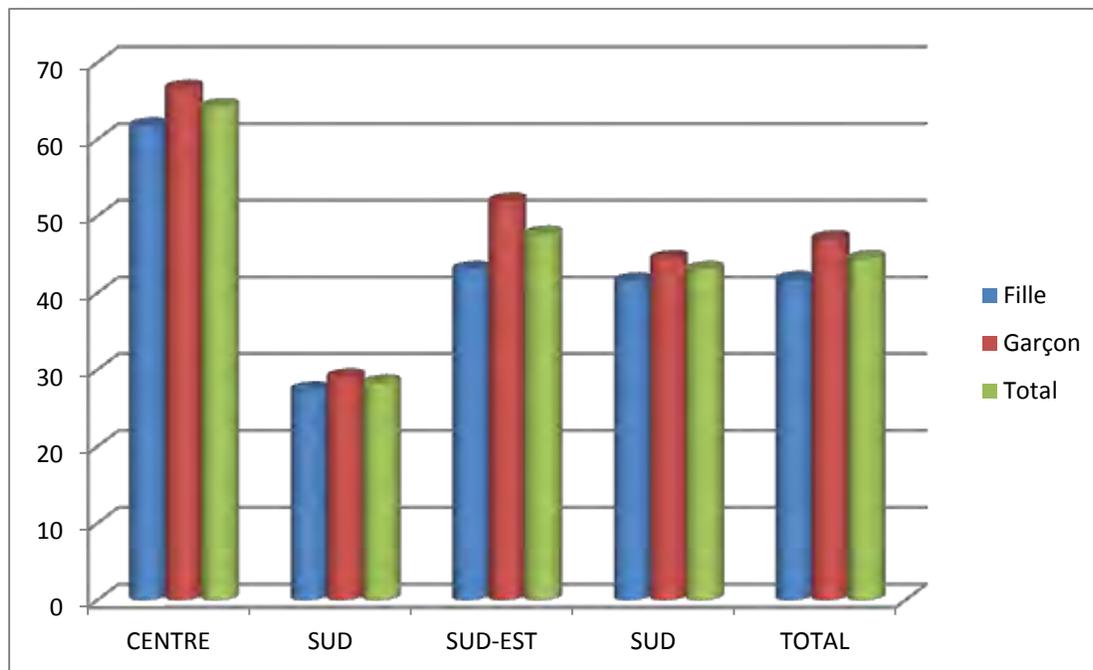
In all geographic zones and NGO intervention zones, stunting affects more boys than girls. On average, 47% of boys suffer from stunting, compared to 42% of girls of the same age.

Figure 6: Percentage of children 6-59 months of age who suffer from stunting (Height/Age < -2SD), by sex, NGO intervention zone (a) and by geographic zone (b) (SALOHI, Madagascar, 2009)

a) By NGO intervention zone



b) By Geographic Zone



4.3. Underweight (Weight/Age) in children 0-59 months of age

Table 19 indicates the percentage of children under five who are underweight for their age (using both NCHS and WHO standards). On average, 29% (WHO) - 35% (NCHS) of children under five years of age living in SALOHI zones suffer from underweight. The geographic variation of underweight follows that of stunting – it is highest in the Center (46%), followed by the South East (39%), the East (29%) and the South (23%). Boys are more likely to suffer from underweight (36%) than girls (33%) in all geographic zones, but the differences are slightly less than those for stunting.

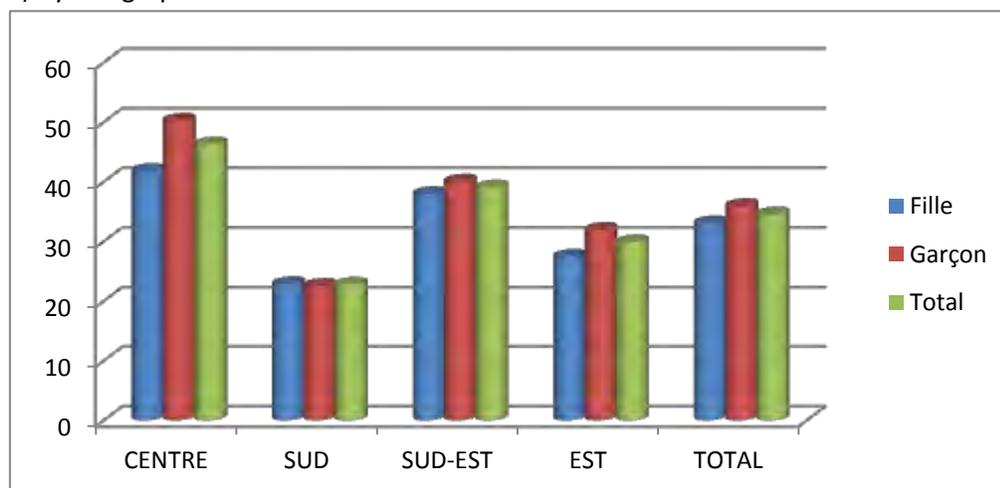
Table 19: Percentage of children 0-59 months of age suffering from underweight (W/A < - 2 SD), by sex, Intervention Zone and Geographic Zone (with 95% confidence intervals).

Zones	Sex	Weight/Age (NCHS)			Weight/Age(WHO 2005)		
		Value	CI 95 %		Value	CI 95 %	
			Lower limit	Upper limit		Lower limit	Upper limit
ADRA (n = 823)	Girl	40,9	35,3	46,5	34,0	28,8	39,1
	Boy	47,1	41,3	52,9	39,6	34,1	45,4
	Total	44,1	39,4	48,8	36,9	32,7	41,1
CARE (n = 981)	Girl	34,9	28,6	41,2	26,3	19,3	33,4
	Boy	32,2	27,8	36,7	28,2	24,1	32,4
	Total	33,5	29,2	37,8	27,3	22,7	31,9
CRS	Girl	25,6	20,3	30,9	22,1	16,5	27,7

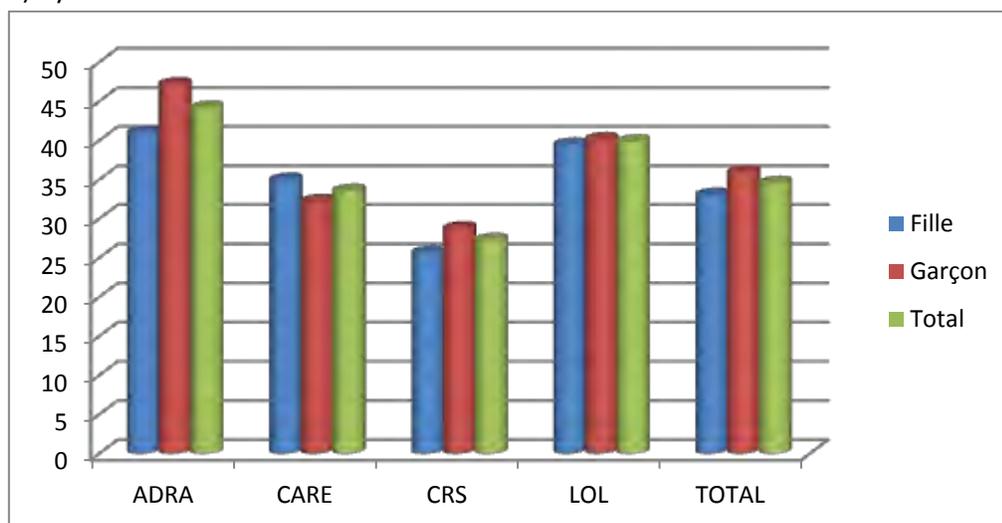
Zones	Sex	Weight/Age (NCHS)			Weight/Age(WHO 2005)		
		Value	CI 95 %		Value	CI 95 %	
			Lower limit	Upper limit		Lower limit	Upper limit
(n = 1076)	Boy	28,7	23,3	34,1	25,4	19,0	31,7
	Total	27,2	22,5	31,9	23,8	18,4	29,3
LOL (n = 996)	Girl	39,4	34,8	43,9	31,8	27,8	35,8
	Boy	40,1	35,5	44,7	33,6	30,1	37,0
	Total	39,8	36,6	42,9	32,7	30,2	35,2
CENTER* (n = 453)	Girl	41,8	32,9	50,6	33,8	25,8	41,8
	Boy	50,2	42,2	58,2	43,5	36,5	50,6
	Total	46,2	39,5	52,9	38,9	33,3	44,5
SOUTH (n = 1041)	Girl	22,8	17,2	28,4	17,8	12,8	22,8
	Boy	22,5	17,2	27,7	16,5	11,6	21,4
	Total	22,7	17,9	27,4	17,1	12,9	21,3
SOUTH-EAST (n = 1746)	Girl	37,9	33,8	42,1	32,3	27,7	37,0
	Boy	40,0	35,5	44,6	35,9	31,7	40,1
	Total	39,0	35,7	42,3	34,1	30,7	37,5
EAST (n = 634)	Girl	27,4	20,8	34,1	23,1	14,3	31,9
	Boy	31,9	25,3	38,5	28,2	20,3	36,1
	Total	29,8	24,8	34,8	25,8	18,6	33,0
TOTAL	Girl	33,0	30,3	35,7	27,4	24,2	30,5
	Boy	35,9	32,3	39,4	30,9	27,4	34,4
	Total	34,5	31,8	37,2	29,2	26,3	32,1

Figure 7: Percentage of children under five years of age who are underweight (Weight/Age <-2SD), by sex, Geographic Zone (a) and NGO Intervention Zone (b)(NCHS)

a) By Geographic Zone



b) By NGO Intervention Zone



4.4 Acute malnutrition

Acute malnutrition is calculated by comparing the weight of a child to their height. When a child suffers from low weight for height (Z score more than two standard deviations from the mean) it is considered acutely malnourished. Acute malnutrition is generally an indication of a sudden change in food security status, usually in the short term. Data in Table 20 indicates that 8 (NCHS) – 9% (WHO) of children in SALOHI zones are acutely malnourished. Acute malnutrition is slightly higher in CRS zones [9.8 (NCHS) – 10.7% (WHO)] than in other NGO intervention zones, and slightly less in the Central Plateau [5.1 (NCHS) – 5.4% (WHO)]. There is no statistically significant difference between the acute malnutrition rates in ADRA, CARE, and LOL zones, or the East, South East and South (NCHS).

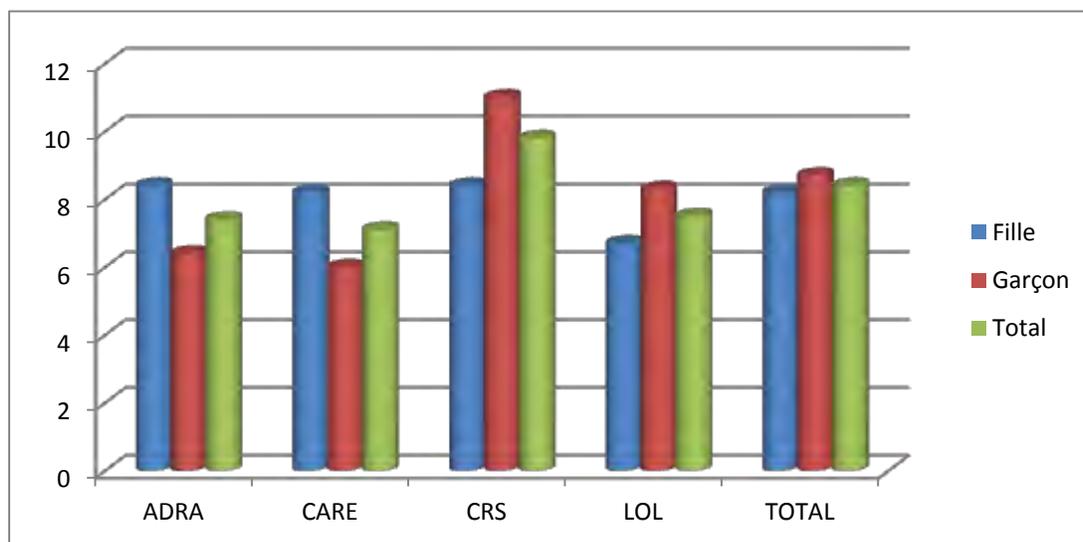
Table 20: Percentage of children 0 – 59 months who are acutely malnourished, by sex, NGO intervention zone and geographic zone.

Zones	Sex	Weight/Height (NCHS)			Weight/Height (WHO)		
		Value	CI 95 %		Value	CI 95 %	
			Lower Limite	Upper Limit		Lower Limite	Upper Limit
ADRA (n = 823)	Girls	8,4	5,4	11,4	8,1	5,0	11,2
	Boys	6,4	3,2	9,6	8,1	4,2	12,0
	Total	7,4	5,0	9,7	8,1	5,1	11,1
CARE (n = 981)	Girls	8,2	4,9	11,5	9,5	6,2	12,7
	Boys	6,0	3,5	8,6	8,0	4,8	11,3
	Total	7,1	5,0	9,4	8,7	6,4	11,1
CRS (n = 1076)	Girls	8,4	5,8	10,9	9,4	6,7	12,0
	Boys	11,0	8,0	14,0	11,9	8,3	15,5
	Total	9,8	7,5	12,0	10,7	8,1	13,3
LOL	Girls	6,7	4,2	9,0	8,1	5,2	11,1

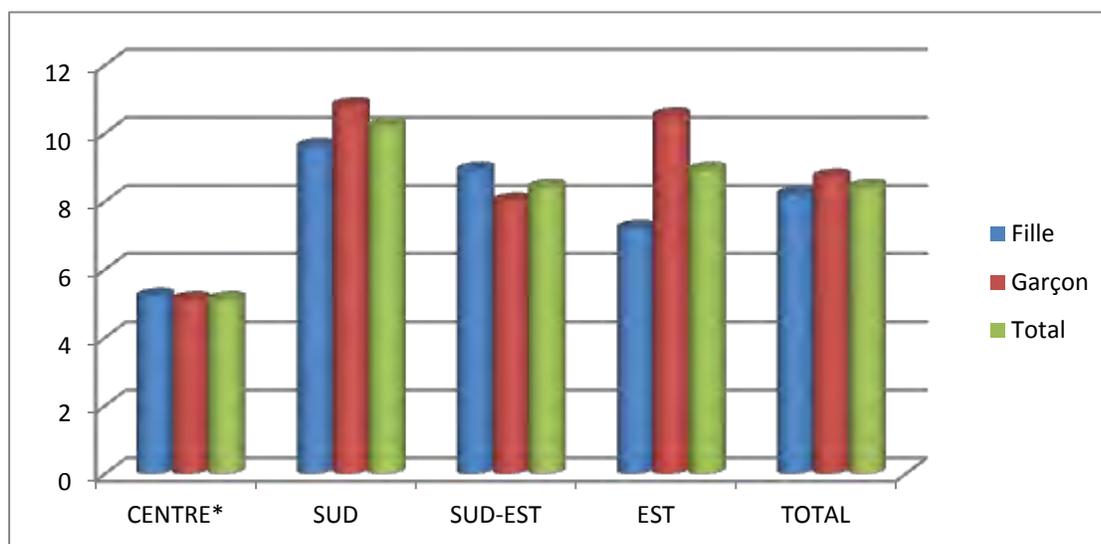
Zones	Sex	Weight/Height (NCHS)			Weight/Height (WHO)		
		Value	CI 95 %		Value	CI 95 %	
			Lower Limite	Upper Limit		Lower Limite	Upper Limit
(n = 996)	Boys	8,3	5,7	10,9	10,3	7,6	13,0
	Total	7,5	5,6	9,4	9,2	7,1	11,4
CENTER* (n = 453)	Girls	5,2	2,8	7,6	5,2	2,7	7,8
	Boys	5,1	1,7	8,4	5,5	1,5	9,5
	Total	5,1	3,2	7,0	5,4	2,9	7,8
SOUTH (n = 1041)	Girls	9,6	6,8	12,4	8,8	6,1	11,5
	Boys	10,8	7,5	14,1	9,2	5,7	12,7
	Total	10,2	7,8	12,6	9,0	6,7	11,3
SOUTH EAST (n = 1746)	Girls	8,9	6,1	11,7	9,8	7,0	14,4
	Boys	8,0	5,7	10,3	11,1	7,9	14,4
	Total	8,4	6,6	10,3	10,5	8,0	13,1
EAST (n = 634)	Girls	7,2	3,6	10,7	10,0	5,2	14,9
	Boys	10,5	4,7	16,2	13,1	5,4	20,7
	Total	8,9	5,3	12,6	11,6	6,1	17,2
TOTAL	Girls	8,2	6,6	9,8	8,9	7,2	10,5
	Boys	8,7	6,8	10,5	10,0	7,7	12,4
	Total	8,4	7,2	9,7	9,5	7,8	11,1

Figure 8: Percentage of children 0-59 months of age who are acutely malnourished, by NGO intervention zone and by Geographic Zone. (NCHS)

a) By NGO zone



b) By Geographic Zone



4.5: Malnutrition Rates by Age

Many studies have indicated that the nutritional status of children varies with age. However, the exact relationship between age and nutritional status, and the moment when most children falter and become malnourished has significant programmatic implications. Data in Table 21 presents malnutrition data by age group for children under 5 in SALOHI zones, indicating that malnutrition levels in children living in SALOHI zones peak at 24 months of age.

Table 21: Malnutrition status by age. Percentage of children 0 – 59 months of age who are underweight (WAZ <-2 SD), stunted (HAZ <-2SD) or acutely malnourished (W/H <-2 SD), by age group and nutritional standard.

Age Group	NCHS			WHO			Number of children
	WAZ	HAZ	W/H	WAZ	HAZ	W/H	
0-5 months	5,6	10,4	4,5	13,2	16,6	12,4	356
6-11 months	26,8	26,8	10,0	25,1	30,3	17,3	399
12-23 months	37,4	45,3	11,7	25,6	48,7	8,5	836
24-59 months	40,0	47,0	6,5	33,7	54,4	7,4	2032
TOTAL	34,6	40,8	7,9	28,9	46,7	9,2	3623

Figure 9: Malnutrition level by age group (NCHS and WHO).

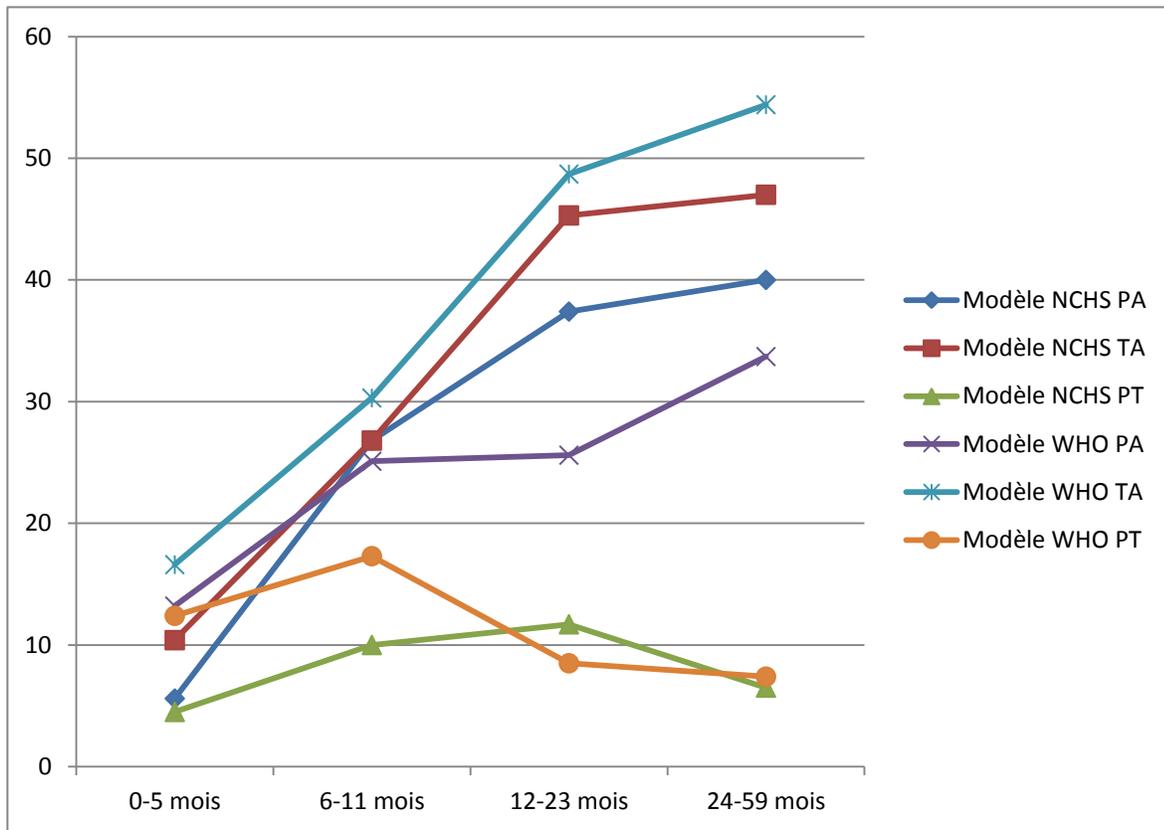


Figure 9 shows that chronic malnutrition and underweight get progressively worse with age, reaching a peak at 24 – 59 months of age, regardless of the nutritional reference standard used (NCHS or WHO). Acute malnutrition, on the other hand, reaches a peak in children 12 – 24 months of age (NCHS) or earlier (6 – 11 months of age using WHO standards). In general, there is no clear trend in the data to correlate NCHS results with WHO results (sometimes results are higher, and sometimes they are lower).

4.6. Children’s nutritional status. Waterlow Analysis

The Waterlow table crosses two nutritional status indicators (weight/height and height/age) to classify children into four groups depending on their nutritional status: normal nutritional status, stunting only, acute malnutrition only, or both stunting and acute malnutrition. This classification has practical implications, because it facilitates the prioritization of medical interventions. Children suffering from stunting are generally in less need of immediate medical attention than children suffering from acute malnutrition. However, children who suffer from both acute malnutrition and stunting require immediate care. Data in Table 22 and Figure 10 show the results of this classification for all children surveyed in SALOHI zones, using this analytical tool.

Figure 10: Nutritional status of children 0-59 months of age, by Waterlow classification

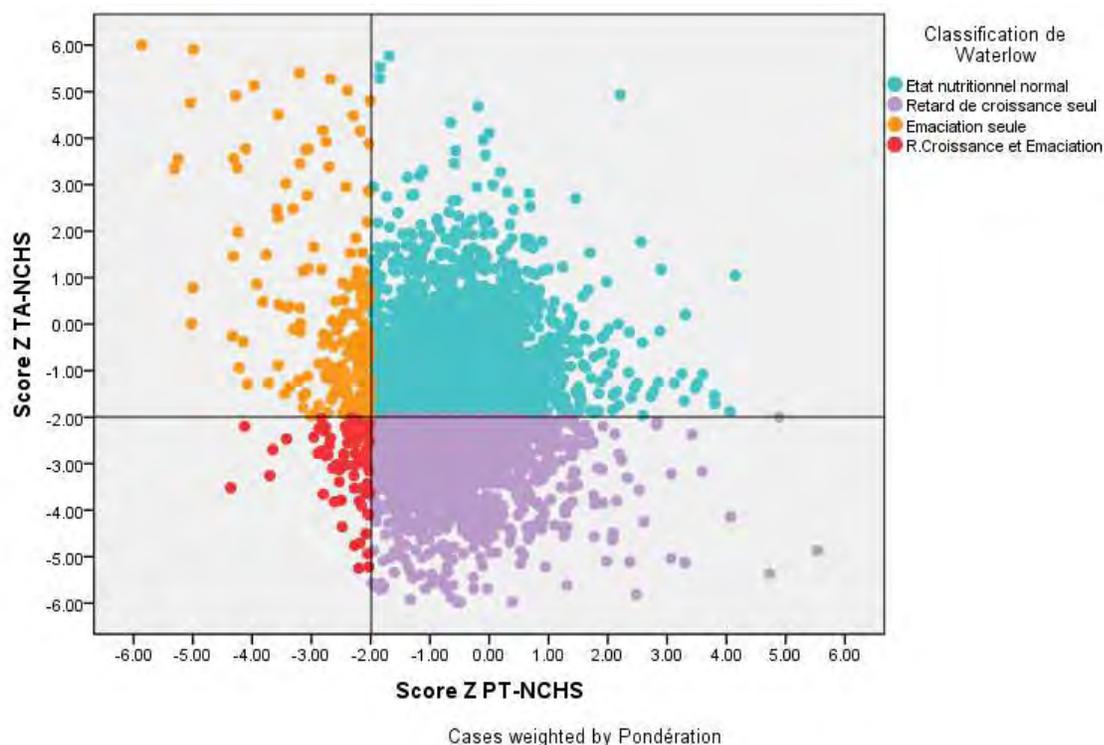
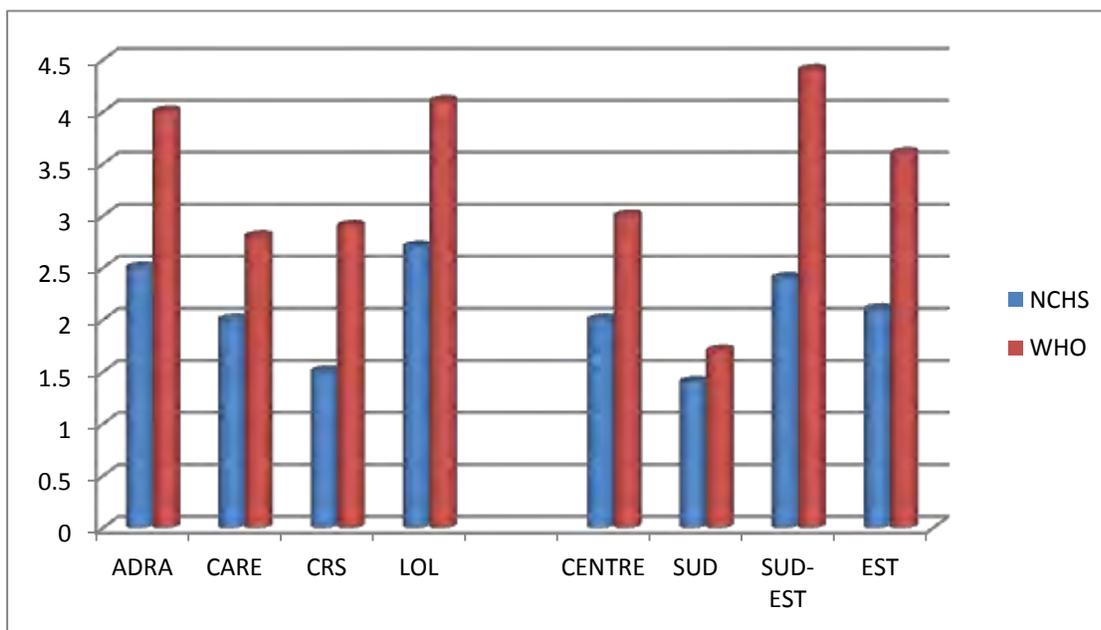


Table 22: Distribution of children aged 0 – 59 months of age, by nutritional status (stunting and acute malnutrition), using the Dr. Waterlow table, by NGO intervention zone and Geographic Zone.

Zones	Nutritional Status				Number of children 0 – 59 months of age
	Neither stunted nor acutely malnourished	Stunting only	Acute malnutrition only	Both stunted and acutely malnourished	
NCHS					
ADRA	42,5	50,1	4,9	8,5	1160
CARE	52,5	40,2	5,2	2,0	497
CRS	59,3	30,9	8,3	1,5	1692
LOL	52,8	39,8	4,7	2,7	339
Total	52,5	39,0	6,5	2,0	3688
WHO					
ADRA	37,8	54,0	4,1	4,0	1160
CARE	45,4	46,0	5,8	2,8	497
CRS	53,9	35,4	7,6	2,9	1692
LOL	45,0	45,6	5,3	4,1	339
Total	46,8	43,7	6,2	3,3	3688

Zones	Nutritional Status				Number of children 0 – 59 months of age
	Neither stunted nor acutely malnourished	Stunting only	Acute malnutrition only	Both stunted and acutely malnourished	
NCHS					
CENTER	37,3	57,8	3,0	2,0	609
SOUTH	65,1	25,2	8,2	1,4	915
SOUTH EAST	51,8	40,0	5,7	2,4	1487
EAST	55,0	37,1	5,9	2,1	615
Total	53,3	38,8	5,9	2,0	3626
WHO					
CENTER	33,1	61,6	2,3	3,0	609
SOUTH	60,5	30,6	7,1	1,7	915
SOUTH EAST	45,3	44,3	5,9	4,4	1487
EAST	47,1	41,9	7,3	3,6	615
Total	47,4	43,4	5,8	3,4	3626

Figure 11: Percentage of children 0 – 59 months of age who suffer from both chronic malnutrition (stunting) and acute malnutrition, by NGO intervention zone and Geographic Zone, using NCHS and WHO reference standards.



The percentage of children under five who suffer from both chronic and acute malnutrition in SALOHI zones is roughly 2% (NCHS) – 3.4% (WHO). It varies considerably by geographic zone, especially in the South which has the lowest rate, and the South East, which has the highest.

4.7. Nutritional Practices and Mother and Child Feeding Practices

The nutritional practices and eating habits of pregnant women and children are considered as two of the principal determining factors which affect the nutritional status of children under five. The SALOHI results framework identifies several nutritional practices which have an important impact on malnutrition, including immediate (within one hour of birth) and exclusive breastfeeding for six months. In addition, the quality and quantity of complimentary foods given to children after they have reached six months of age are critical to meet their nutritional needs, once mothers' milk is no longer sufficient. These practices are explored in detail in the following section, before we explore the relationship between the nutritional status of children under five and each of these practices.

4.7.1 Breastfeeding Practices

Immediate breastfeeding ensures children receive immunizing colostrum, which provides protection and essential nutrients to new born children. Exclusive breastfeeding during the first six months of a child's life ensures that children are less exposed to contaminants and disease pathogens that come from contaminated water and other food sources, and ensures children receive all the essential vitamins and nutrients required for growth during this fragile period.

For each child under two years of age, survey staff asked mothers if they breastfed the child since it was born. If the child had been breastfed, the survey team asked how long after the baby was born it received mother's milk. Finally, the survey team asked if the mother if the child had received other liquids or solids, other than breast milk, since the baby was born, or in the day preceding the survey. Responses to these questions allowed the team to appreciate breastfeeding practices in target zones.

The results in Table 23 show that the great majority of children under two (92%) are breastfed. Children in the South East and the East (89%) are less frequently breastfed than children in the Center (95%) and South (97%). Women with higher levels of education practice breastfeeding slightly more often (94%) than women with less education (91%). There is no difference in breastfeeding practice by age of the mother.

Table 23: Percentage of children under two years of age who were breastfed, percentage of children 0-6 months who were breastfed in the first hour of birth, and the percentage of children 0 – 6 months of age who were exclusively breastfed since birth, and the day before the survey.

Zones Characteristics of Mothers	Children 0 – 24 months	Children 0 – 6 months			Number of children under six months of age
	Breastfed	Breastfed within one hour of birth	Exclusively breastfed		
			Since birth	In last 24 hours	
Geographic Zone					
Center	95,3	84,4	57,0	57,5	
South	97,5	78,3	25,6	26,1	
South-East	89,2	70,4	67,6	67,3	

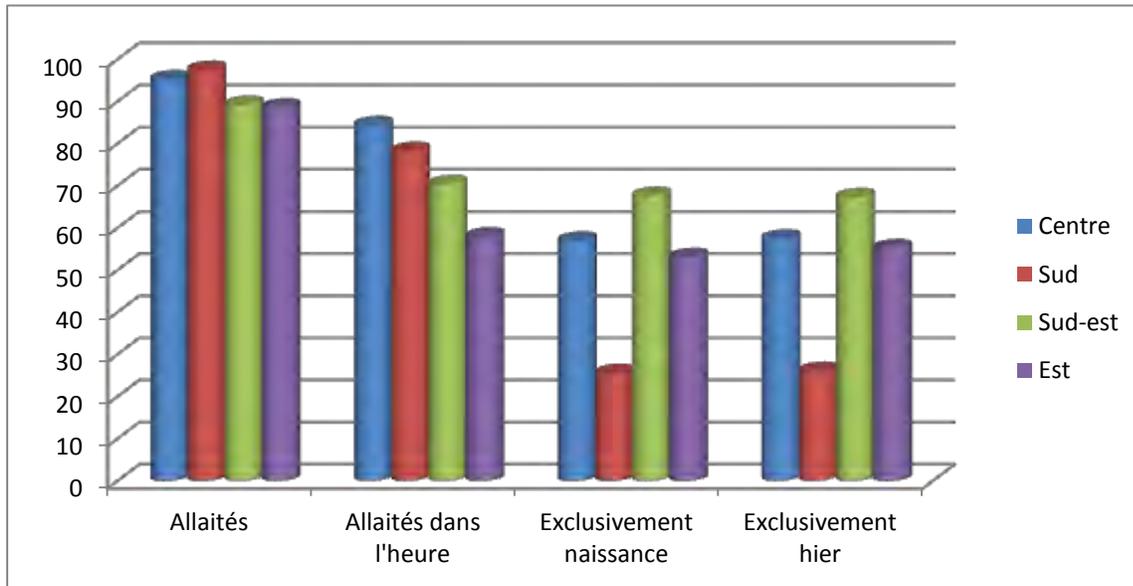
Zones Characteristics of Mothers	Children 0 – 24 months	Children 0 – 6 months			Number of children under six months of age
	Breastfed	Breastfed within one hour of birth	Exclusively breastfed		
			Since birth	In last 24 hours	
East	88,6	58,0	53,1	55,2	
NGO Intervention Zone					
ADRA	93,2	79,7	64,5	63,6	
CARE	95,9	62,0	52,4	47,8	
CRS	90,7	70,6	52,2	52,6	
LOL	91,6	60,3	50,7	59,2	
Instruction level of mother					
None	91,1	65,2	43,6	43,6	
Primary school	92,3	74,1	65,6	66,7	
Secondary School +	94,4	79,0	53,9	52,3	
Age of mother					
15-19	88,5	59,5	53,9	49,7	
20-24	93,4	75,5	53,4	52,0	
25-29	93,5	72,1	58,3	61,4	
30-34	93,0	73,9	50,7	52,9	
35-39	88,7	75,4	61,6	64,1	
40-44	93,4	58,5	69,5	73,1	
45-49	93,7	69,7	-	-	
Total	92,1	71,2	55,4	55,8	

Approximately 71% of children 0 – 6 months of age were breastfed within an hour of birth. This varied considerably by geographic zone (highest in the Central Plateau – 84% - and lowest in the East – 58%), and NGO intervention zone (highest in ADRA zones, which include the Central Plateau – 79%, and lowest in LOL and CARE zones – 60 to 62%). This has an impact on NGO and SALOHI final targets, as well as the potential of the program to affect significant improvements in this indicator, which is already quite high.

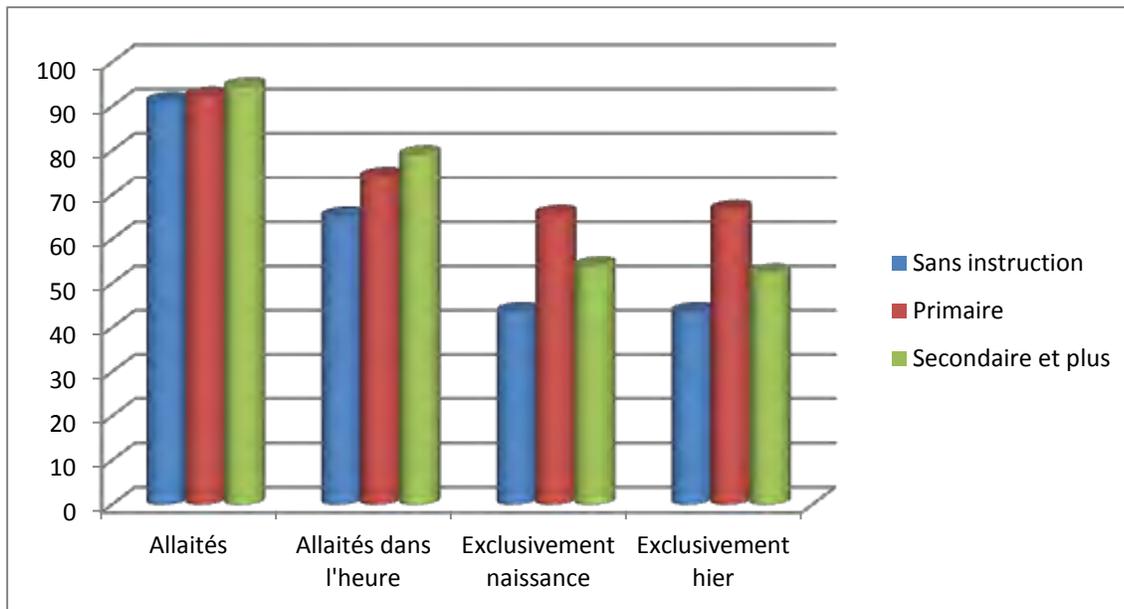
In terms of the characteristics of mothers and their impact on nutrition practices, women who are more educated tend to practice immediate breastfeeding within one hour of birth more often than women with less education (79% of women with secondary education, 74% of women with primary education only, and 65% of women without any formal education practice immediate breastfeeding). Women who are younger (15 – 19 years of age) and older (40 years +) are less likely to practice immediate breastfeeding than women who are middle aged (20 – 39 years of age).

Figure 12: Percentage of children under five years of age who were breastfed, the percentage of children 0 – 6 months of age who were immediately breastfed, and the percentage who are exclusively breastfed.

a) By Geographic Zone



b) By Educational Level (without instruction, primary school, secondary plus)



More than half of children 0 – 6 months of age were exclusively breastfed (55%) since birth as well as the day before the survey. This practice varies considerably by NGO Intervention Zone (64% in ADRA zones vs. 51 – 52% in CRS, CARE and LOL zones) as well as Geographic Zone (68% in the South East, 57% in the Central Plateau, 53% in the East and 26% in the South). Women with primary schooling are much more likely to practice exclusive breastfeeding than either women with no schooling (65.6% vs. 43.6% respectively), or

women with secondary schooling (53.9%). Older mothers (40+) are more likely to practice exclusive breastfeeding than younger mothers (69.5% vs. 50.7%).

Mothers who do not practice exclusive breastfeeding give a number of different liquids and solid foods to their children, including water, coffee, and rice water (Table 24).

Table 24: Percentage of women who give liquids other than breast milk to children 0 – 6 months of age, by type of liquid given in the 24 hour period before the survey.

Type of liquid	NGO Intervention Zone				Geographic Zone				Total
	ADRA	CARE	CRS	LOL	Center	South	South- East	East	
Water	10,4	31,0	26,9	11,8	13,3	61,3	7,7	22,2	21,5
Sugar water	4,8	6,3	5,0	5,5	8,1	1,9	2,8	11,8	5,2
Rice water	22,7	15,6	19,0	12,3	23,6	15,1	16,3	26,0	19,0
Fruit juice	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Tea	3,1	4,8	4,6	4,9	6,2	2,4	3,0	7,6	4,3
Fresh milk	2,1	2,9	0,0	1,6	1,7	0,9	1,0	0,5	1,0
Powder milk	0,0	1,2	3,2	1,3	0,0	0,0	1,7	5,9	2,0
Coffee	13,2	11,6	8,3	4,8	10,2	0,0	14,1	7,5	9,6
Other liquid	0,9	10,4	4,9	2,9	0,0	10,2	2,9	4,3	4,2
No. of women	136	49	280	48	68	96	243	105	513

Most women who give any liquid to children under six months of age give them simple water (22 %), rice water (19%) or sugar water (5%). A surprising percentage of mothers give their children tea or coffee (14%). Many people, including people with high levels of education, do not believe it is possible for infants to survive on breast milk alone for six months. Because of the small number of cases (513), it is difficult to make comparisons between zones. However, there appears to be a tendency to introduce simple water more often in the South (61%), sugar water in the East (12%) and rice water in the Center (24%) and East (26%). There is a significant percentage of “other” liquid given to children under six months of age in the South, which needs to be explored.

These same tendencies are maintained when we analyze liquids given to children under two years of age. However, the percentage of children given coffee increases to 30%, and is much higher in the Center and South –East (41%) and lower in the East (32%) and almost nonexistent in the South (2%).

4.7.2 Complimentary Feeding Practices

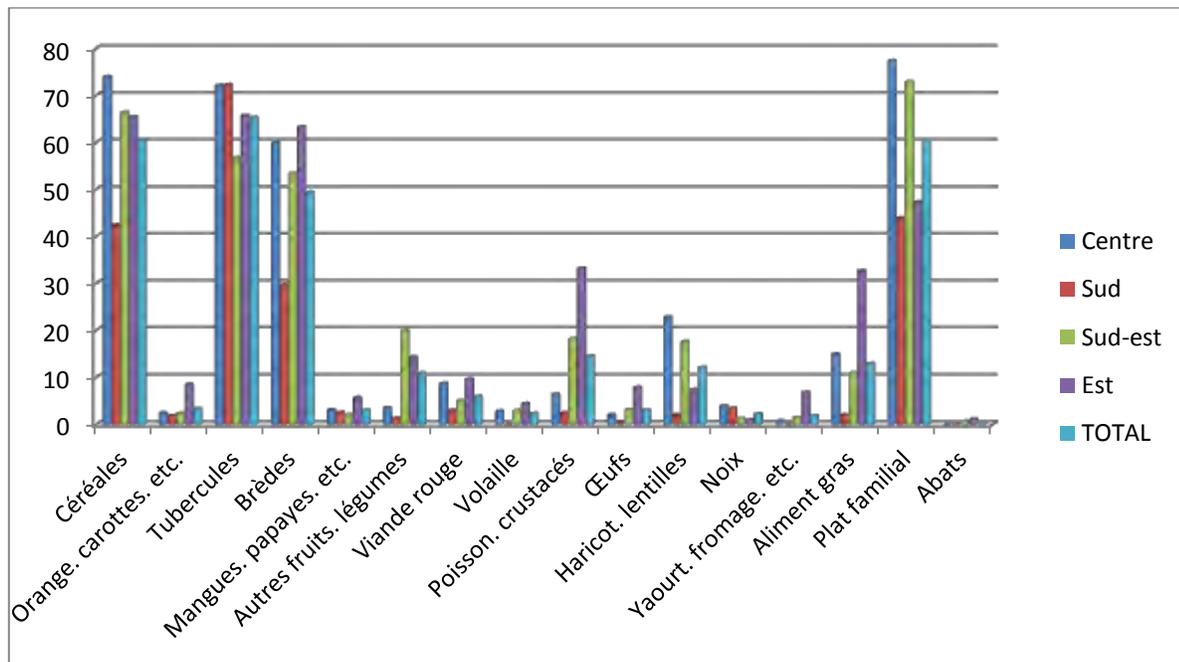
The nutritional status of many children starts to decline between 6 – 24 months of age. During this time, breast milk is no longer sufficient to sustain child growth, and mothers must introduce appropriate quantities and types of complimentary foods to ensure adequate nutrition, while maintaining adequate breastfeeding. Baseline data indicates that breastfeeding is practiced even after 24 months; 91% of children are breastfed for 12 – 18 months, and 68% are breastfed at 18 – 24 months of age.

The introduction of semi-solid foods in children begins as early as two months of age. For children under six months of age, the most common foods given include cereals (19%) and tubers (11%), and to a lesser degree, a portion of the family meal (7%). In older children (6 – 24 months of age), the most common foods given include tubers (65%), cereals (61%), a portion of the family meal (61%) and greens (50%). Very few mothers report giving fish (15%), beans (12%), fats (13%), fruits or vegetables (11%), or meat (6%) to their children.

Table 25: Percentage of women who give solid foods to children 0 – 6 months or 6 – 24 months of age, by type of food consumed the day before the survey.

Type of solid food given in the 24 hour period before the survey	Percent of children 0-6 months	Children 6 – 24 months of age				Total
		Center	South	South-East	East	
Cereals	19,0	74,1	42,5	66,5	65,6	60,6
Oranges, carrots, etc.	0,4	2,5	1,9	2,4	8,6	3,4
Tubers	11,3	72,2	72,4	56,8	65,8	65,4
Greens	5,2	60,1	29,8	53,5	63,4	49,5
Mangos, papayas, etc.	0,1	3,2	2,6	2,1	5,8	3,1
Other fruits or vegetables	0,8	3,6	1,4	20,0	14,4	11,0
Red meat	0,6	8,8	3,1	5,1	9,7	6,0
Poultry	0,3	2,9	0,0	3,0	4,5	2,4
Fish, sea food	1,8	6,5	2,5	18,3	33,3	14,6
Eggs	1,8	2,1	0,5	3,2	8,0	3,1
Lentils or beans	0,9	22,9	2,1	17,7	7,5	12,2
Nuts	0,1	4,0	3,5	1,3	1,0	2,3
Yogurt, cheese, etc.	0,7	0,8	0,0	1,5	6,9	1,9
Fats	1,3	15,0	2,1	11,0	32,8	13,0
Family meal	6,9	77,5	44,0	73,0	47,4	60,7
Intestines	0,3	0,0	0,1	0,7	1,2	0,5
Number of women	513	175	318	411	200	1094

Figure 13: Profile of the introduction of solid food to children 6 - 24 months. Percentage of mothers who gave the type of food indicated to their children, by Geographic Zone.



There is not much difference in complimentary feeding practices by zone. Not surprisingly, more fish and seafood are given to children in the East and South East (along the coast), as well as more fruits and vegetables. Family meals and beans are more often shared with children in the Center and South East.

4.7.3 Knowledge and consumption of foods rich in vitamin A, iron and iodine

a) Knowledge of foods rich in vitamin A, iron and iodine.

Knowledge of micronutrient rich foods in SALOHI zones is quite low. Only 39% of women surveyed could name one food rich in vitamin A, 12% a food rich in iron, and 14% a food rich in iodine (usually salt). Women in the East and the Center had better knowledge of these types of foods, compared to the South and South East. Capacity to name micronutrient rich food increases with education – 73% of women who attended secondary school or higher could name at least one food rich in vitamin A, compared to 43% of women who attended primary school, and 26% of women who didn't attend school. There is also a linear relationship between education level and/or literacy, and knowledge and consumption of iron rich foods, and/or iodine rich foods. Women who can read are twice as likely to know iron rich foods, and three times more likely to identify foods rich in iodine than women who can't read, and women with a secondary school education are three times more likely to identify iron rich foods and four times more likely to be able to identify iodine rich foods.

Table 26: Percentage of women who were able to identify at least one food rich in vitamin A, iron or iodine, by Geographic Zone, NGO Intervention Zone, and education level.

	Able to name one food rich in vitamin A	Able to name one food rich in iron	Able to name one food rich in iodine	Number of women
NGO Intervention Zone				
ADRA	33,4	8,0	14,1	794
CARE	47,4	9,5	17,1	343
CRS	42,3	14,4	13,8	1092
LOL	30,8	6,0	8,8	251
Geographic Zone				
Center	48,4	14,1	19,2	426
South	26,6	15,5	7,4	545
South-East	36,0	5,5	11,3	1050
East	51,8	21,9	22,4	459
Education level				
No schooling	25,7	8,5	6,1	1046
Primary education	43,4	10,6	14,3	1125
Secondary or more	72,8	33,0	41,9	276
TOTAL	39,0	12,2	13,8	2480

More than half the women who were able to name a food rich in vitamin A named carrots (51%). Other foods including milk, liver and squash were listed as foods rich in vitamin A by one woman in four (25%). Figure 14 shows great diversity between geographic zones. Women in the South, in particular, have a good knowledge of eggs and whole milk as sources of vitamin A, but little knowledge of mangoes, orange fleshed fruits or carrots. Women in the East more often cited green leafy vegetables and orange fleshed sweet potatoes as sources of vitamin A.

Table 27: Percentage of women who were able to name one vitamin A rich food, the type of foods cited, by geographic zone and NGO zone.

Vitamin A rich foods cited	Center	South	South-East	East	TOTAL
Carrots	3,7	18,8	54,8	50,6	51,3
Squash	0,0	1,9	2,2	3,0	1,9
Liver	4,5	16,4	8,2	6,1	8,1
Dark green leafy vegetables	9,9	34,4	19,3	41,0	24,9
Egg yolks	16,5	51,7	18,1	9,6	20,6
Whole milk	7,8	53,8	9,0	12,9	16,3

Vitamin A rich foods cited	Center	South	South-East	East	TOTAL
Yellow fruit	49,5	6,5	39,6	24,9	33,2
Mangoes	33,6	13,4	22,8	34,6	26,7
Orange fleshed sweet potatoes	22,5	21,7	18,1	54,3	28,6
Number of women	206	141	374	238	958
	ADRA	CARE	CRS	LOL	TOTAL
Carrots	66,3	44,0	44,4	55,5	51,3
Squash	0,0	2,9	2,2	4,6	1,9
Liver	4,6	13,7	7,6	11,2	8,1
Dark green leafy vegetables	13,1	17,7	33,5	29,3	24,9
Egg yolks	15,5	20,8	24,7	13,0	20,6
Whole milk	8,0	19,5	19,1	21,6	16,3
Yellow fruit	49,9	24,3	26,5	34,3	33,2
Mangoes	30,0	42,4	20,1	21,4	26,7
Orange fleshed sweet potatoes	21,3	30,1	34,2	17,1	28,6
Number of women	265	160	457	77	958

Out of 2876 women interviewed only 291 could name at least one food rich in iron, and 344 a food rich in iodine. The most commonly cited foods rich in iron included green leafy vegetables (36%), and fish (30%). Most women who could name at least one food rich in iodine mentioned salt (88%).

Figure 14: Profiles of knowledge of vitamin A rich foods. Percentage of women who could name at least one vitamin A rich food, by type of food indicated and Geographic Zone.

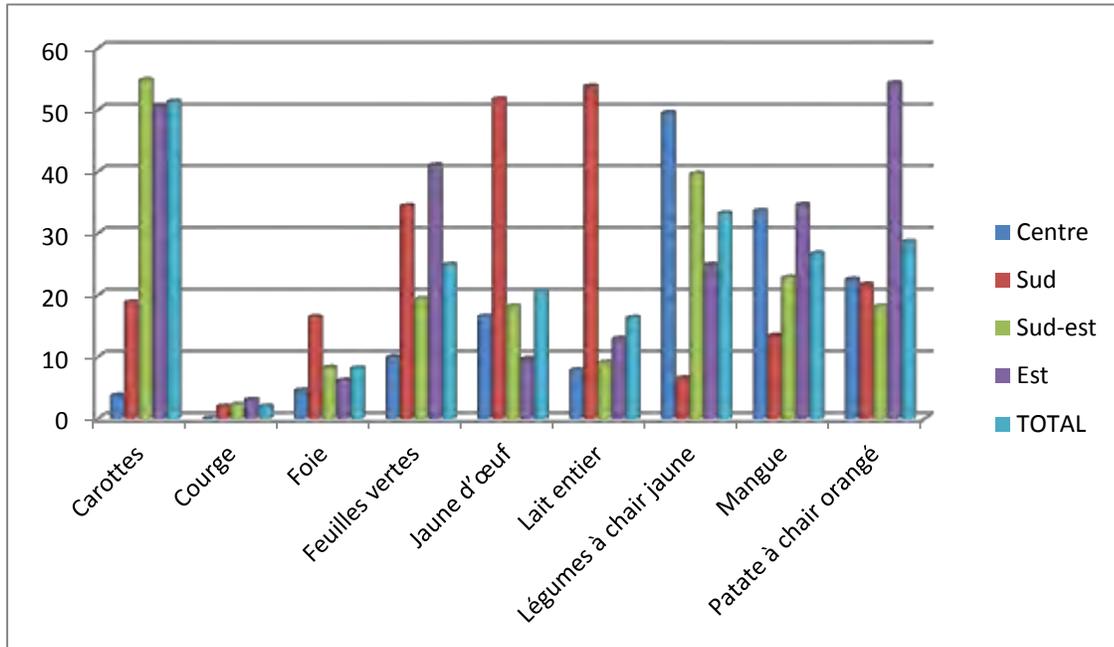


Figure 15: Percentage of women in each Geographic Zone by number of vitamin A rich foods they could cite.

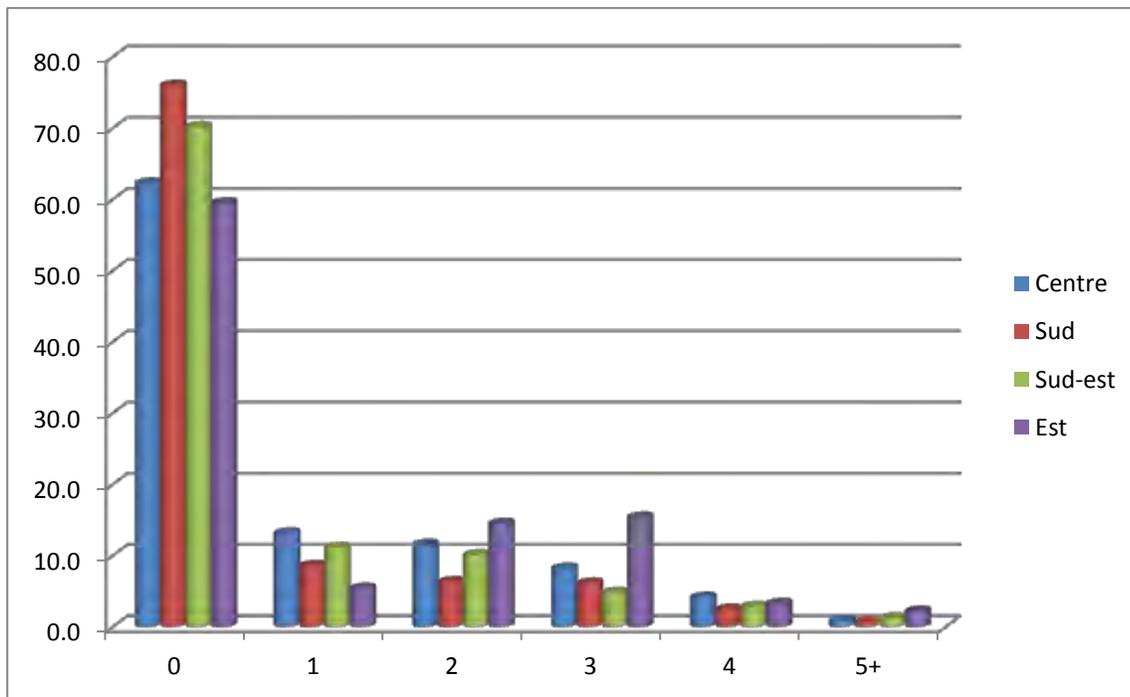
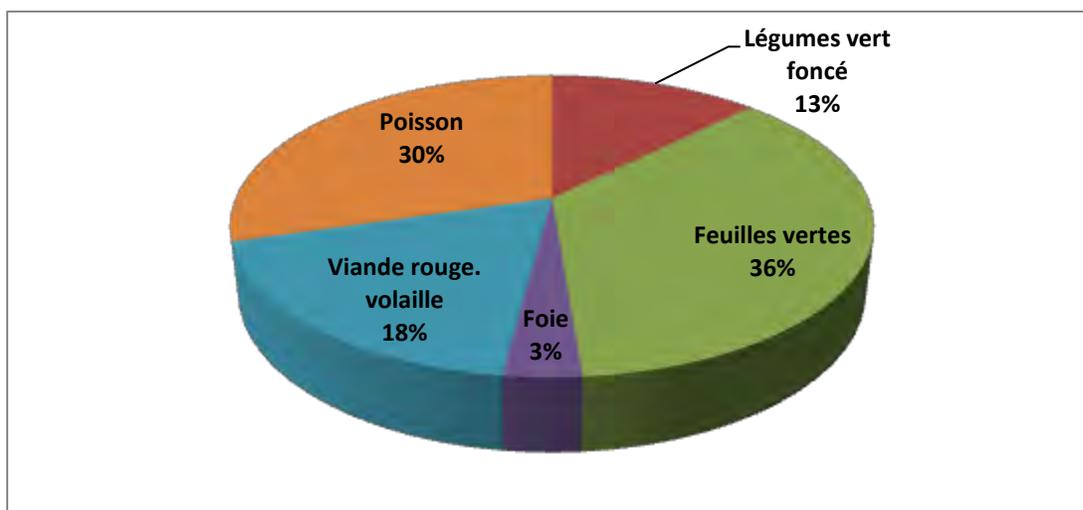


Figure 16: Percentage of women who could name at least one food rich in iron, by the type of food cited.



b) Consumption of foods rich in Vitamin A, iron and iodine

Data collectors listed a series of six foods rich in vitamin A or iron, and asked them if they had consumed them in the 24 hour period before the survey (yesterday). The data in Tables 28 and 29 indicates the percentage of women who consumed foods rich in vitamin A and iron. Comparing the results in these tables with Table 26, the level of women who consumed foods rich in vitamin A and iron was comparable to their knowledge of sources of these important nutrients. 39% of women were able to name a source of vitamin A rich foods, and 36% of women consumed at least one vitamin A rich food. 12.2% of women were able to name one source of food rich in iron, and 12% consumed at least one food rich in iron.

Women in the South were much more likely to have eaten vitamin A rich food (52.6%), despite the fact that their knowledge of vitamin A rich foods was low (26.6%; Table 26). Consumption of iron rich foods was relatively higher in the East and Central geographic zones. Educated women were much more likely to have consumed foods rich in iron – 18.1% of women with a secondary education consumed iron rich foods in the 24 hour period before the survey, compared to 11.4% of women with primary schooling, and 8.9% of women without any education.

Table 28: Percentage of women who consumed each type of food, in the day before the survey.

	Food groups	Number of women	%
a	Carrot, spinach, green pepper, tomato, beet, orange fleshed sweet potato	939	37,4
b	Apricot, kaki, mango	52	1,8
c	Pork, veal or poultry liver	31	1,1
d	Milk, butter	80	3,2
e	Meat – beef, pork, sheep, goat, rabbit, poultry,	259	10,4
f	Eggs	93	3,7

Table 29: Percentage of women who consumed at least one vitamin A rich food and the percentage who consumed at least one iron rich foods, the day before the survey, by geographic zone and level of education.

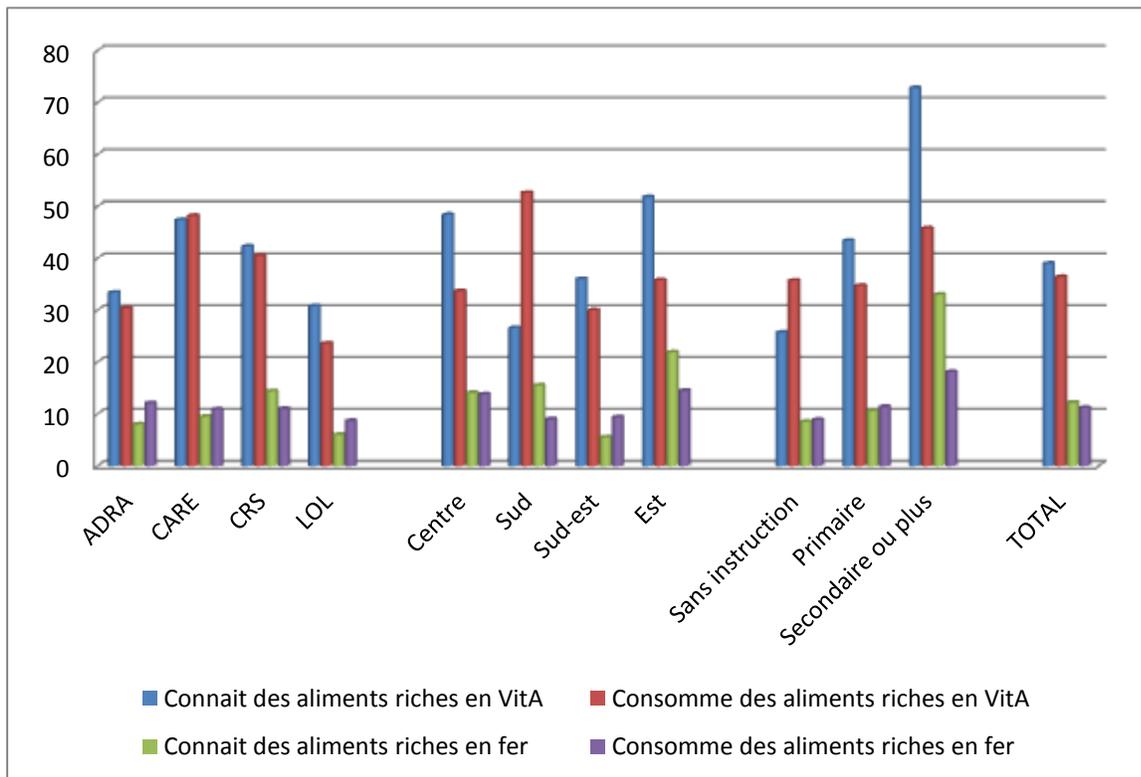
Geographic Zone NGO Intervention Zone Education level	Percent who consumed at least one vitamin A rich food	Percent who consumed at least one iron rich food	Percent who consume iodized salt	Number of women
Geographic Zone				
Center	33,7	13,8		566
South	52,6	9,0		576
South-East	30,0	9,4		1176
East	35,8	14,5		559
NGO Intervention Zone				
ADRA	30,4	12,1		1041
CARE	48,2	10,9		394
CRS	40,5	11,0		1187
LOL	23,6	8,7		254
Education level				
No schooling	35,7	8,9		1164
Primary School	34,7	11,4		1321
Secondary School or higher	45,8	18,1		330
Total	36,4	11,2		2876

Data showed that consumption of iodine rich food is equally low – 31% of women reported that they use iodized salt in their homes. The percentage of households who stated that they regularly consume iodized salt varies considerably by NGO intervention zones and geographic zone.

Table 30: Percentage of households who stated that they regularly consume iodized salt, by NGO intervention zone and Geographic Zone.

	ADRA	CARE	CRS	LOL	CENTER	SOUTH	SOUTH-EAST	EAST	TOTAL
Percentage of households who regularly consume iodized salt	62,5	63,2	22,3	59,3	60,5	14,3	49,1	32,2	31,3

Figure 17: Comparison between the level of knowledge and the consumption of foods rich in vitamin A and iron, by NGO Intervention Zone and Geographic Zone (date from Tables 26 and 29).



4.8. Disease prevention and treatment practices

Disease prevention and treatment practices have a great impact on the nutritional status of children under five years of age. The SALOHI program will target personal hygiene and food hygiene practices, as well as prenatal care practices, and the integrated management of childhood illnesses. Data was collected regarding water sanitation, hygiene, use of latrines, pre and post natal care, breastfeeding, vaccination, vitamin A supplementation, deworming, use of mosquito nets, and knowledge of HIV/AIDS.

4.8.1 Pre and post natal care, and assisted deliveries

a) Pre-natal care

A series of questions were asked to all women who had children under two years of age, regarding pre-natal care practices during their last pregnancy. Data in Table 31 indicates that the majority of women (86%) received at least one pre-natal care visit during their last pregnancy. There are no significant differences between geographic zones, but women in the East were slightly more likely to have received pre-natal care services (90%) than women in other zones. There is a linear relationship between education level and pre-natal care: 97% of women with a secondary school education received pre-natal care services, vs. 88% of women with a primary education, and 83% of women with no education.

Data in Table 31 indicates that most women (94%) said they had health cards. Survey teams were able to verify this in 54% of cases (or in 58% of those who said they had them). On average, women had their first

prenatal visit at 4.4 months, and had 3.6 consultations/pregnancy. These figures don't vary significantly by zone.

Most pre-natal care service providers were doctors or mid-wives (in all zones and all education levels). Few women reported using traditional birth attendants (4.8%) or community health volunteers (none) for pre-natal care services. Women in the East were twice as likely to have consulted traditional birth attendants (11.8%) than women in other geographic zones. Women in CARE zones were much more likely to have consulted mid-wives (80.3%) rather than doctors (17.3%). There was no significant difference in type of service provider consulted by women of different education levels.

During pre-natal care examinations, health staff are expected to provide pregnant women with a number of services and information which increase the likelihood of successful delivery, including pregnancy danger signs, appropriate nutritional practices for pregnant women, breastfeeding advice, tetanus vaccination, iron supplementation, presumptive malaria treatment (in malarial zones) and prevention (use of mosquito nets), and deworming. Table 34 summarizes the types of services women received during their pre-natal care appointments.

Table 31: Percentage of women (mothers of children under two years of age) who received prenatal care services during their last pregnancy and the type of service care provider, by geographic zone, NGO intervention zone and education level.

Geographic zone Intervention zone Education level	Received pre-natal care services	Type of pre-natal care service provider			Number of women
		Doctor	Mid wife	Traditional Birth Attendant	
Center	86,6	46,4	58,0	0,6	206
South	86,0	40,0	61,8	1,4	347
South-East	84,5	51,4	47,3	5,0	551
East	90,0	62,6	41,2	11,8	277
ADRA	80,3	55,6	45,4	2,8	370
CARE	85,8	17,1	80,3	5,5	165
CRS	90,4	56,5	45,8	6,2	711
LOL	84,7	40,4	60,6	2,0	135
No schooling	82,2	47,7	52,1	4,1	598
Primary school	88,1	50,6	51,5	5,3	607
Secondary school	97,3	56,1	48,4	4,1	146
Total	86,4	50,0	51,4	4,8	1381

Table 32: Distribution (%) of women according to age of pregnancy during their first prenatal care exam, by NGO Intervention Zone and Geographic Zone.

Age of pregnancy	ADRA	CARE	CRS	LOL	CENTER	SOUTH	South East	EAST	TOTAL
1 months	0,0	2,5	0,9	0,7	0,0	1,7	0,5	1,7	0,7
2 months	3,2	7,1	4,4	5,5	1,1	4,6	4,6	6,7	4,4
3 months	16,7	26,5	23,9	25,1	16,1	25,0	21,8	25,7	22,4
4 months	24,5	30,5	28,7	30,6	27,2	31,0	25,4	30,4	28,0
5 months	23,3	18,1	23,2	22,0	24,7	21,5	23,4	19,3	22,4
6 months	18,5	11,8	15,0	11,3	17,8	12,2	16,7	13,2	15,3
7 months	10,4	2,9	2,8	3,3	8,9	2,5	6,1	2,5	5,1
8 months	3,4	0,6	1,0	1,2	4,2	1,2	1,5	0,4	1,7
Avg Months	4,8	4,0	4,3	4,2	4,9	4,2	4,5	4,1	4,4
Median Months	5,0	4,0	4,0	4,0	5,0	4,0	4,0	4,0	4,0
Health card	95,5	95,7	90,8	97,2	98,8	87,5	94,5	93,7	93,5
Health card verified	51,2	47,4	57,6	56,8	60,4	55,3	50,3	56,4	54,3
No. Of women	604	288	998	213	353	451	873	426	2096

Table 33: Distribution (%) of women by the total number of prenatal care visits (ANC) undertaken, by NGO Intervention Zone and Geographic Zone.

Number of ANC	ADRA	CARE	CRS	LOL	CENTER	SOUTH	SOUTH EAST	EAST	TOTAL
1	7,4	5,1	4,3	2,7	6,5	3,6	5,2	5,7	5,4
2	12,8	10,1	11,5	7,6	11,9	16,0	9,5	9,7	11,3
3	33,2	28,2	32,9	25,4	32,8	31,1	28,7	36,9	31,6
4	26,6	28,0	32,2	29,5	27,2	27,1	32,1	29,7	29,7
5	15,3	20,1	15,3	20,7	17,2	15,5	17,5	15,0	16,5
6	3,6	5,3	2,8	9,8	3,2	4,8	5,3	1,4	4,1
7	0,9	1,7	0,4	3,4	1,0	1,0	1,2	0,9	1,0
8	0,2	0,9	0,5	0,8	0,0	0,6	0,5	0,8	0,5
9	0,0	0,6	0,0	0,0	0,0	0,4	0,0	0,0	0,1
Average	3,5	3,8	3,6	4,1	3,5	3,6	3,7	3,5	3,6
Median	3,0	4,0	4,0	4,0	3,0	3,0	4,0	3,0	4,0
Number of Women	607	285	998	212	355	440	877	428	2101

Table 34: Percentage of women who received at least one pre-natal care visit and the type of services they received, by NGO intervention Zone and Geographic Zone.

Services received	NGO Intervention Zone				Geographic Zone				Total
	ADRA	CARE	CRS	LOL	Center	South	South-East	East	
Delivery preparation	54,0	56,6	45,3	44,1	61,9	26,4	46,5	72,5	48,9
Immediate breastfeeding	49,6	60,1	42,9	50,9	55,7	34,9	48,4	55,0	47,5
Breastfeeding	56,1	66,8	45,1	51,4	63,2	39,1	51,5	57,0	51,3
Birth spacing	47,7	60,6	49,1	40,8	61,9	48,3	43,6	51,8	49,2
Tetanus vaccination	71,7	76,0	66,9	65,1	74,5	79,9	62,9	64,1	69,1
Danger signs	29,1	45,1	24,3	28,9	33,1	21,9	27,2	36,0	28,5
Vitamin A rich foods	27,6	23,4	19,5	8,8	37,2	20,5	13,9	24,1	21,1
Iron rich foods	41,8	60,0	38,0	25,8	53,2	35,6	34,6	48,1	40,3
Use of mosquito nets	34,4	78,2	70,2	54,1	29,3	79,3	50,7	77,1	59,3
Iron supplementation	48,1	46,4	36,3	42,5	49,6	34,2	43,4	39,8	41,4
Treatment for malaria	29,1	38,0	21,5	47,1	25,6	2,8	40,9	35,6	28,2
Number de femmes	413	175	750	158	230	368	608	289	1486

The principal types of pre-natal care services received include tetanus vaccination (69%), use of mosquito nets (59%), breastfeeding (51%), birth-spacing (49%) and preparation for delivery (48%). Less than 50% of women received advice regarding identification of pregnancy danger signs (28.5%), or nutritional advice (21% of women received advice regarding the importance of consuming foods rich in vitamin A, and 40.3% received advice regarding iron rich foods). Only 41.4% received iron folate supplements.

In general, the quality of pre-natal care service delivery is higher in the Central Plateau (except for the use of mosquito nets; malaria prevalence is relatively lower in the Central Plateau than in other parts of Madagascar), and in CARE zones (especially for breastfeeding, birth-spacing, promotion of iron rich foods and pregnancy danger signs). Nutritional counseling is limited in all zones.

Knowledge of Danger Signs

Although all pregnancies involve a high level of risk (especially in isolated rural areas, where access to health care is limited), it is important for women to be aware of danger signals which indicate that they should seek immediate medical attention. The limited amount of advice women receive regarding these danger signs during their pre-natal visits translates into a relatively high percentage of women who are unable to identify these danger signs. 38% of women surveyed could not name one single danger sign. In the Central Plateau, this figure is even higher (56%).

Data in Table 35 indicates that the most common danger signs that women were able to identify included fever (35% of women) and bleeding (12%). In the East and South, women were slightly better able to identify danger signs (and more danger signs), compared to women in the Center and South East.

Table 35: Percentage of women who are able to name different signs of danger during pregnancy, by NGO Intervention Zone and Geographic Zone.

Danger Signs	ADRA	CARE	CRS	LOL	CENTER	SOUTH	SE	EAST	TOTAL
Fever	18,1	56,2	38,0	47,5	12,2	34,2	32,9	61,7	35,1
Respiratory distress	6,2	16,3	10,8	6,1	2,1	13,0	8,1	16,6	9,6
Bleeding	18,9	13,4	13,4	19,5	21,1	16,0	15,3	11,9	15,8
Odema	3,8	13,1	6,3	4,1	4,1	6,6	5,1	10,6	6,2
Other	20,6	42,9	29,2	35,6	21,8	40,6	28,6	24,3	29,0
Don't know	56,7	18,6	32,2	33,7	55,7	26,0	45,3	19,6	38,4
Identified the health center as the first place to go in case of danger signs	82,0	88,2	89,0	94,8	80,3	87,8	88,1	90,5	87,2
Number of women	753	327	1014	239	395	467	1033	438	2334

b) Assisted delivery and post-natal care

Although 86% of women received at least one pre-natal care visit with a doctor or mid-wife (and only 5% with a traditional birth attendant), the data in Table 36 indicates that only 32% of these women delivered their babies with the assistance of a doctor or mid-wife. 64% of women delivered their children with a traditional birth attendant (TBA).

Table 36: Percentage of women (mothers of children under two years of age) by type of personnel who assisted during delivery, by zone and by education level.

Geographic Zone NGO zone Education level	Delivered with the assistance of :				Number of women
	Doctor	Mid wife or nurse	TBA	Community Health Agent	
Center	15,4	20,6	59,2	0,0	236
South	12,5	28,7	54,8	0,0	412
South-East	12,5	12,1	73,7	0,1	652
East	21,0	7,4	58,0	12,8	301
ADRA	16,8	15,4	63,9	0,0	458
CARE	8,0	30,6	56,6	0,0	191
CRS	15,7	13,4	64,6	4,9	793
LOL	10,3	20,8	67,3	0,5	159
No schooling	11,5	13,7	70,3	1,4	734
Primary school	16,8	18,6	60,5	3,3	685
Secondary school	21,6	29,2	43,2	2,9	151
Total	14,5	16,7	63,7	2,5	1616

Traditional Birth Attendants (TBAs) are widely used, especially in the South East (74 %) and by women without any formal education (70 %). However, even women who attended secondary school used TBAs more than any other type of service provider (43 % used TBAs vs. 29% midwives/ nurses and 22% doctors). In general, women in the East (21%) and in ADRA (17%) and CRS (16%) zones used doctors more than women in CARE (8%) or LOL (10%) zones. Additional qualitative research is needed to explore the reasons why women continue to use TBAs rather than doctors or mid-wives during delivery.

Only 32% of women with children under two reported receiving post natal care. There is, however, a linear relationship between post natal care and education level – 48% of women with secondary schooling, 37% of women with primary schooling, and 25% of women with no schooling received post natal care services. In general, women in the Eastern geographic zone received more post-natal care (47% vs. 35% in the South East, 31% in the Center and only 20% in the South).

The SALOHI program will promote support groups for pregnant and lactating women, as well as pre-natal care outreach, to improve the quality of pre and post natal care services received throughout the SALOHI zone, as well as to improve breastfeeding and complimentary feeding practices.

The nutritional and health care practices of women during pregnancy have a significant impact on the health of children at birth, and can result in low birth weight (< 2.5 kg). Mothers of children under two years of age were asked if their children were weighed at birth, and if so, how much they weighed. If the child wasn't weighed, mothers were asked to describe their baby's size when she or he was born: very small, smaller than normal, average, bigger than average, or very large. Table 37 presents the distribution of children under two according to their birth weight or size.

Table37: Percentage of children under two who were weighed at birth ; percentage o children under two who were weighed at birth and weighed less than 2.5 kgs ; and the percentage of children under two according to their birth size, by NGO Intervention Zone and Geographic Zone.

Zones	Weighed at birth	Avg wt/ median wt	Low Birth Weight (< 2.5 kg)	Size of the baby at birth according to the mother				
				Very small	Below avg	Avg	Larger than avg.	Very large
ADRA	29,6	3,1 / 3,0	13,4	25,1	17,4	31,7	23,6	2,1
CARE	44,6	4,1 / 3,4	11,0	24,1	13,8	37,4	20,5	4,1
CRS	39,6	3,7 / 3,1	12,8	18,0	12,7	50,1	13,1	6,0
LOL	34,4	3,3 / 3,0	10,2	15,4	18,5	32,1	23,5	10,5
CENTER	42,1	3,1 / 3,1	9,7	20,6	18,0	28,0	31,5	1,8
SOUTH	25,7	4,4 / 3,5	4,0	22,2	12,4	41,5	16,8	7,1
SE	31,7	3,3 / 3,0	13,5	22,7	14,0	39,8	16,8	6,7

Zones	Weighed at birth	Avg wt/ median wt	Low Birth Weight (< 2.5 kg)	Size of the baby at birth according to the mother				
				Very small	Below avg	Avg	Larger than avg.	Very large
EAST	57,8	3,7 / 3,1	17,6	13,5	17,0	56,0	11,7	1,8
	36,8	3,6 / 3,1	12,5	20,5	14,8	41,7	18,0	5,1

The data in Table 37 indicates that only 37% of children were weighed at birth (32% of women gave birth with the help of a health professional). The average weight for children weighed at birth was 3.6 kg, which is above the 2.5 kg threshold. Women who gave birth with trained health professionals, and had their children weighed at birth are most likely to be those who practice optimal prenatal behaviors. Children in the South who were weighed at birth have a higher average weight than children born in other regions. However, few children (26%) born in the South are weighed at birth, compared to other zones (42% in the Center and 58% in the East). Overall, 12.5% of children who were weighed at birth suffer from low birth weight, most of them in the East (17.6%). One third of children are born very small (20%) or below average (15%), which seems to indicate that much can and should be done to improve prenatal care practices, to help newborns get off to a safe and healthy start in life.

4.8.2. Vaccination of children under five years of age

Vaccination is a critical component of disease prevention programs. Although it is closely linked with morbidity and mortality, it is not an intervention area for the SALOHI program. Thus, the baseline survey did not include detailed questions regarding the type and completeness of childhood vaccinations (which was already collected and reported in the most recent Demographic Health Survey, 2008/09), but simply asked if the child had been vaccinated at all since birth, as a proxy indicator of disease prevention practices and care seeking behavior.

Mothers reported that the majority (85%) of children under five years of age had been vaccinated at least once since birth. Vaccination varied by geographic zone: 79% of children in the South received at least one vaccination since birth, compared to 83% in the South East, 89% in the Center, and 92% in the East. Vaccination varied considerably by education level: 95% of children under five whose mothers attended secondary school were vaccinated, compared to 88% of children whose mothers attended primary school, and 79% of mothers without schooling.

4.8.3. Vitamin A supplementation and Deworming

Bi annual vitamin A supplementation (VAS) and deworming are recommended by UNICEF and the World Health Organization for all children 6 – 59 months of age (for vitamin A) in countries with high under five mortality rates. Vitamin A is essential for eye health, disease prevention/immunity and growth. Worms cause diarrhea, reduce growth and contribute significantly to malnutrition.

During the collection of baseline data, women with children under five years of age were asked if their child had received a dose of vitamin A, six months after birth, or de-worming medicine one year after birth. The data in Table 38 indicates that almost all children had received vitamin A supplementation (90%) and de-worming medication (89%). Children in CRS zones were slightly less likely to have received vitamin A supplements (86%) or deworming medicine (84%), and children in the South much less likely (78.7% received VAS and 72.6% deworming medicine).

Table 38: Percentage of children 6 – 59 months of age and 12 – 59 months of age who received vitamin A supplementation and de-worming medicines, respectively, by zone and education level.

	Received VAS at 6 months +	Received de-worming medicine at 12 months +	Number of children 6 – 59 months of age	Number of children 12 – 59 months of age
NGO intervention zone				
ADRA	92,8	92,1	649	534
CARE	93,5	93,1	283	238
CRS	86,1	83,8	871	681
LOL	93,7	94,2	202	160
Geographic Zone				
Center	93,4	92,3	349	293
South	78,7	72,6	437	314
South-East	92,5	92,1	820	673
East	94,7	95,2	398	333
Education Level				
No schooling	85,0	83,5	827	632
Primary school	92,8	91,2	911	753
Secondary school	96,4	96,4	227	199
TOTAL	90,1	89,0		

4.8.5. Use of mosquito nets by children under five

Malaria is one of the most common causes of infant and under five mortality in Africa. The use of treated bed nets has been shown to significantly reduce malaria prevalence and mortality due to malaria. Many organizations promote the distribution and promotion of the use of mosquito nets in Madagascar, including UNICEF, USAID and the Global Fund.

Almost 60% of women reported receiving advice regarding the use of mosquito nets during pre-natal visits. 61% of women reported that their child slept under a mosquito net the night before the survey. This varied considerably by zone. Children in the Central Plateau area (where malaria is not endemic) rarely slept under a mosquito net (4%). Almost all children in the East (97%) and 2/3 of children in the South (67%) and South East (63%) slept under nets.

Table 39: Percentage of women with children under five, whose child slept under a mosquito net the night before the survey, by zone and education level.

ADRA	CARE	CRS	LOL	Center	South	South-East	East	None	Primary	Secondary	Total
24,3	90,9	75,6	68,8	4,1	67,3	63,1	96,5	59,8	60,5	66,1	61,1

4.8.6. Growth monitoring and promotion

Participation in regular growth monitoring and promotion activities allows health care providers to routinely weigh children and provide nutritional counseling to women, and to identify malnourished children at an early stage. SALOHI staff plan to support growth monitoring and promotion activities throughout SALOHI zones, to facilitate nutritional surveillance and early warning systems, and to improve caretakers' knowledge of appropriate disease prevention and nutritional practices to improve household food utilization.

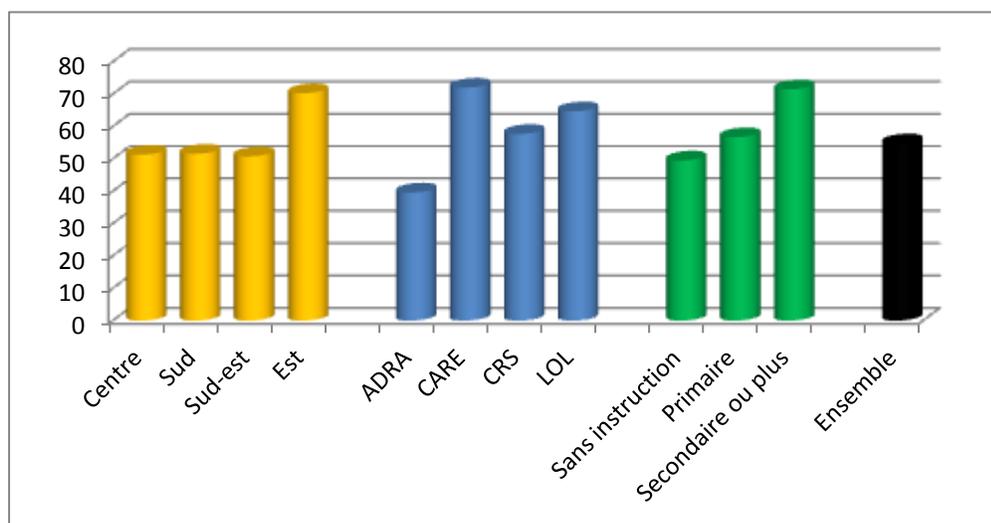
During the baseline survey, the survey team asked women with children under two if they participate in growth monitoring activities, and if so, at what level (community, health center, etc.). Data in Table 40 indicates that slightly more than half (55%) of the women with children under two surveyed participate in growth monitoring. Children in the East participate much more in growth monitoring events than children in other zones (70% vs. 50%). Education level makes a difference. 50% of children under two whose mothers had no schooling, 57% with primary education, and 72% with secondary or higher education participated in growth monitoring activities. 62% participated in community level growth monitoring programs, and 38% at public health centers. Women in the Central Plateau were more likely to use public health centers (71%), as were women with secondary education (55%).

Table 40: Percentage of mothers with a child under two years of age whose children participated in growth monitoring, by zone and education level.

Zones Education level	Participated in growth monitoring	Participated in growth monitoring at :		Number of women
		Public Health Center	Community health structure	
Center	51,3	70,8	29,2	243
South	51,6	32,4	65,4	406
South-East	50,8	31,7	67,8	644
East	70,3	32,1	67,9	304
ADRA	39,6	62,2	37,8	465
CARE	72,0	27,2	72,8	190
CRS	57,7	31,5	67,3	783
LOL	64,7	34,3	65,7	159

Zones Education level	Participated in growth monitoring	Participated in growth monitoring at :		Number of women
		Public Health Center	Community health structure	
No schooling	49,5	31,7	67,5	727
Primary school	56,7	38,3	61,7	685
Secondary school	71,5	54,5	44,4	153
Total	54,8	37,6	61,7	1597

Figure 18 : Percentage of mothers of children under two whose children participated in growth monitoring activities, by zone and level of schooling.



4.8.6. Personal hygiene practices and food hygiene practices

The adoption of disease prevention practices constitutes one of the two intermediate results required to improve the health and nutritional status of children under five in the SALOHI program (Strategic Objective 1). The percentage of women who practice appropriate food hygiene practices and personal hygiene practices are two key program indicators.

Recommended personal hygiene behaviors include hand washing (with soap) at critical moments, such as:

1. Before cooking food
2. Before eating
3. After using the toilet
4. Before giving food to children
5. After washing children who have used the toilet.

Recommended food hygiene behaviors include:

1. Using potable water or treated drinking water;
2. Using clean, adequately stored cooking utensils;
3. Adequate storage of leftovers

4. Reheating food before eating it

During the baseline survey, all women who cook for the household or collect water for the household were asked a series of questions regarding their water sanitation practices. Certain questions were not appropriate in all zones, or for all households. For example, 26% of households said they don't have leftover food, so the question regarding food storage and reheating were less pertinent. Because the SALOHI indicator is a composite indicator for all households, only data from those households which responded to all food hygiene questions are included in Tables 39 (a) and (b) .

a) Personal hygiene practices

Women were asked a series of questions regarding when they wash their hands, and when they wash their hands with soap. Data in Tables 27 (a) and (b) summarizes the results. 40% of women said they washed their hands before they cook meals, 61% before eating, 11% after using the toilet, 26% before giving food to their children, and 23% after washing children who have gone to the toilet. In all cases, women from the East and South – East wash their hands more frequently than women in other zones. The percentage of women who wash their hands at critical moments increases with education level. Only 4% of women reported washing their hands at all five critical moments (and only half of those used soap).

36% of women in the SALOHI zone stated that they never use soap when washing their hands. 19% said they use soap before preparing meals, 8% before giving food to children, 14% after using the toilet and 13% after washing a child who used the toilet. Women with more schooling are more likely to use soap (46%) than women without schooling (29%). Women in CRS zones were almost twice as likely as women in CARE zones to use soap (39% vs. 19%). Almost 50% of women in CARE households never use soap to wash their hands.

Table 41 a: Percentage of women who spontaneously identified occasions when they wash their hands, by zone and instruction level.

Zones Education	Hand washing Behavior						
	At least one of the critical moments	All five critical moments	Before preparing meals	Before eating	After using the toilet	Before giving food to kids	After washing children who used the toilet
ADRA	83,9	2,8	39,5	66,1	7,0	17,5	15,8
CARE	80,0	6,5	33,7	63,2	13,2	46,3	28,9
CRS	77,4	4,4	41,6	56,1	10,9	26,8	24,8
LOL	83,9	8,2	43,9	60,9	22,3	29,2	32,0
Center	79,1	1,4	34,3	60,2	6,6	11,4	7,8
South	55,6	1,1	30,3	20,7	2,8	23,7	26,0

Zones Education	Hand washing Behavior						
	At least one of the critical moments	All five critical moments	Before preparing meals	Before eating	After using the toilet	Before giving food to kids	After washing children who used the toilet
South-East	86,7	5,6	42,6	70,4	13,2	24,0	25,1
East	95,4	8,5	50,2	84,1	18,4	49,0	29,6
No school	73,6	3,5	28,0	50,7	7,9	21,5	22,6
Primary school	84,7	4,4	37,5	66,7	10,9	27,1	23,1
Secondary	91,3	8,3	40,0	74,7	19,3	40,6	21,7
Total	80,7	4,4	40,0	61,1	10,8	26,3	22,8

Table 41 b: Percentage of women who spontaneously identified occasions when they wash their hands with soap or ashes, by zone and education level.

Zones	Wash hands with soap								
	Possess soap	Used soap in the last 24 hours	Used soap at least once	Used soap at all critical moments	Never use soap	Use soap before cooking	Before giving food to children	After using the toilet	After helping a child use the toilet
ADRA	59,0	83,3	32,3	1,1	37,7	20,7	5,5	9,4	11,2
CARE	48,5	73,3	19,3	1,3	49,5	9,7	4,8	11,9	5,9
CRS	55,8	66,5	38,7	3,4	28,0	22,0	10,7	19,5	18,7
OL	37,4	77,9	20,0	2,4	43,3	11,1	7,2	6,9	9,9
Center	65,4	83,5	31,5	0,5	29,4	19,8	5,7	9,3	9,0
South	42,5	46,3	29,0	0,3	25,6	10,7	1,9	14,9	20,2
South East	49,4	79,9	29,8	3,3	41,2	19,0	8,3	10,8	12,4
East	65,7	81,2	40,5	3,6	41,6	26,0	14,2	22,9	13,1
No school	44,2	64,6	28,6	2,2	38,2	15,9	7,2	11,6	14,9
Primary	57,6	76,5	32,4	1,6	35,3	18,6	7,1	13,0	11,6
Secondary	75,2	88,8	45,7	4,4	28,5	32,0	12,4	24,8	15,6
TOTAL	54,3	73,7	32,1	2,2	35,8	18,9	7,7	13,7	13,4

On average 54% of women said they possess soap, and 74% said they used soap in the past 24 hours. Households in the Center and East are more likely to have soap and use it, compared to households in the South and South East. 41% of households in the East and South East never use soap to wash their hands. Survey staff also reported that they observed soap, ashes or other cleaning products in 58% of households (more in the Center – 75%; less in the South East – 39%).

Table 41 c: Percentage of women by the number of occasions they wash their hands and the number of occasions they use soap, by zone and education level.

	Hand washing						Hand washing with soap				
	0	1	2	3	4	5	0	1	2	3	4
ADRA	16,1	45,2	24,5	8,1	3,4	2,8	67,7	22,0	7,2	2,0	1,1
CARE	20,0	25,4	23,5	18,2	6,4	6,5	80,7	9,9	7,1	1,0	1,3
CRS	22,6	31,1	25,0	11,6	5,4	4,4	61,3	18,7	11,8	4,7	3,4
LOL	16,1	31,6	22,9	14,9	6,2	8,2	80,0	11,0	5,3	1,4	2,4
Center	20,9	50,8	20,5	4,2	2,1	1,4	68,5	21,8	7,7	1,5	0,5
South	44,4	27,2	15,4	7,9	3,9	1,1	71,0	16,1	7,9	4,7	0,3
South-East	13,3	37,4	26,3	12,2	5,0	5,6	70,2	17,3	7,5	1,8	3,3
East	4,6	24,3	33,7	20,7	2,3	8,5	59,5	17,8	14,2	4,9	3,6
No school	26,4	35,0	21,9	9,7	3,5	3,5	71,4	15,5	7,7	3,2	2,2
Primary school	15,3	37,6	25,0	12,0	5,7	4,4	67,6	20,3	8,2	2,3	1,6
Secondary	8,7	31,1	30,9	15,8	5,2	8,3	54,3	19,9	16,7	4,6	4,4
Total	19,3	35,5	24,4	11,5	4,9	4,4	67,9	18,0	8,9	2,9	2,2

Figure 19 a: Number of recommended occasions caregivers wash their hands.

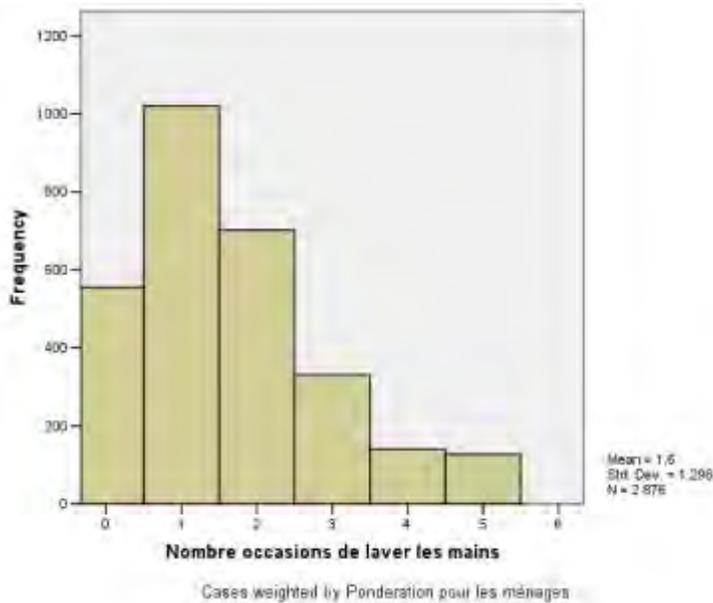
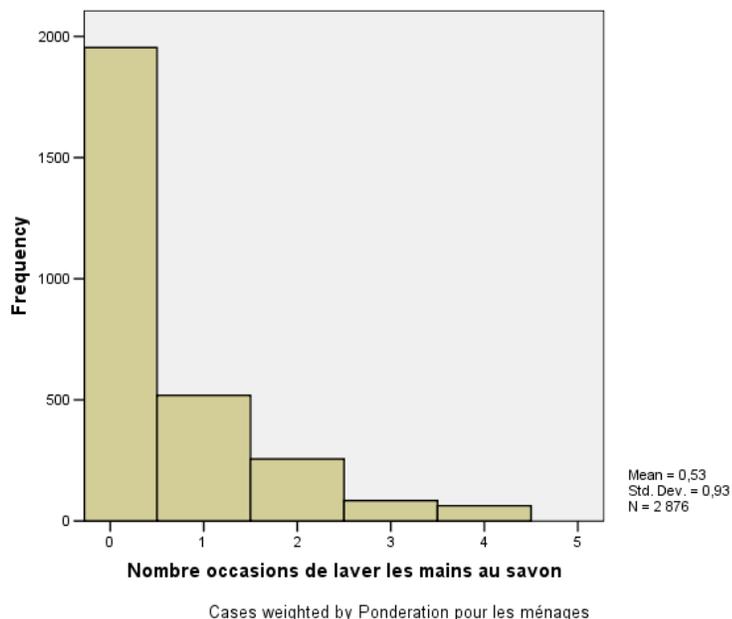


Figure 19 a: Number of recommended occasions caregivers wash their hands with soap.



b) Food hygiene practices

Women were asked their principal source of drinking water, water treatment and storage practices, where they store their cooking utensils, where they store their leftover food and precautions taken before eating leftovers. These practices constitute the four principle food hygiene practices which SALOHI staff hope to promote.

Although households reported using a number of different types of water sources, only faucets, pumps, wells with pumps or treated water from other sources were considered « potable ». Cooking utensils were considered appropriately stored if they were kept off the ground in a specific place (on a table, shelf or suspended from the roof). Appropriate places to store leftover food include a covered container or a food storage cabinet. Leftovers should be adequately and fully reheated before eating. Table 42 summarizes food hygiene practices in SALOHI households.

Table 42 a: Percentage of women who practice appropriate food hygiene, by zone and education level.

Zone Education level	At least one criteria	All four criteria	Use potable water	Appropriately stored cooking utensils	Appropriately stored leftovers	Treatment of leftovers
ADRA	81,7	5,9	30,0	30,6	64,2	62,5
CARE	81,3	6,6	35,0	25,4	70,8	57,2
CRS	89,7	11,5	33,9	49,0	72,7	80,1
LOL	89,9	8,6	50,6	31,6	81,8	38,2

Zone Education level	At least one criteria	All four criteria	Use potable water	Appropriately stored cooking utensils	Appropriately stored leftovers	Treatment of leftovers
Center	81,7	9,0	33,5	46,8	55,8	68,3
South	80,6	6,1	20,1	27,8	68,8	93,2
South-East	86,0	7,5	38,8	30,9	73,6	53,8
East	94,2	12,8	39,4	52,3	78,7	68,3
No schooling	79,9	5,3	27,1	28,4	66,2	39,4
Primary school	89,3	9,3	36,8	39,1	73,1	65,8
Secondary or +	90,3	14,6	45,3	59,2	70,2	61,1
Total	85,6	8,6	34,1	37,6	70,2	67,0

Table 42 summarizes the food hygiene practices in SALOHI households. On average, 34% of households use potable water, 38% conserve cooking utensils in an appropriate manner, 70% conserve their food leftovers adequately, and 67% reheat their leftovers before eating them. At least 86% of households observe at least one recommended practice, but only 9% practice all four. Households in the East are more likely to practice adequate food hygiene: 94% practice at least one behavior, and 13% observe all four practices (vs. 9% in the Center, 7% in the South East, and 6% in the South). Households in CRS zones are twice as likely to observe all four food hygiene practices than households in ADRA or CARE zones (12% vs. 6%). Food hygiene behavior improves linearly with the education level of women.

c) Access to potable water

Data in Table 42 indicates that the most common water source for households in SALOHI zones is surface water. Almost half of all SALOHI households collect drinking water from open streams or ponds. 20% use natural uncapped sources, and 16% use traditional wells. For most households, the source of water they use is the only year round water source available.

On average, 26% of households treat their drinking water. This proportion is higher in the East (39%) and the South (31%). The most common method used to treat drinking water is to boil it. 90% of households who treat their water use this method. Treatment products like Sur Eau are more frequently used in the South and East. Water filters are more commonly used in the South.

Table 42 b: Principal sources of drinking water. Percentage of households who use the water sources indicated, and the percentage of households who treat their water, by NGO Intervention Zone and Geographic Zone.

Source of drinking water	ADRA	CARE	CRS	LOL	CENTER	SOUTH	SOUTH EAST	EAST	TOTAL
Stream	40,9	49,1	56,7	44,9	15,2	41,7	62,2	62,6	48,9
Tap	10,8	2,5	9,7	3,9	11,7	11,3	9,2	1,6	8,6
Bore hole/pump	0,0	0,0	0,3	2,8	0,0	0,5	0,6	0,0	0,3

Source of drinking water	ADRA	CARE	CRS	LOL	CENTER	SOUTH	SOUTH EAST	EAST	TOTAL
Well with pump	0,4	13,0	3,7	2,8	0,7	0,7	3,7	9,5	3,7
Traditional well	1,1	25,4	21,4	41,3	0,7	37,2	12,4	19,0	16,4
Rainwater	0,3	0,0	0,0	0,0	0,5	0,0	0,0	0,0	0,1
Implivium	0,0	2,8	1,3	0,0	0,0	4,7	0,0	0,0	0,9
Natural source	46,4	6,4	4,7	3,9	71,2	1,0	10,7	6,8	19,9
Other source	0,2	0,8	2,2	0,4	0,0	2,8	1,2	0,5	1,1
TOTAL	100,0								
Treatment of drinking water	19,7	33,2	25,0	47,4	22,3	8,4	30,9	38,5	26,2
Sur'Eau or similar product	2,5	4,5	11,5	2,5	1,6	13,0	4,9	9,5	6,3
SODIS	0,0	0,6	0,0	0,0	0,0	2,2	0,0	0,0	0,1
Bouillir	98,5	80,3	85,9	96,7	97,6	60,9	97,5	79,2	89,8
Filter	2,5	0,0	6,2	0,0	4,0	25,5	0,0	2,6	3,0
Other	0,0	0,0	0,4	1,7	0,0	4,3	0,5	0,0	0,4

d) Latrines

In the area of family hygiene, SALOHI staff asked questions regarding the use of latrines, and the type of latrines used. Data in Table 43 indicates that most households (71%) do not have toilets, and household members routinely defecate outside. Approximately one in four of households use traditional latrines. The absence of toilets is especially remarkable in the South (93% of households) and in the South East (83%). 50% of households in the Central Plateau and 45% in the East use traditional latrines. Many households (43%) throw children's waste into the yard.

Table 43: Percentage of households who use different types of toilets, by NGO Intervention Zone and by Geographic Zone.

Types of toilet used	ADRA	CARE	CRS	LOL	CENTER	SOUTH	SOUTH-EST	EAST	TOTAL
Nature	62,5	81,8	69,1	93,3	45,3	93,9	82,5	47,2	70,6
Traditional latrine	32,3	17,5	22,5	5,5	49,9	3,5	11,1	45,1	23,8
Improved latrine	0,7	0,5	1,6	0,0	0,9	2,6	0,6	0,2	1,0
Public latrine	4,3	0,3	6,8	1,2	3,6	0,0	5,8	7,5	4,5
Latrines with water	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Other type of toilet	0,2	0,0	0,0	0,0	0,4	0,0	0,0	0,0	0,1
Children's waste disposal	ADRA	CARE	CRS	LOL	CENTER	SOUTH	SOUTH EAST	EAST	TOTAL
Latrines	27,9	19,0	24,7	3,1	37,8	8,4	13,2	44,5	23,2
Hole	5,0	24,4	19,0	17,3	2,1	17,9	14,2	24,1	14,4
Nature	46,2	23,9	47,7	39,9	34,4	54,5	56,0	13,3	43,3
Other	18,3	34,6	11,4	40,6	25,5	22,4	15,1	21,0	19,7

4.8.7. Disease incidence in children under five

Disease has a strong impact on the nutritional status of children under five. 44% of children under five in SALOHI zones were sick in the two weeks preceding the survey. This varied from 30% in the Center to 51% in the South. Children in ADRA zones were less often sick (38%) than children in CARE, CRS or LOL zones (46 – 49%). Children whose mothers had secondary schooling or more were less likely to have been sick in the two weeks preceding the survey (37% vs. 44% for children whose mothers had primary schooling only, and 45% for children whose mothers had no education).

Fever and coughs were the most common symptoms from which the children suffered (45% and 42% respectively). 29% suffered from diarrhea, and 20% from other symptoms.

Table 44: Percentage of children under five who suffered from sickness in the two weeks prior to the survey, and the type of symptoms from which they suffered, by NGO intervention zone, Geographic Zone and education level of mothers/ caretakers.

	Sick in the past 2 weeks	Disease symptoms			
		Diarrhea	Fever	Cough	Other symptom
NGO Intervention zones					
ADRA	38,0	34,2	39,1	43,2	11,5
CARE	47,9	24,2	47,7	41,5	17,9
CRS	46,2	29,2	45,9	44,4	27,4
LOL	48,8	22,3	52,6	33,7	14,3
Geographic Zones					
Center	29,9	37,9	18,6	38,1	14,8
South	50,7	38,7	36,4	54,1	28,0
South-East	49,2	25,8	53,6	42,3	16,3
East	38,5	19,2	50,7	31,2	21,4
Education level					
No schooling	45,3	31,0	42,7	38,9	23,7
Primary school	44,4	26,9	47,7	44,6	16,9
Secondary school	37,4	29,9	45,8	45,6	20,2
TOTAL	44,1	29,0	45,1	42,4	20,1

4.9 Knowledge of HIV/AIDS

Heads of households and mothers/caretakers were asked about their knowledge of and attitudes towards HIV/AIDS (transmission and prevention). Data in Table 45 and 46 indicate that their level of knowledge of HIV/AIDS is relatively low, especially for women. By geographic zone, more household heads in the Center (92% of men and 84% of women), and fewer in the South (68% of men and 67% of women) have heard of AIDS.

Among the people who have heard of AIDS, the percentage of those who can name at least one mode of transmission varies from 75% in the Central Plateau to 56% in the South East (for men), and 66% in the Center and 46% in the South (for women). The most common transmission method known in all zones is unprotected sex (93% of men who have heard of AIDS in the South and 74% of those in the South East; 85% of women who have heard of AIDS, to 72% in the South East). Other modes of transmission are not very well known, in particular mother to child transmission.

Table 45: Percentage of men and women who have heard of AIDS, percentage who can name at least one mode of transmission and prevention, by NGO Intervention Zone.

	Men				Women			
	ADRA	CARE	CRS	LOL	ADRA	CARE	CRS	LOL
Heard of HIV/AIDS	83,8	84,8	72,7	68,5	77,5	79,4	64,7	57,1
Can name at least one mode of transmission	66,2	68,9	60,9	53,1	57,1	64,7	51,8	44,1
<i>Blood donation</i>	14,1	16,6	19,4	22,9+	13,3	17,1	14,2	19,8
<i>Unprotected sex</i>	75,9	84,0	83,3	76,7	71,1	84,7	79,7	74,3
<i>Mother to Child</i>	1,1	1,8	5,5	9,2	0,7	3,2	3,5	6,7
<i>Breastfeeding</i>	0,2	0,9	2,5	3,7	0,0	1,1	2,4	4,5
<i>Unsterilized materials</i>	15,9	17,2	14,7	22,7	13,2	15,2	13,3	20,1
Can name at least one way to prevent the spread of HIV/AIDS	58,8	66,5	60,6	46,5	46,4	63,3	51,2	38,0
<i>Abstinence</i>	18,1	8,8	17,0	8,7	7,5	6,9	20,5	5,9
<i>Condoms</i>	25,6	73,0	59,0	55,8	25,5	74,0	58,5	56,5
<i>Monogamy</i>	45,6	38,2	52,7	38,7	39,0	35,1	39,9	36,9
<i>Testing</i>	4,6	3,0	6,1	18,6	4,9	1,9	4,8	12,4
Constraints to use these prevention means								
<i>Lack of condoms</i>	4,7	15,9	35,3	3,1	0,8	13,2	21,4	2,0
<i>Distance to health center</i>	4,3	5,6	22,7	1,2	1,2	3,8	15,6	0,2
<i>Lack of testing and counseling services</i>	6,0	14,1	33,7	2,4	0,9	9,5	14,2	1,4
<i>Polygamy</i>	5,0	13,6	16,2	5,9	7,3	11,3	16,1	3,1
<i>Tabus and beliefs</i>	2,4	10,2	4,8	2,0	3,0	10,5	2,5	1,6
<i>No constraints</i>	20,7	25,2	14,78	35,3	36,6	29,3	18,8	34,9

Table 46: Percentage of men and women who have heard of HIV/AIDS, percentage who can name at least one mode of transmission and prevention, by Geographic Zone.

	Men				Women			
	CENTER	SOUTH	SE	EAST	CENTER	SOUTH	SE	EAST
Heard of HIV/AIDS	92,2	67,7	74,5	81,3	84,2	59,8	67,4	75,0
Can name at least one mode of transmission	75,4	61,4	55,6	69,0	66,0	46,4	49,4	64,0
<i>Blood donation</i>	17,2	20,6	14,3	20,0	18,1	13,6	11,9	17,1
<i>Unprotected sex</i>	78,8	92,6	73,5	83,1	75,6	80,2	71,5	84,8
<i>Mother to Child</i>	1,5	3,1	2,8	7,5	0,8	4,9	2,3	3,2
<i>Breastfeeding</i>	0,3	0,7	1,1	3,9	0,0	2,4	1,4	2,2
<i>Unsterilized materials</i>	18,2	11,1	16,4	17,4	17,9	11,8	12,3	14,7
Can name at least one way to prevent the spread of HIV/AIDS	64,3	59,5	52,5	69,8	56,2	47,7	40,9	65,0
<i>Abstinence</i>	15,3	22,5	13,9	13,3	9,0	34,1	6,7	8,7
<i>Condoms</i>	20,9	60,4	45,1	72,1	29,1	59,2	38,7	75,2
<i>Monogamy</i>	54,9	60,7	37,4	43,3	43,2	42,3	34,6	37,9
<i>Testing</i>	3,1	5,3	8,4	5,5	5,2	3,6	6,5	2,8
Constraints to use these prevention means								
<i>Lack of condoms</i>	3,0	37,3	7,7	36,3	0,9	30,2	4,5	17,8
<i>Distance to health center</i>	1,4	18,4	6,3	24,4	1,0	13,0	2,6	16,9
<i>Lack of testing and counseling services</i>	5,7	43,9	5,2	31,0	1,2	18,1	1,5	16,1
<i>Polygamy</i>	2,2	27,1	9,7	8,5	3,4	31,0	10,3	3,6
<i>Tabus and beliefs</i>	1,1	3,8	4,1	9,0	1,7	4,5	4,4	4,4
<i>No constraints</i>	31,3	10,2	17,2	22,4	46,7	12,6	25,3	29,4

Among those who have heard of HIV/AIDS, the percentage of those who can name at least one mode of prevention or protection varies from 70% in the East to 52% in the South East (for men), and from 65% in the East to 41% in the South East (for women). The most commonly identified prevention method is fidelity and the use of condoms (especially in the East and South). Constraints to the prevention of the spread of AIDS include the lack of condoms (in the South and East), the distance to health care services (also in the South and East) and lack of counseling and testing services (in the South and East). Abstinence is rarely cited, but more often cited by men and women in the South. Polygamy is cited as a constraint in the South, by both men and women. Almost one third of the men and one half of the women who have heard of AIDS in the Central Plateau stated that there are no constraints to prevent its spread.

4.10 Health and nutritional status of children under five, and nutrition and disease prevention practices

4.10.1 Hypotheses, dependant and independent variables

The results framework for the SALOHI program posits that improving nutritional knowledge, attitudes and practices of household members and increasing the adoption of household food and personal hygiene behaviors will contribute to an improvement in the health and nutritional status of children under five. Three hypotheses are explicit in the results framework:

- Children of mothers who participate in growth monitoring and promotion are less likely to be malnourished than children who do not participate;
- Children of mothers who practice Essential Nutrition Actions are less likely to be malnourished than children of mothers who do not;
- Children whose mothers practice all four food hygiene behaviors and all five personal hygiene behaviors are less likely to be sick. Children who are sick are more likely to be malnourished.

In this section, we will try to test these assumptions and evaluate the results framework and the relationship between program intermediate results and the outcomes and impacts they are designed to contribute towards. Two dependant variables are concerned by the above mentioned hypotheses: malnutrition and morbidity in children under five years of age. In the SALOHI results framework, malnutrition indicators include stunting (H/A <-2 SD in children 6 – 59 months of age) and underweight (W/A <- 2 SD in children 0 – 59 months of age). The incidence of disease in the two weeks prior to the survey is used as an indicator of morbidity. Two groups of independent (explanatory) variables are analyzed in relation to these dependent variables: nutritional practices and disease prevention practices

- Nutritional Practices :
 - Breastfeeding
- Disease prevention practices
 - Participation in growth monitoring
 - Personal and food hygiene behaviors

The dichotomous variables are analyzed in a 2 X 2 cross tab to calculate simple statistical associations, principally the relative risk and the odds ratio. The goal of the exercise is not to discover a completely explicative model for malnutrition, taking into consideration all the factors that could theoretically be pertinent. We are simply looking to support the Program results framework by identifying the existence of one-dimensional relationships between nutritional practices and disease prevention practices, on the one hand, and on nutritional status and morbidity of children under five years of age, on the other.

4.10.2. Association between participation in growth monitoring activities and malnutrition

Children under five are classified into two categories – household where mothers or caregivers state that their children participate in growth monitoring activities, and households where mothers or caregivers state that children do not participate in growth monitoring. The same children are then classified into two groups depending on their nutritional status: children who are malnourished and children who are not malnourished. Three indicators are used to determine malnutrition: stunting (H/A<-2SD), underweight (W/A<-2 SD) and emaciation (W/H <-2 SD).

The “complex sample table” module of Epi Info was used to calculate the level of malnutrition for each type of child, the relative risk, the odds ratio and their respective confidence intervals at 95%. Table 48 summarizes the results.

Table 48: Statistical association between participation in growth monitoring activities and malnutrition in children under five years of age.

		Malnutrition					
		H/A		W/A		H/W	
		Yes	No	Yes	No	Yes	No
Participate in growth monitoring	No	38,6	61,3	31,4	68,6	7,5	92,5
	Yes	39,7	60,3	33,9	66,1	10,5	89,5
Odds ratio		0,957		0,893		0,693	
Lower Level Confidence Interval (95 %)		0,72		0,69		0,46	
Upper Level Confidence Interval (95 %)		1,264		1,156		1,042	
Relative Risk (RR)		0,974		0,927		0,716	
Lower Level Confidence Interval (95 %)		0,82		0,78		0,49	
Upper Level Confidence Interval (95 %)		1,154		1,104		1,040	
RR = Risk to be malnourished if participation in growth monitoring is No, vs. The risk to be malnourished if participation in growth monitoring is Yes.							

Relative risk is the relationship between the incidence in people with the risk factor (exposed to risk) and the incidence in people who are not exposed to the risk factor (non exposed to risk). The risk factor in Table 48 is participation (or not) in growth monitoring. The incidence level is the percentage of new cases, opposed to the prevalence in all cases (new and old). The level of malnutrition calculated here are not the levels of incidence; they are the prevalence levels. In this case the relative risk is equal to the odds ratio (OR). It is a relative risk of prevalence (RRP). In Table 48, the OR corresponds to the RR. For stunting (H/A) the $RR = OR (38.6 \times 60.3) / (39.7 \times 61.3) = 0.956$. This corresponds to the value of the OR in the Table.

A RR equal to 1 signifies that the risk is identical for people exposed to the risk and for people who are not exposed. A RR less than 1 indicates that the risk is less for people exposed to the risk than for people not exposed to the risk. When the 95% Confidence Interval contains 1 (when the lower limit of the CI is less than or equal to 1 and the upper limit is more than or equal to 1), the RR or the OR are not statistically significant. If the upper limit and the lower limit are located on the same side of 1 (above or below), the RR or the OR is statistically significant, even if we can't determine to what level (threshold).

The OR and the RR in Table 48 are less than 1, no matter what level of malnutrition. Which signifies, paradoxically, that the risk to be malnourished, for a child living in a household where mothers do not participate in growth monitoring activities, is less than the risk to be malnourished for a child living in a household where the mother participates in growth monitoring. Regardless, neither the OR nor the RR is statistically significant. The difference is due to chance. We tested the association between the two variables in each geographic zone separately. The conclusions are the same. Participation in growth monitoring alone has no influence on the nutritional status of children under five. Other (intermediate) variables must be taken into consideration.

The absence of association between participation in growth monitoring activities and the nutritional status of children under two should make us question not only our assumptions, but also the pertinence of the

activity. How long does a child need to participate in growth monitoring before it has an effect on malnutrition? What advice and nutritional support is given to mothers and caregivers? To what extent is this advice put into practice? It is possible that children who participate in these activities do not benefit enough from them, from a nutritional stand point. We should take these findings into consideration when designing, implementing and monitoring program activities.

4.10.3. Associations between nutritional practices and malnutrition

We used breastfeeding as a variable for nutritional practices which have an impact on malnutrition in children under five, and crossed it with three malnutrition indicators in children 0 – 24 months (breastfeeding practices were only collected for women with children under two). Table 49 summarizes the statistical associations.

This analysis indicates that breastfeeding (at all) reduces the risk of malnutrition in children under two, no matter which malnutrition indicator is used. In SALOHI households, the risk of stunting is at least one and a half times higher (up to two and a half times higher, using the upper limit of the CI) in children under two who are not breastfed, compared to children who are breastfed. These results are statistically significant. On the other hand, even though the statistical analysis indicates that the risks of underweight and emaciation are higher in non breastfed children, the CI indicate that the results are not statistically significant.

Table 49: Statistics of the association between breastfeeding and malnutrition in children 0-24 months of age.

		Malnutrition (children 0-24 months)					
		H/A		W/A		H/W	
		Yes	No	Yes	Yes	No	Yes
Children breastfed	No	49,7	50,3	35,3	64,7	13,3	86,7
	Yes	38,4	61,6	32,4	67,6	8,7	91,3
Odds ratio		1,580		1,143		1,615	
Lower Level Confidence Interval (95 %)		1,05		0,77		0,92	
Upper Level Confidence Interval (95 %)		2,368		1,700		2,820	
Relative Risk (RR)		1,292		1,092		1,533	
Lower Level Confidence Interval (95 %)		1,05		0,84		0,94	
Upper Level Confidence Interval (95 %)		1,593		1,414		2,493	
RR = Risk to be malnourished if the child is not breastfed, vs. the risk to be malnourished if the child is breastfed							

4.10.4. Association between morbidity and malnutrition in children 0-59 months of age

The baseline survey asked all mothers with children under five years of age, if their child had been sick in the two weeks prior to the survey, and if yes, the symptoms of his or her sickness. The association between sickness in the two weeks prior to the survey and malnutrition is presented in Table 50.

Table 50: Statistical association between morbidity and malnutrition in children under five years of age

		Malnutrition (children 0-59 months)					
		H/A		H/A		H/A	
		Yes	Yes	Yes	Yes	Yes	Yes
Sick in two weeks before survey	No	41,7	58,3	31,5	68,5	6,9	93,1
	Yes	40,9	59,1	38,4	61,6	10,3	89,7
Odds ratio		1,035		0,736		0,646	
<i>Lower Level Confidence Interval (95 %)</i>		0,92		0,63		0,49	
<i>Upper Level Confidence Interval (95 %)</i>		1,159		0,858		0,860	
Relative Risk (RR)		1,020		0,819		0,670	
<i>Lower Level Confidence Interval (95 %)</i>		0,85		0,74		0,52	
<i>Upper Level Confidence Interval (95 %)</i>		1,090		0,906		0,871	
RR = Risk to be malnourished if the child was not sick vs. the risk to be malnourished if the child was sick in the two weeks prior to the survey.							

The analysis indicates that there is a significant association between the incidence of disease in children under five and underweight, on the one hand, and emaciation on the other. The risk of stunting is the same for children who were sick and who were not sick. These findings are logical, as a sickness in the two weeks prior to the survey would certainly have a greater impact on weight than height. A disease of long duration or frequent disease incidence could have an impact on weight as well as height in children under five.

4.10.5. Hygiene and disease in children under five years of age

If personal hygiene and food hygiene have consequences on malnutrition, it is undoubtedly through their impact on disease and morbidity. This is our third hypothesis to test. We have related the adoption of personal and food hygiene behaviors to morbidity. We classified mothers into two categories – those who practice good hygiene and those whose practices are poor. For personal hygiene, we classified mothers who wash their hands at least two critical moments out of five as good. We classified as good households who practice at least two recommended food hygiene practices out of four.

Table 51: Statistical association between personal hygiene practices and food hygiene practices of mothers, and morbidity in children under five years of age

		Sick in two weeks prior to the survey	
		Yes	No
Personal Hygiene Practices	Poor	48,4	51,6
	Good	40,2	59,8
Odds ratio		1,397	
<i>Lower Level Confidence Interval (95 %)</i>		1,12	
<i>Upper Level Confidence Interval (95 %)</i>		1,750	
Relative Risk (RR)		1,205	
<i>Lower Level Confidence Interval (95 %)</i>		1,06	
<i>Upper Level Confidence Interval (95 %)</i>		1,367	
Food Hygiene Practices	Poor	45,2	54,8
	Good	43,7	56,3
Odds ratio		1,061	
<i>Lower Level Confidence Interval (95 %)</i>		0,79	
<i>Upper Level Confidence Interval (95 %)</i>		1,428	
Relative Risk (RR)		1,034	
<i>Lower Level Confidence Interval (95 %)</i>		0,88	
<i>Upper Level Confidence Interval (95 %)</i>		1,220	

There is a statistically significant relationship between personal hygiene practices and morbidity in children under five years of age in SALOHI zones. The risk for children living in households with poor personal hygiene practices is 1.5 times higher than for children who live in households with good personal hygiene practices. On the other hand, the risks related to food hygiene practices show no statistical significance.

Section 5: Food insecurity and household livelihoods

The second Strategic Objective in the SALOHI program is to improve household livelihoods and strengthen household coping strategies by increasing agricultural production, strengthening farmers' groups and agribusinesses, and supporting village savings and loans. Two impact indicators are used to evaluate household livelihoods – average household dietary diversity score and the average number of months of adequate household food provisioning. These two indicators focus on the desired outcome of improved food access – improved household food consumption – and are standard Food for Peace indicators for Title II programs.

In this section, we will present the current levels for these two indicators and analyze variations by NGO intervention zone and geographic zones, as well as type of household (FHH and MHH). Information relative to agricultural production, farmers' organizations and household savings and credit practices is also presented. Finally, simple statistical methods are used to explore the relationship between these indicators, using the average number of months of adequate household food provisioning as a dependant variable, and agriculture production and farmer organization as independent (explicative) variables.

5.1. Household food insecurity: food access

USAID defines household food security as “when all people at all times have both physical and economic access to sufficient food to meet their daily dietary needs for a productive and healthy life” (USAID, April 1992). Using this definition, three variables are considered critical for food security:

- a) Food availability: there is a sufficient quantity of food (calories) available nationwide, per person, from national production, commercial imports, or food aid;
- b) Food access : people have physical and economic access to the food that is available;
- c) Food utilization: people are able to use the food that is accessible and available to extract their full nutritive value and meet their daily dietary requirements.

The SALOHI program focuses on all three components of food security, increasing food availability through monetization and increased agricultural production; improving food access by creating roads, strengthening household livelihoods, and distributing food directly to the most vulnerable; and improving food use by strengthening community capacity to prevent common diseases and maintain adequate nutrition.

Questions regarding the number of months of adequate household food provisioning and household dietary diversity were asked of women (either as the spouse of the household head, or as the defacto head of the household), who generally monitor household food stocks and prepare meals in Malagasy households.

5.1.1. Average number of months of adequate household food availability

96% of households surveyed experienced at least one month during which they didn't have enough food to meet their family's needs. Using the standard FANTA questionnaire (FANTA 2007), the survey team asked each household to list the months when they did not have enough food during the last year. Table 52 summarizes these results.

Table 52: Percentage of households who cited the months of when there was not enough food in the household, by NGO zone and geographic zone.

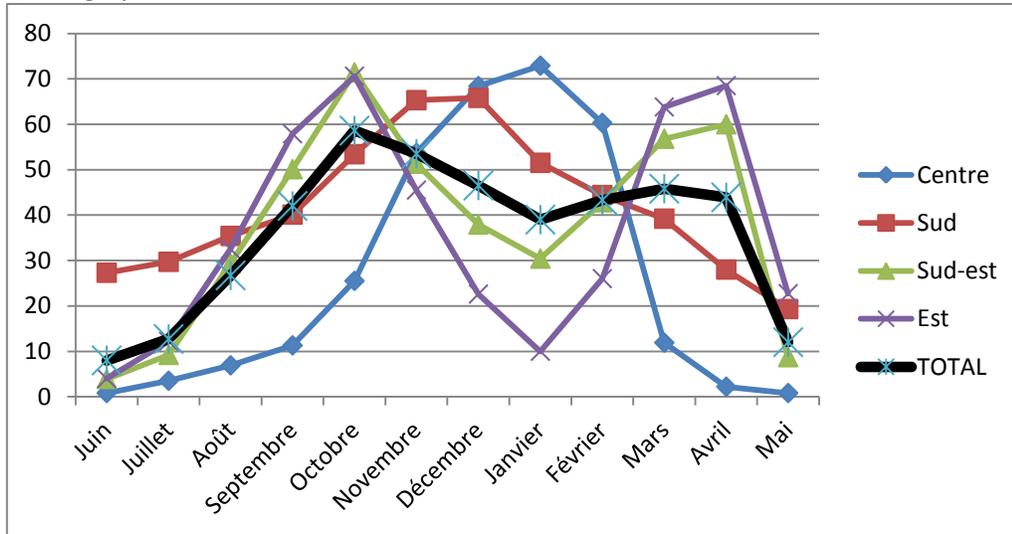
	ADRA	CARE	CRS	LOL	Center	South	South-East	East	TOTAL
January	59,7	42,5	23,6	21,1	72,9	51,5	30,4	10,0	39,0
February	51,1	53,3	32,0	51,3	60,3	44,4	42,8	26,0	43,3
March	22,2	60,4	54,4	79,9	2,2	39,2	56,8	63,8	45,8
April	13,8	55,4	56,2	91,3	0,8	28,0	60,0	68,5	43,9
May	1,9	24,5	16,0	15,2	0,8	19,3	8,7	22,7	12,0
June	0,6	18,9	11,0	7,1	3,5	27,3	3,9	4,0	8,0
July	3,0	32,0	14,1	16,3	6,9	29,7	9,2	12,2	12,7
August	12,6	49,7	27,5	45,4		35,4	29,3	32,5	26,7
September	23,2	64,9	43,8	74,8	11,3	40,1	50,1	57,9	42,0
October	45,9	79,1	57,0	86,5	25,5	53,4	71,4	70,6	58,6
November	60,4	55,6	49,0	42,7	53,7	65,3	51,3	45,5	53,5
December	64,4	41,5	37,6	22,6	68,4	65,8	37,9	22,6	46,5

Table 52 and Figure 20 show that, on average, the hungry season in SALOHI communities lasts from September to April, when more than 40% of women said their households lack sufficient food. During the period just after the main harvest from May to August, most households (73 – 91%) have sufficient access to food. During the months of October and November, food insecurity peaks, and more than half of the households surveyed lack sufficient food to meet their family needs.

In terms of adequate food access, results vary considerably by NGO intervention zone and geographic zone. The South East and the East have similar household food access profiles, and are close to the program average, with a few important differences. In the East households have improved household access to food from December – February, whereas in the South East, the period is slightly shorter (December – January) and less pronounced. The Central Plateau has a particular profile, characterized by one hungry season lasting four months, from November to February, affecting more than half the households (and affecting 2/3 of households in December/January). In the South, more than half the households lack access to sufficient food from October – January (4 months), but 40% of households lack access to food from September – February (6 months), and 30% lack food from August to March (8 months). Over two thirds of Land O'Lakes households suffer from inadequate access to food in two distinct hungry seasons, in March/April and September/October. These differences will have important impacts on the programming of food distribution, as well as food aid targeting.

Figure 20 : Monthly variation in food access. Percentage of women who reported lacking adequate access to food during each month.

a) Geographic Zone



b) NGO zone

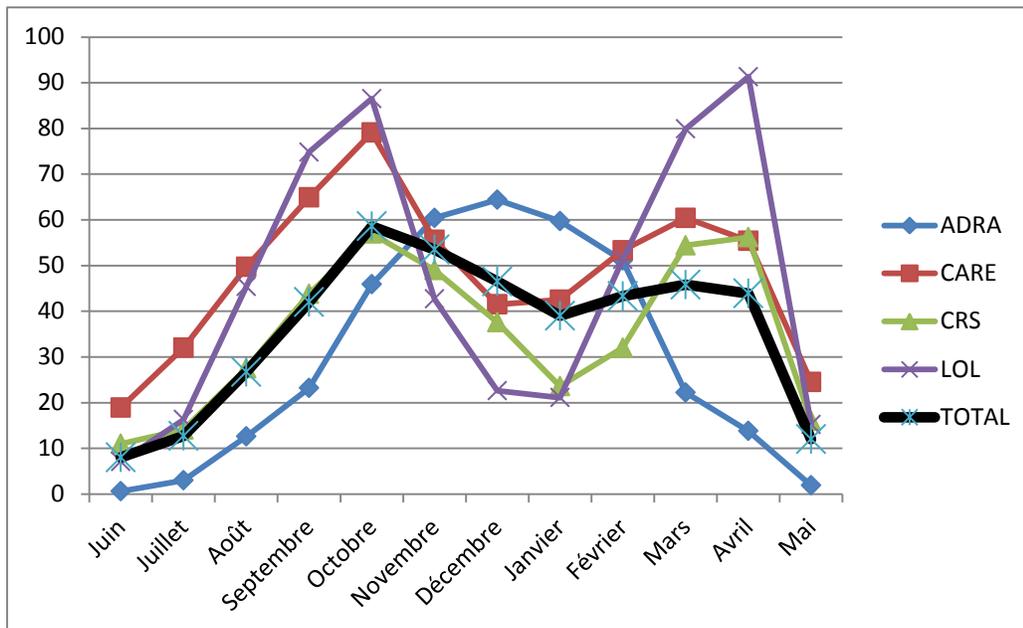


Table 53 shows the distribution of households by the number of months of adequate food provisioning. For the total SALOHI zone, the average number of months of adequate food provisioning is 7.7. It varies somewhat by zone, from a low of 7 months in the South, 7.5 in the East and South East, to 8.8 months in the Central Plateau.

Table 53: Months of Adequate Household Food Provisioning (MAHFP; Percentage of Households with Adequate Food Provisioning, by NGO zone and geographic zone).

Number of MAHFP	ADRA	CARE	CRS	LOL	Center	South	South-East	East	TOTAL
0	0,0	9,4	0,2	2,2	0,0	6,4	0,5	0,4	1,6
1	0,2	0,5	0,0	0,4	0,3	0,2	0,1	0,2	0,2
2	0,3	2,4	0,3	1,9	0,2	1,0	0,8	0,6	0,7
3	0,3	3,6	0,9	3,7	0,5	0,9	1,5	1,8	1,3
4	1,3	7,9	4,7	7,4	1,2	5,7	4,4	5,0	4,1
5	3,4	13,9	9,3	13,4	3,3	11,5	8,1	9,9	8,2
6	8,1	14,8	13,2	27,5	4,9	11,7	17,1	12,9	12,8
7	13,9	11,5	14,1	12,7	9,2	14,0	15,8	12,9	13,6
8	26,7	11,7	15,8	12,6	22,4	13,1	21,5	15,9	18,9
9	18,9	9,4	19,5	7,3	21,9	19,5	11,7	19,4	16,8
10	16,3	9,5	15,1	7,0	20,4	11,9	12,2	13,6	14,0
11	3,4	2,0	5,1	1,5	3,2	1,5	4,6	4,5	3,7
12	7,3	3,4	1,9	2,5	12,2	2,7	1,7	2,5	4,1
Average	8,4	6,2	7,8	6,5	8,8	7,0	7,5	7,6	7,7
Median	8,0	6,0	8,0	6,0	9,0	7,0	8,0	8,0	8,0

MAHFP =Months of Adequate Household Food Provisioning

The average number and the median number of months of adequate food provisioning are more or less identical for MHH and FHH (Table 53 b). MHH have, on average, 0.3 more months of adequate food provisioning, which increases to almost ½ of a month in the Center and South East.

Tableau 53 b: Average number of months of adequate household food provisioning, by sex of the household head, NGO Intervention Zone and Geographic Zone.

Sex of HH head	MAAA	ADRA	CARE	CRS	LOL	CENTER	SOUTH	SOUTH-EAST	EAST	TOTAL
Masculin	Average	8,5	6,2	7,8	6,6	8,9	7,0	7,6	7,6	7,7
	Median	8,0	6,0	8,0	6,0	9,0	7,0	8,0	8,0	8,0
	No of HH	888	327	954	172	490	466	926	459	2341
Féminin	Average	8,2	6,5	7,7	6,2	8,4	7,1	7,2	7,7	7,4
	Median	8,0	7,0	8,0	6,0	9,0	8,0	7,0	8,0	8,0
	No of HH	152	67	232	82	75	109	250	99	533
TOTAL	Average	8,0	6,2	7,8	6,5	8,8	7,0	7,5	7,6	7,7
	Median	8,0	6,0	8,0	6,0	9,0	7,0	8,0	8,0	8,0
	No of HH	1040	394	886	254	565	575	1176	558	2876

5.1.2. Household Dietary Diversity Score (HDDS)

Household dietary diversity is defined as the number of different food groups consumed in the household during a pre-determined reference period (in this case, 24 hour recall is used). This is an attractive proxy indicator for a number of reasons. First, a diversified diet is an important outcome in and of itself. Eating from a variety of food sources is an excellent way to ensure adequate nutrition, especially micronutrient nutrition. In addition, a diversified diet is associated with a number of improved outcomes including reduced anemia, increased birth weight, and decreased malnutrition levels in children under five. Finally, a diversified diet is useful as a proxy indicator for household income, and socio-economic status (FANTA 2006). Dietary diversification is also an appropriate household coping strategy, and increased dietary diversification increases household capacity to withstand shocks. Unlike the Individual Dietary Diversity Score (IDDS), the HDDS is not used in this context as a proxy for the nutritional quality of an individual's diet (FANTA 2006).

Using a pre-determined list of food groups from FAO and FANTA, women were asked which foods were consumed in the household during the previous 24 hour period. Food groups included rice, bread and wheat flour products, cereals, roots and tubers, orange colored vegetables (sources of vitamin A), dark green leafy vegetables (sources of iron), other vegetables, fruits or fruit juice, meat, eggs, seafood, beans, dairy products, oils or fats, sugar or honey, or tea/coffee. The list was read and women were asked to respond positively or negatively to each food group. Table 54 summarizes the percentage of households which consumed the various foods in the 24 hours preceding the survey.

Table 54: Percentage of households in which each food group was consumed, by NGO intervention zone and geographic zone.

Food groups	ADRA	CARE	CRS	LOL	Center	South	South-East	East	TOTAL
Rice and rice products	98,1	65,2	68,5	86,3	98,6	15,1	94,7	98,7	80,3
Bread and wheat flour products	4,9	2,9	8,0	6,6	6,6	1,7	5,6	10,9	6,0
Maize, sorghum and derivatives of maize	10,0	15,6	14,8	1,8	16,1	19,4	4,0	17,3	12,0
Carrots, sweet potatoes, melon/pumpkin	41,9	58,1	30,6	23,3	47,6	42,4	33,0	33,3	37,8
Roots and tubers	69,9	70,6	80,1	51,7	56,3	74,1	75,6	81,1	72,6
Green leafy vegetables	79,3	56,4	68,9	69,9	77,5	51,8	77,1	71,5	71,0
Other vegetables	3,4	4,5	4,2	13,1	3,1	1,3	6,4	6,5	4,7
Fruit and fruit juice	19,0	19,9	21,3	34,0	6,4	4,4	36,4	22,4	21,4
Meat (all types)	16,5	9,4	10,6	7,5	17,7	6,9	10,5	16,1	12,3
Eggs	3,3	1,3	4,8	2,3	4,3	0,8	3,5	5,9	3,6
Fish and seafood	16,6	30,5	21,5	17,3	12,5	2,1	22,6	43,8	20,6
Beans, peas, lentils, peanuts	38,4	10,5	19,6	13,6	38,2	5,7	27,8	23,3	24,6
Dairy products	2,7	5,9	3,0	2,2	4,5	3,7	1,8	4,3	3,2
Oil and fats	42,9	47,3	34,4	39,9	50,9	7,4	42,1	56,5	39,7

Food groups	ADRA	CARE	CRS	LOL	Center	South	South- East	East	TOTAL
Sugar, honey	74,7	28,6	34,5	46,5	75,4	3,6	60,6	46,0	49,3
Coffee, tea	83,7	45,9	55,7	55,1	76,6	10,8	81,9	70,6	64,4
Number of Households	1039	394	1186	254	564	574	1176	559	2873

Table 54 indicates that 80% of SALOHI households consumed rice or rice products, 72% consumed roots or tuber crops, 71% consumed green leafy vegetables, and 64% consumed coffee or tea in the 24 hour period before the survey. Almost half of all households consumed sugar or honey, but only 40% consumed any oils or fats. One in four households consumed beans or legumes, and one in five consumed seafood or fish, and fruits. Only one in six households consumed any meat or eggs.

Consumption patterns vary significantly by zone. LOL and ADRA zones consume more rice (86 -98%) than CARE and CRS zones (65-68%). In contrast, rice is consumed by over 90% of households in all geographic zones, except the South (15%). Wheat flour products, although not widely consumed by any households (6%), are twice as likely to be consumed in the East (11%). Maize is consumed more often in CARE and CRS zones, and in the East and the South (17 – 19%). Carrots and other orange fleshed vegetables were half as likely to have been consumed in LOL zones than in ADRA or CARE zones (23% vs. 42 – 58%). Root and tuber crops were less likely to have been consumed in LOL zones (52%) or the Central Plateau (56%). Green leafy vegetables were less likely to have been consumed in CARE zones, and in the South. Fruits and fruit juices were much less likely to have been consumed in LOL zones than in other NGO zones, and in the Center (6%) or South (4%) than in the East (22%) or South East (36%). Meat was consumed two times more frequently in ADRA (17%) zones than LOL (7.5%) zones, and half as frequently in the South (7%) than in the Center (18%) or East (16%). Consumption of oils, fats, beans/pulses, sugar/honey, and coffee/tea were much lower in the South than in other zones.

These consumption practices will have an impact on the approaches taken to improve dietary diversity by each NGO, as well as on the target crops in each zone and opportunities to improve agricultural production and micronutrient nutrition in each zone.

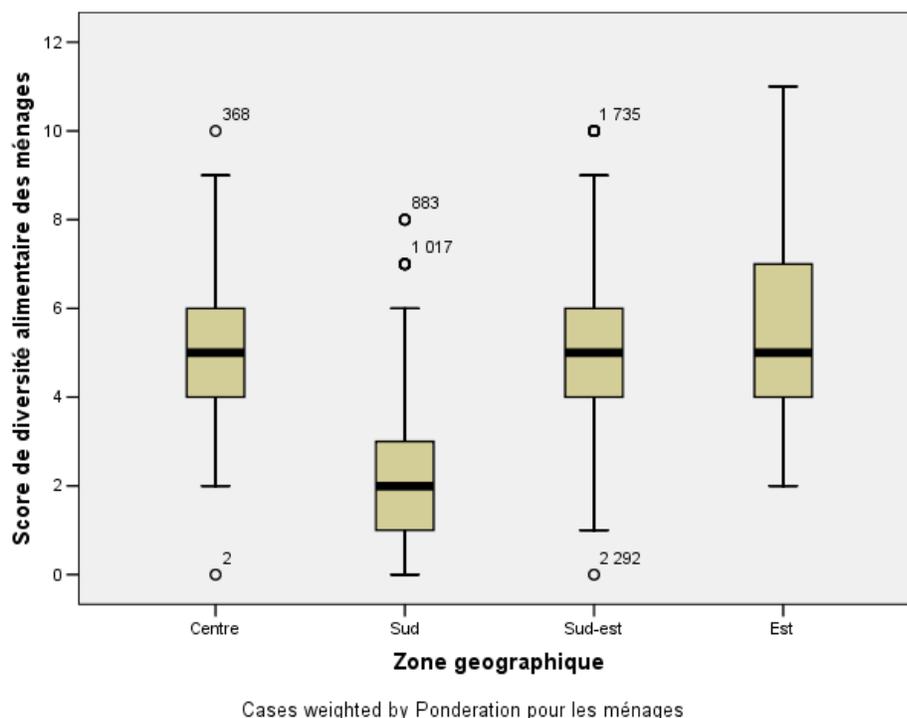
FANTA-2 recommends that the HDDS be calculated based on 12 standard food groups. Using this process, the average dietary diversity score is calculated for all SALOHI households (Table 54). SALOHI households consumed an average of five food groups out of the standard 12. Households in the South have a much lower HDDS of 2.2 food groups out of 12. ADRA households have a slightly higher HDDS than other households in other NGO zones (5.5 vs. 4.4).

Table 54: Average Household Dietary Diversity Score (HDDS) in SALOHI zones, by sex of the Household Head, NGO zone and geographic zone.

Sex of the HH head	ADRA	CARE	CRS	LOL	CENTER	SOUTH	SOUTH EAST	EAST	TOTAL
MHH	5,6	4,4	4,4	4,5	5,4	2,3	5,5	5,6	4,9
FHH	5,3	3,6	4,1	4,1	4,6	2,1	5,0	5,1	4,4
TOTAL	5,5	4,3	4,4	4,4	5,3	2,2	5,4	5,5	4,8

Dietary diversity scores are slightly lower for FFH than MHH, in all NGO zones and in all geographic zones. These differences are more pronounced in CARE households, and in the Center, East and South East. There is almost no difference in the dietary diversity score for MHH and FFH households in the South.

Figure 21: Variation in HDDS in SALOHI households, by geographic zone⁶



Household Dietary Diversity Scores within each geographic zone differ considerably, especially in the East (Figure 21).

⁶ The outlying numbers in the chart refer to the household number associated with the data point (an identifying household number was given to each household surveyed during the baseline)

5.1.3. Household Coping Strategies

The Coping Strategies Index (CSI) was developed (Maxwell and Caldwell, 2008) to evaluate the strategies households use to respond to periods when food is unavailable, and to evaluate the degree to which households resort to destructive practices during times of hardship. Households are asked what they do when they don't have enough food to meet their family needs (or enough money to buy enough food), and how often they resort to each strategy in a seven day period. The CSI protocol includes five coping strategies most commonly used to deal with the lack of food access, including (1) consuming less expensive or less preferred foods; (2) borrowing food or using assistance from family or friends; (3) decreasing the amount of food eaten at each meal; (4) decreasing the amount consumed by adults to allow children to eat first, and (5) reducing the number of meals consumed per day. Each strategy is classified by the degree to which it has a long term impact on the productive capacity of the household (less severe, severe, or very severe). Finally, the frequency with which each strategy is employed in a seven day period is multiplied by the severity score to develop an overall Coping Strategies Index, or CSI, per household and per zone.

Table 55 summarizes the percentage of households which used each of the five coping strategies, and the number of days in a week each strategy was used. In general, all five strategies were used in SALOHI households, in all geographic zones. The most common strategy used was decreasing the ration size per meal (88%), and consuming less expensive or less preferred foods (85%). Decreasing consumption of adults in favor of children was also widely practiced (72% of households resorted to this strategy at some point during times of hardship). Reducing the number of meals (65%) and borrowing food (63%) were practiced less frequently.

However, there were important differences in the strategies used, depending on the zone. Households in the Center were less likely to resort to reducing adult consumption in favor of children (47%), or reducing the number of meals per day (29%) than other zones. Households in the East were more likely to resort to borrowing (71%), and households in the South East to decrease ration size (90%). Households in the South are generally distinguished by the frequency with which they practice these coping strategies (99% of households resort to using less expensive foods at least once per week, and 75% reduce the number of meals per day everyday, 66% reduce ration site every day, and 55% reduce adult consumption in favor of children **every day** during times of hunger!).

Table 55: Household Coping Strategies Index (CSI). Percentage of households who adopted various coping strategies, and the number of days in a week the strategy was adopted, by zone.

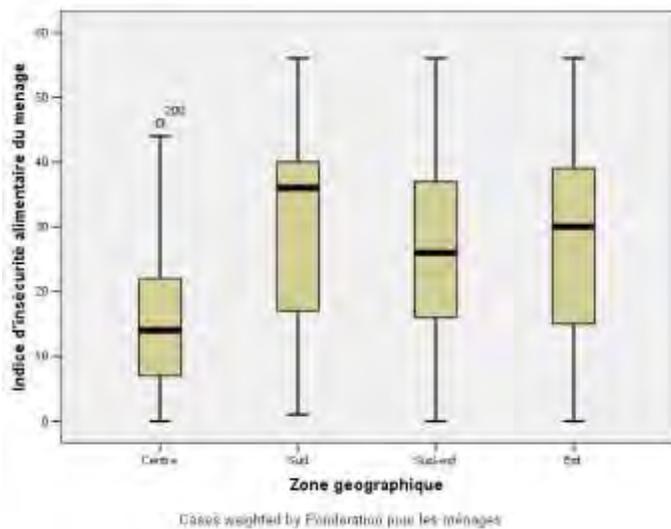
Geographic Zone	Number of days out of 7 in which the strategy was used								CSI
	0	1	2	3	4	5	6	7	
Center									
Using less expensive or less desired foods	21,9	21,3	14,6	14,9	6,0	2,3	0,9	18,0	79,0
Borrow food	41,8	17,3	23,1	10,9	3,7	1,2	-	1,9	58,2
Decrease ration size	26,6	11,2	12,4	11,8	8,0	3,0	0,9	26,0	73,4
Reduce consumption of adults for children	53,2	8,5	7,9	7,7	7,8	2,9	0,2	12,7	46,8
Reduce number of meals eaten per day	70,6	3,8	8,4	4,0	1,9	0,5	0,5	10,3	29,4

Geographic Zone	Number of days out of 7 in which the strategy was used								CSI
	0	1	2	3	4	5	6	7	
South									
Using less expensive or less desired foods	0,6	50,3	11,6	8,5	4,1	2,5	2,7	19,8	99,4
Borrow food	46,8	10,6	18,3	9,1	4,2	2,4	1,6	7,0	53,2
Decrease ration size	17,0	4,0	4,9	3,3	2,1	1,2	1,6	65,8	83,0
Reduce consumption of adults for children	27,2	6,5	2,5	4,7	2,0	1,0	1,3	54,9	72,8
Reduce number of meals eaten per day	9,8	6,1	2,7	1,4	2,6	1,4	1,2	74,9	90,2
South-East									
Using less expensive or less desired foods	15,8	7,8	15,0	18,5	11,0	5,1	2,4	24,3	84,2
Borrow food	35,1	16,8	21,0	15,6	5,9	2,0	0,9	2,8	64,9
Decrease ration size	5,0	5,0	12,8	12,3	8,9	5,5	2,3	48,2	95,0
Reduce consumption of adults for children	18,6	5,6	12,8	14,1	8,9	4,5	2,0	33,5	81,4
Reduce number of meals eaten per day	30,5	3,7	12,7	10,4	7,0	3,9	2,2	29,6	69,5
East									
Using less expensive or less desired foods	18,9	10,5	14,2	20,6	7,5	5,8	4,0	18,5	81,1
Borrow food	29,0	16,2	21,9	16,5	6,7	1,1	1,9	6,7	71,0
Decrease ration size	4,7	2,8	9,1	13,5	6,6	5,3	6,2	5,7	95,3
Reduce consumption of adults for children	23,9	3,9	6,1	12,7	8,9	7,1	5,6	31,7	76,1
Reduce number of meals eaten per day	35,4	1,6	5,9	10,3	4,8	7,0	5,3	29,6	64,6
Total									
Using less expensive or less desired foods	14,6	19,5	14,1	16,2	8,0	4,2	2,5	21,0	85,4
Borrow food	37,5	15,6	21,0	13,6	5,3	1,7	1,1	4,2	62,5
Decrease ration size	11,6	5,6	10,4	10,6	6,9	4,1	2,7	48,0	88,4
Reduce consumption of adults for children	27,9	6,0	8,4	10,7	7,3	4,0	2,2	33,3	72,1
Reduce number of meals eaten per day	35,0	3,8	8,5	7,3	4,7	3,3	2,3	34,9	65,0

The CSI for SALOHI households is 24.9 (Table 56). The average CSI is much lower in ADRA zones and in the Central Plateau (15 vs. 28 for other NGO zones), indicating that households in ADRA zones and in the Central Plateau are less likely to resort to the most severe coping strategies during times of hardship. Inter-zone variation is very high and the median value varies considerably from one zone to the next, as can be seen in Figure 22.

Figure 22: Variation in the Household Coping Strategy Index (CSI)

a) Geographic Zones



b) NGO intervention zones

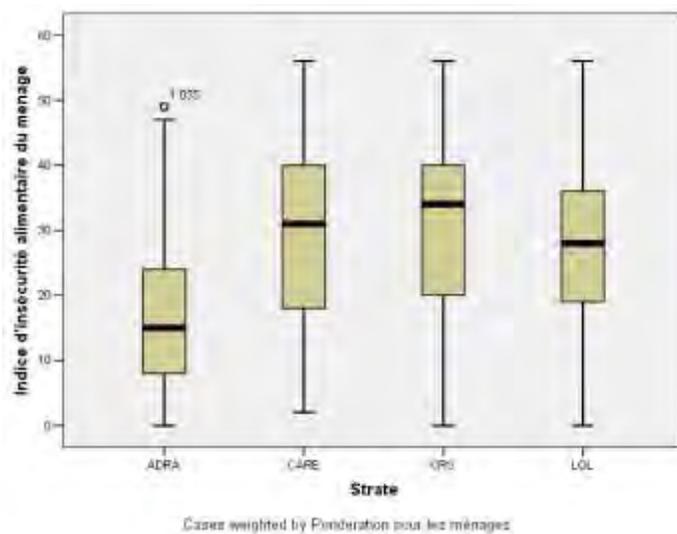


Table 56: Median and average values for Coping Strategies Index (CSI), by NGO zone and geographic zone.

Sex of HH	CSI	ADRA	CARE	CRS	LOL	CENTER	SOUTH	SOUTH EAST	EAST	TOTAL
MHH	Average	16,6	30,0	28,9	27,2	14,6	30,0	25,4	26,6	24,3
	Median	14,0	31,0	33,0	26,4	13,0	36,0	25,0	29,0	23,0
FHH	Average	19,2	29,0	32,0	30,6	17,7	28,5	29,7	29,6	27,8
	Median	18,0	33,5	36,0	30,7	16,0	30,0	30,6	35,0	28,0
TOTAL	Average	16,9	29,8	29,5	28,3	15,0	29,7	26,2	27,1	24,9
	Median	15,0	31,0	34,0	28,0	14,0	36,0	26,0	30,0	24,0

In addition to the fact that the household dietary diversity score is lower in FHH, data in Table 56 indicates that the coping strategies index is higher in FHH, except in the South. This means that FHH suffer more than MHH during times of hunger (the lean season), because they are forced to resort to more severe coping strategies to manage their more limited resources.

The reduction in the number of meals per day is considered by the Coping Strategies Index as one of the most severe strategies. The coefficient is, along with the reduction in food rations, the highest (3). As evidenced in Table 57, this strategy is practiced by 65% of SALOHI households (74% of FHH and 63% of MHH).

Table 57: Percentage of households who implement different strategies during the hungry season, by sex of household head, NGO Intervention Zone and geographic zone.

	MHH	FHH	TOTAL
Use of cheaper food	84,4	89,5	85,4
Borrowing food	61,6	66,3	62,5
Limiting rations	87,8	90,5	88,4
Reducing consumption	70,1	77,4	72,1
Reducing number of meals	62,7	73,8	65,0

In a normal period, households in SALOHI zones eat an average of 2.9 meals per day, and during the lean season, they eat an average of 2.4. Data in Table 57 indicates that, specifically, 88% of households eat three meals per day when food is available. During the lean season, only 49% of households manage three meals per day (51% of MHH and 41% of FHH), or a reduction of 44%.

Table 57: Percentage of households who take 1 – 5 meals per day during the « normal » season, and the number of meals consumed during the lean season.

Number of meals during the normal season	Number of meals in the lean season							Number	%
	0	1	2	3	4	5	ND		
1	5,6	88,9	-	-	-	-	5,5	18	0,6
2	0,4	68,7	30,5	-	-	-	0,4	259	9,3
3	0,1	9,1	36,2	54,4	-	-	0,2	2472	88,4
4	0,0	3,1	12,5	53,1	25,0	-	6,3	32	1,1
5	0,0	0,0	13,3	46,7	0,0	40,0	0,5	15	0,5
Number	5	419	981	1370	8	6	7	2796	100,0
%	0,2	15,0	35,1	49,0	0,3	0,2	0,3	100,0	

According to responses from heads of households, the three main sources of food during the last lean season were (in order of importance) (1) food purchases (95% of households, 40% of responses); (2) own harvest (58% of households, 28% of responses); (3) purchase of food on credit (50% of households, 21% of responses). MHH are slightly (4%) more likely to resort to their own harvest than FHH (indicating that their agricultural production levels may be higher).

Table 58: Percentage of responses from Head of Household regarding the three principal sources of food used during the last lean season, by NGO Intervention Zone and Geographic Zone.

Principal Source of Food Cited:	ADRA	CARE	CRS	LOL	CENTER	SOUTH	SOUTH EAST	EAST	TOTAL
Own harvest	37,2	16,4	26,2	18,0	39,3	20,5	28,7	23,9	28,2
Purchased food	40,2	42,4	39,8	41,3	40,6	44,5	40,8	36,0	40,4
Credit for food	18,3	29,7	20,8	23,8	16,2	21,6	22,4	23,7	21,3
Exchange	2,2	3,5	8,0	3,9	0,9	3,6	3,0	13,1	4,9
Gift from family or friends	0,5	2,2	0,5	3,3	0,3	0,8	1,2	1,2	1,0
Food aid	0,5	0,6	2,4	0,7	0,4	5,7	0,4	0,2	1,3
No sources	1,1	0,8	0,7	2,3	2,0	1,7	0,6	0,2	1,0
Other sources	0,2	4,5	1,4	6,6	0,2	1,6	2,8	1,7	1,8
TOTAL	100,0								

Table 58 b: Percentage of responses given by Head of Household regarding the three principal sources of food during the last lean season, by type of HH (MHH or FHH).

Principal source of food cited :	MHH	FHH	TOTAL
Own harvest	29,0	24,6	28,2
Food purchases	40,3	41,0	40,4
Credit for food	21,3	21,6	21,3
Exchange	4,8	5,4	4,9
Gift (family, friends)	0,8	1,7	1,0
Food aid	1,2	1,9	1,3
None	0,9	1,3	1,0
Other	1,7	2,6	1,8
TOTAL	100,0	100,0	100,0

5.2. Agricultural Production: Volume, Yield and Value of Crops Produced

Agricultural production is an essential component of household food security in Madagascar. The availability of food at the household level and the community level depends largely on local food production. Household food self sufficiency, achieved by increasing the volume of food produced and increasing the yields of crops produced, is the only sustainable way to improve local food availability. Data was collected during the baseline survey to help the SALOHI team determine existing agricultural production practices, local agricultural productive capacity, and constraints to agricultural production that should be addressed over the life of the program.

5.2.1. Agricultural Context

94% of households in SALOHI zones practice agriculture as one of their principal economic activities. This figure is slightly less in the South (89%) and South East (93%), and higher in the East (97%). 79% of SALOHI households practice agriculture and animal husbandry, especially in the Center (90%) and the South (82%). In the East less than 70% of households practice both crop production and animal husbandry. No households practice animal husbandry exclusively.

Most households practice crop production in low-lying areas. More than 70% of households have at least one rice paddy, especially in the Center (94%), South East (84%) and East (74%). In the South most households cultivate upland crops (76%).

However, few households benefit from irrigation. Out of approximately 2600 households who practice crop production, only 620 benefit from irrigation (24%). The largest number of irrigated fields is found in the Central Plateau, where 44% of households have irrigated crop land (246 households). In the East, 129 households practice irrigated crop production (26% of households in the East), and in the South East, 22% or 235 households benefit from irrigation. In the South only 2% of households benefit from irrigation.

Because of the lack of water management, crops are often destroyed by floods or drought. More than 65% of households in the South East and the East, and 48% of farmers in the Center were victims of floods during the last agricultural season. In the South, where crops are mostly produced in upland areas, no households suffered from flooded fields.

Nine farmers out of 10 received some sort of technical assistance in agriculture. Farmers had knowledge of a large number of agricultural techniques – 83% are aware of modern weeding techniques, 71% are familiar with crop associations, 63% with crop rotations, 52% with crop spacing/planting in lines, and 52% with organic fertilizers. However, fewer than 2% of farmers apply improved integrated rice production technologies (SRI or SRA).

Table 59: Percentage of farmers who know various agricultural techniques, and the percentage (%) who practice them, by Geographic Zone.

Agricultural Technique	CENTER		SOUTH		SOUTH EAST		EAST	
	Know	Practice	Know	Practice	Know	Practice	Know	Practice
Crop rotation	69,0	60,6	95,1	90,6	52,6	42,0	52,1	21,3
Crop associations	79,2	76,4	95,9	91,6	65,3	59,2	56,4	38,8
Planting in lines	85,1	48,7	26,1	13,3	56,3	10,4	40,8	3,8
Use of improved seed	39,7	15,6	70,0	36,1	34,2	17,5	29,6	8,2
Post harvest operations	32,5	17,5	36,9	26,7	15,1	7,8	26,2	15,4
Transformation/ processing	39,4	24,5	21,2	0,8	13,8	8,2	17,9	6,3
Use of organic matter	95,6	90,8	35,8	14,5	54,7	27,6	22,2	4,5
Compost	69,9	28,5	17,7	14,7	20,2	9,1	11,0	3,0
Mulching	4,0	2,0	5,6	2,6	7,8	3,3	7,3	1,0

Agricultural Technique	CENTER		SOUTH		SOUTH EAST		EAST	
	Know	Practice	Know	Practice	Know	Practice	Know	Practice
Use of chemical fertilizer	77,9	30,1	7,1	0,4	33,1	6,1	10,5	0,1
Direct seeding/ cover cropping	6,6	0,2	11,5	3,3	7,4	3,2	9,5	3,4
Terracing	81,0	63,7	16,0	2,9	17,8	8,5	10,0	4,1
Live fencing	8,1	3,0	40,0	17,0	14,5	9,0	31,5	9,8
Weeding	87,3	84,8	93,2	91,4	87,8	83,3	67,7	65,5
Water management	75,0	64,4	17,9	5,0	40,7	37,2	52,8	35,2
Integrated pest management	19,2	10,6	38,0	33,0	22,5	18,8	82,4	82,6
Avg no. Of techniques	8,7	6,1	6,3	4,4	5,0	3,1	5,3	3,0
Median no. of techniques	9,0	6,0	6,0	4,0	5,0	3,0	5,0	3,0

Figure 23: Comparison between the level of knowledge and practice of agricultural techniques. Percentage of farmers who know different techniques and the percentage who practice them.

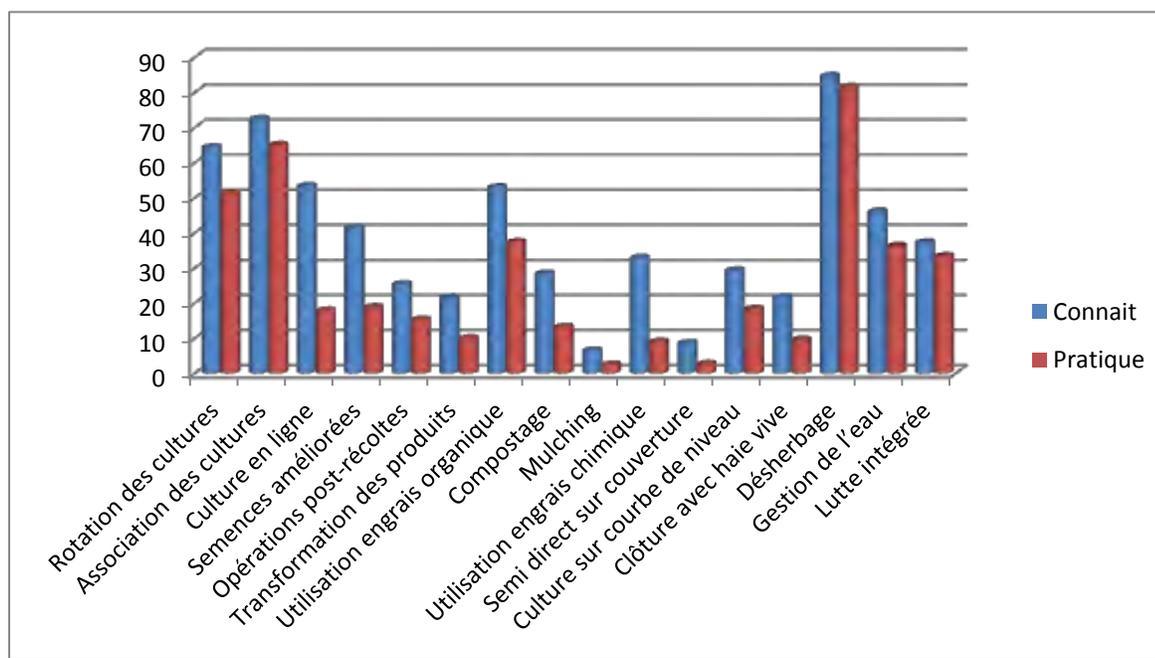


Table 60: Percentage of head of household/farmers who know various agricultural techniques and the percentage who practice them, by sex of head of household.

Agricultural Technique	MHH		FHH		Total	
	Know	Practice	Know	Practice	Know	Practice
Crop rotation	64,9	51,9	61,2	48,5	64,3	51,3
Crop associations	73,5	66,4	66,5	58,3	72,4	65,0
Planting in lines	54,0	18,7	50,0	13,5	53,3	17,8
Use of improved seed	42,2	19,0	37,9	18,1	41,4	18,8
Post harvest operations	26,1	15,4	21,2	13,8	25,3	15,2
Transformation/ processing	21,9	9,9	19,7	9,2	21,5	9,9
Use of organic matter	53,7	34,4	48,8	30,0	52,9	37,3
Compost	29,8	13,7	21,1	10,1	28,3	13,1
Mulching	6,4	2,3	6,5	2,9	6,4	2,4
Use of chemical fertilizer	33,9	9,2	27,6	7,1	32,8	8,9
Direct seeding/ cover cropping	9,1	2,6	5,7	2,8	8,5	2,6
Terracing	30,5	19,4	22,7	13,0	29,2	18,3
Live fencing	21,4	9,2	22,3	10,5	21,6	9,5
Weeding	85,3	81,9	81,7	79,6	84,6	81,5
Water management	47,2	37,1	40,5	32,1	46,0	36,2
Integrated pest management	36,6	33,1	40,2	34,5	37,2	33,3
Avg. No. Techniques	6,2	4,0	5,4	3,5	6,1	4,0
Median no. Techniques	6,0	4,0	5,0	3,0	6,0	4,0

With the understanding that all agricultural technologies are not equally pertinent across zones, on average farmers in SALOHI zones know six agricultural technologies out of 16 which were included in the survey. On average, they apply only four of those six (2/3). The biggest gap between knowledge and practice is in regards to chemical fertilizer, improved seeds and planting in lines.

By geographic zone, farmers in the Center have a higher level of technical knowledge (8 practices) and practice most of them (6/8, or 75%). Farmers in the South East and the East know fewer technologies (an average of 5), and practice only 60% of them (3/5). In terms of gender, FHH know slightly fewer technologies (5 vs. 6 for MHH), and practice fewer technologies (3.5 for FHH vs. 4 for MHH). However the overall percentage of technologies known that are practiced is roughly the same (70%).

The most commonly known agricultural techniques are crop associations, crop rotations, weeding, planting in lines, and the use of organic fertilizer. Few farmers know mulching or direct seeding/cover cropping.

However, among farmers who practice irrigated rice culture (1901 households), only 60 (3%) practice all the components of intensive rice farming (SRI⁷).

There is a significant gap between farmers' agricultural knowledge and practices, depending on the technology. In terms of weeding, almost all farmers who have learned improved weeding practices use them. 67% of farmers who are aware of crop associations practice them, and 52% of farmers who are aware of crop rotation practices apply them. When introducing new technologies, it will be important to look at the constraints to adoption and to address them directly, to ensure that farmers are able and willing to apply new technologies learned.

5.2.2. Crop production and yields

Households cultivate several crops at a time – an average of four. The principal crops produced include cassava (83% of households), rice (81% of households), sweet potatoes (62%), and maize (50%). Other crops are cultivated by fewer than 30% of households. Rice is the main crop grown by most farmers, except in the South (only 11% of households). Sorghum is mostly cultivated in the South (21% of households); maize is cultivated in the South (89%) and the Center (70%). Cassava is cultivated throughout the area, but more in the South and South East. Beans are produced mostly in the Central Plateau. Rice, sorghum, maize, cassava and beans are the main crops which SALOHI teams will promote, depending on the intervention zone (Table 61).

Table 61: Percent of households that cultivate crops indicated, by NGO intervention zone and geographic zone.

Crops	ADRA	CARE	CRS	LOL	Center	South	South- East	East	TOTAL
Cassava	80,9	81,6	85,4	82,8	73,1	87,5	88,0	77,9	83,0
Rice	96,9	70,3	67,0	96,9	94,7	10,6	98,4	98,9	81,0
Sweet potatoes	69,0	71,6	52,2	64,0	80,9	79,2	52,0	45,5	61,9
Maize	55,1	56,5	51,1	4,1	69,8	89,2	26,0	38,3	49,6
Beans	57,1	15,6	11,3	3,0	76,8	10,0	23,9	3,7	28,3
Vegetables	30,7	13,8	12,5	17,4	36,7	13,1	19,9	8,4	19,9
Coffee	14,7	15,5	18,4	35,3	0,5	0,6	30,6	27,3	18,0
Litchi	5,3	21,3	11,7	36,2	0,0	0,7	16,2	29,5	12,5
Other fruit	10,1	15,3	8,1	30,9	9,3	1,7	18,7	8,8	11,6
Tarot	18,7	4,0	5,2	6,1	21,5	2,7	10,9	3,8	10,2
Irish potatoes	18,9	4,7	1,7	4,9	29,6	3,8	3,2	2,9	8,7
Soy	5,9	5,4	12,0	0,5	9,5	27,8	1,3	0,9	8,0
Pepper	5,7	0,6	0,7	4,8	0,0	0,3	6,7	0,5	2,9
Sorghum	0,9	10,6	11,0	0,5	0,8	21,2	3,6	3,4	6,3
Number of households	1000	341	1125	211	557	511	1086	525	2678

⁷ Transplantation of very young plans (10 days), planting in lines, plant spacing 25 cm x 25 cm, frequent weeding and water management.

For all crops cultivated, the baseline team estimated area cultivated, volume harvested, yield and value of production during the last season. It should be noted that these figures are rough estimates based on participant recall, and did not involve biophysical measurements. All measurements were reported in local units, which were later converted into standard units (kg and ha). Data presented here is indicative at best, and will serve as a starting point or reference point for the program. Over the life of the program, SALOHI staff will take annual crop samples from program beneficiaries to measure changes in the volume and value of crops produced.

a) Rice production

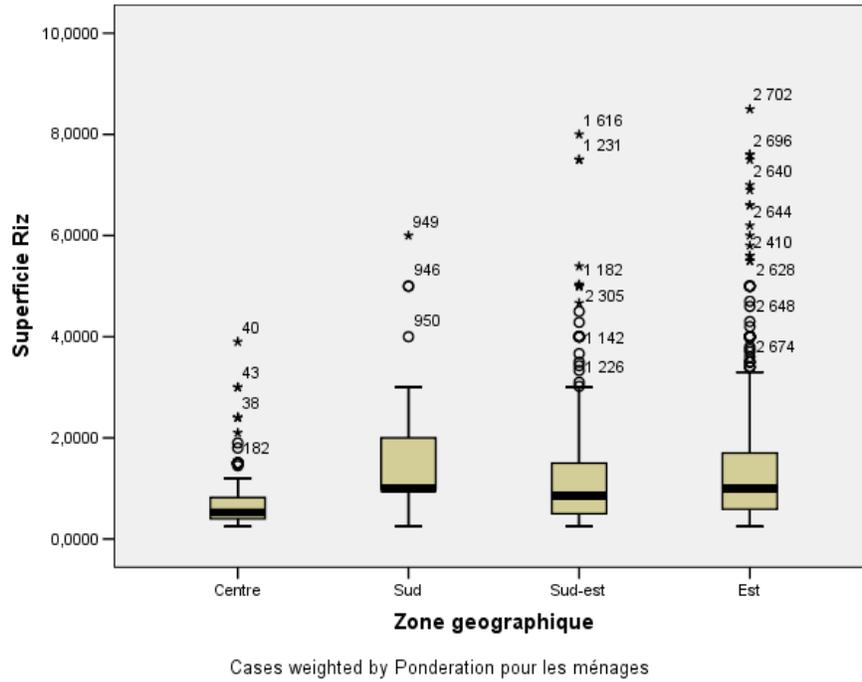
Rice is the number one staple crop in Madagascar. For most Malagasy, rice is synonymous with food, and the lean season is often defined as the period in which rice is hard to find, or expensive. Thus, the baseline team explored in minute detail rice harvest data collected during the survey. In general, rice is produced twice a year in Madagascar – the main rice crop is planted in December/January and harvested in May, and a second rice crop is sometimes planted in August and harvested in December.

There is great diversity in the area cultivated, as well as in production data. In order to maintain the overall structure and integrity of the survey, outlier data that was significantly different from the mean was excluded from the final yield estimate (as shown in Figure 24).

Figure 24 shows the variation in rice area cultivated by geographic zone. This data shows that 50% of households cultivated roughly 1 ha of rice. Few farmers cultivated more than 4 ha. Dividing the estimated amount of rice harvested by each household by the estimated area cultivated, the rice yield per household was calculated. Figure 19 shows the variation in yield by geographic zone. Outlying data was eliminated from this calculation.

Figure 24: Household rice area cultivated, by geographic zone.

a) After eliminating outlying data



b) Maximum area 4 ha

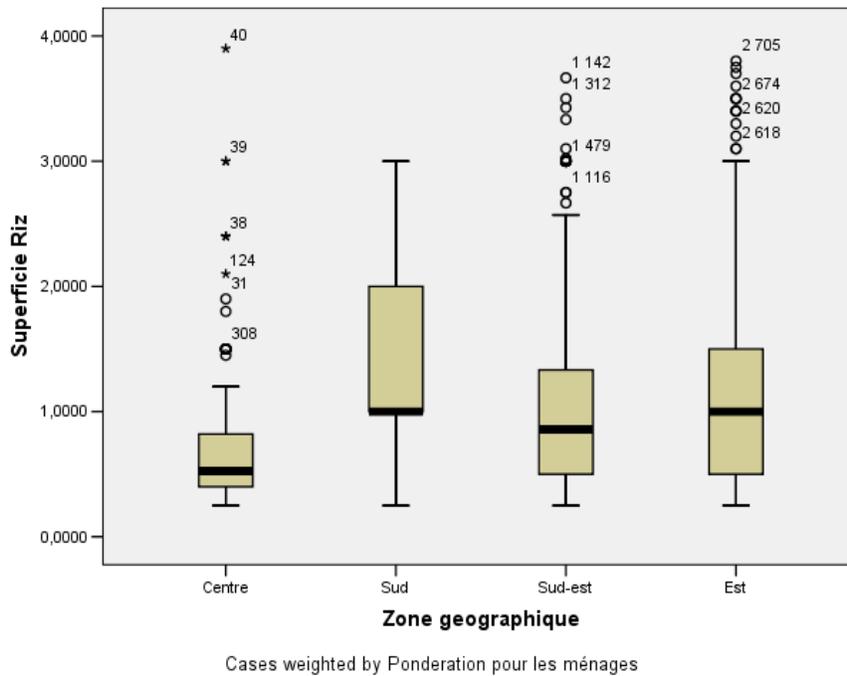
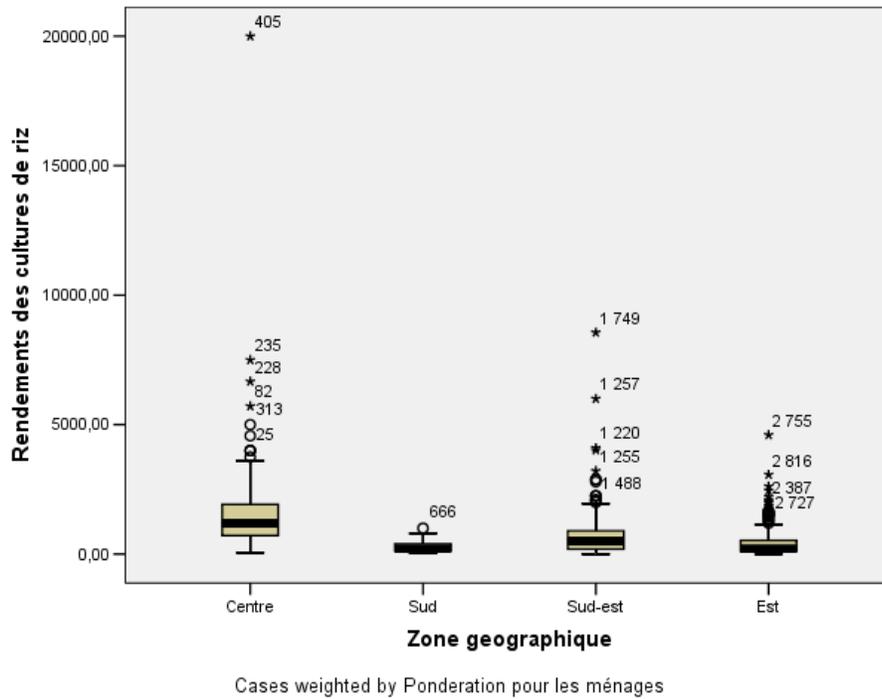
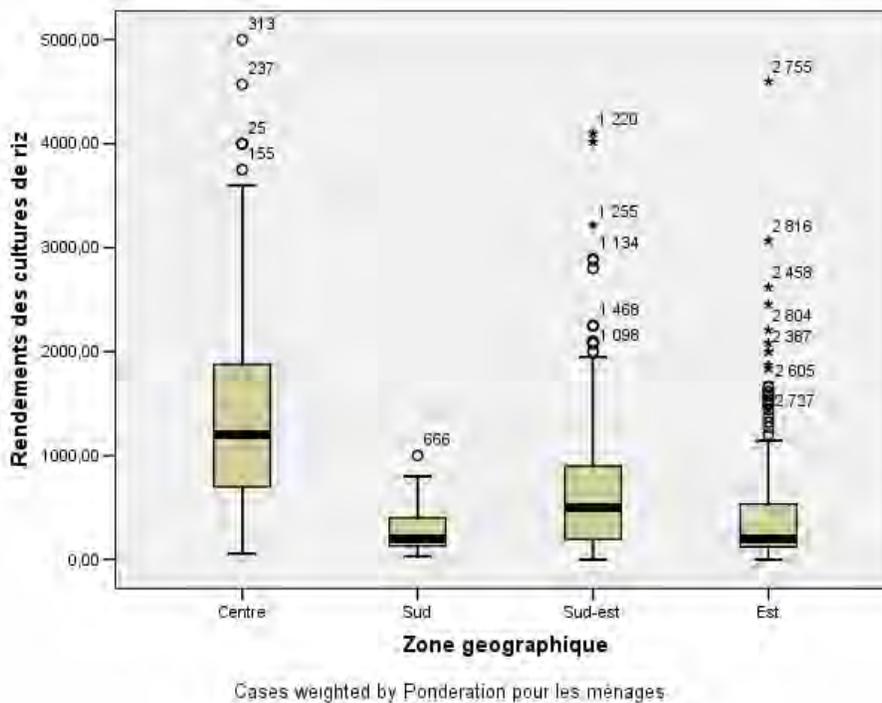


Figure 25: Variation in rice yields per household, by geographic zone.

a) Preliminary results



b) Results removing outliers (yields above 5.000 kg/ha).



After removing outlier data, the average rice yield per NGO zone and per geographic zone was calculated. The final average yield was calculated using the total amount of rice harvested divided by the total area cultivated (Table 62).

Table 62: Average rice yield by geographic zone and NGO intervention zone.

Zones	Total Area cultivated (ha)	Total harvest (kg)	Average Yield (kg/ha)	Average price (AR)	Number of Households
Center	205	317.240	1.544	670	522
South	96	19.769	205	1 225	51
South-East	654	364.256	557	624	1060
East	644	194.146	301	1 000	507
ADRA	688	512.192	745	670	963
CARE	344	59.843	174	1 225	235
CRS	499	270.112	541	500	739
LOL	69	53.265	767	616	204
Total	1.599	895.411	560	700	2.140

Rice yields are in general quite low, averaging 560 kg/ha, with a maximum of 1540 kg/ha in the Center and a minimum of 250 kg/ha in the South. The average rice area cultivated is 0.75 ha, and the average amount of rice harvested per year is 418 kg (paddy).

b) Sorghum production

Sorghum is an important food security crop, as it requires little rainfall, few agricultural inputs and is resistant to drought and other natural disasters. Sorghum is produced almost exclusively in the South, with small patches of production in the South East and East. As shown in Figure 20, the area dedicated to sorghum production varies considerably, with a median of 0.5 ha in the South. Overall, the average area dedicated to the production of sorghum by those who grow it is 0.45 ha. The total area dedicated to sorghum culture by households surveyed was 68.4 ha, with a total production of 10,322 kg, or an average yield of 150 kg/ha. The price for one kg of sorghum was estimated at 600 Ar/Kg, for an average value of 90,000 Ar per household (HH), or 45 USD per HH.

c) Maize production

Maize is also an important food security crop in Madagascar. It can be grown all year long (in both upland areas during the rainy season, and in rotation with rice in lowlands), and is an important source of income in some areas. Moreover, short season varieties of maize can be grown to provide income and food during the hungry season.

Maize production is practiced by 50% of households in the SALOHI zone, especially in the South (89%) and in the Center (70%). As we did for rice, we calculated average yield after removing outlier data.

Figure 26: Variation of sorghum area cultivated per household, by geographic zone

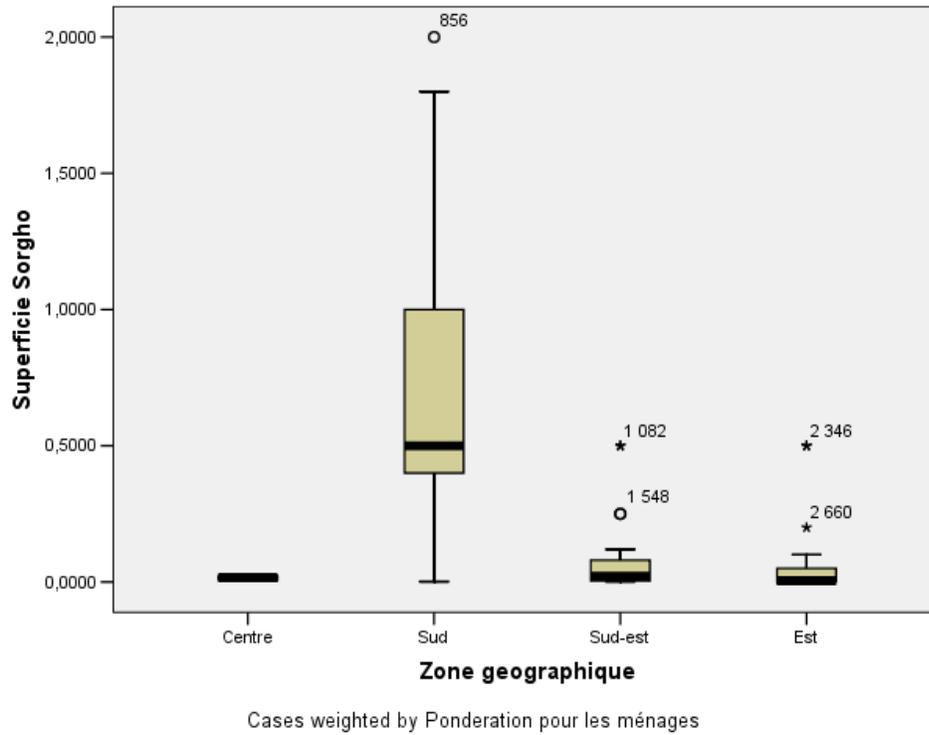


Figure 27: Variation of area cultivated to maize by household, by geographic zone

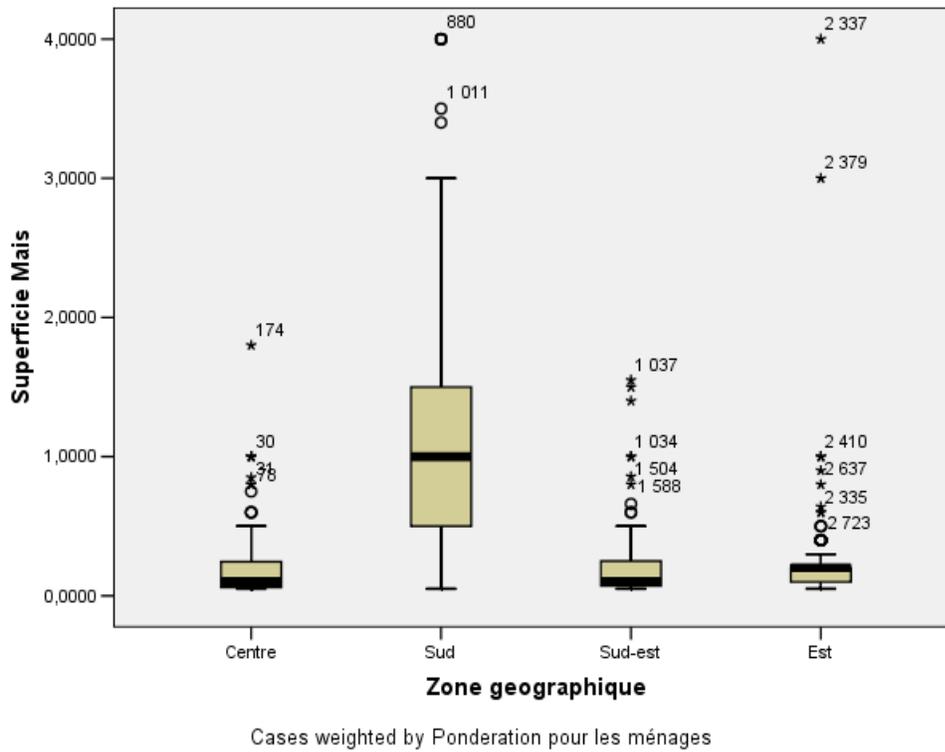


Figure 28 : Variation in household maize yield by geographic zone

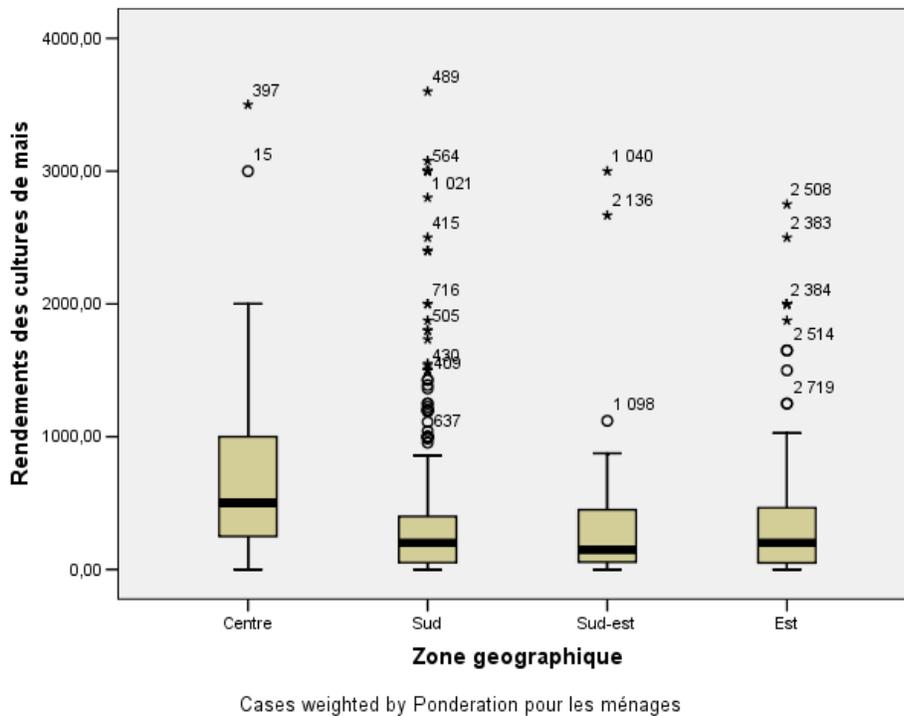


Table 63 shows the total maize area cultivated and the volume of the maize harvest by geographic zone and NGO intervention zone. The average maize yield is 344 kg/ha. It is higher in the Center (800 kg/ha) and lowest in the South (286 kg/ha).

Table 63: Average maize yields per household, by geographic zone and NGO intervention zone.

Zones	Total area (ha)	Total production (kg)	Average yield (kg/ha)	Average price (AR/kg)	Value of production (AR)	Number of HH
Center	53	43.010	809	480		380
South	513	146.726	286	600		437
South-East	34	16.042	472	600		273
East	36	13.094	367	400		198
ADRA	78	52.580	675	520		538
CARE	75	32.236	428	400		181
CRS	481	133.337	277	600		559
LOL	81	718	881	959		8
Total	636	218.872	344	600		1288

d) Cassava production

Cassava is a very important food security crop because it can be stored in the ground for several years, serving as a food bank when needed. Moreover, it requires little rainfall or inputs to grow, and can be grown by even the poorest families and withstand considerable climatic variations. The main constraint to cassava production in Madagascar appears to be temperature, as some varieties require two years before they reach their productive potential (especially in the chilly Central Plateau). Cassava leaves are also a rich source of iron, protein and vitamins, and form the basis of the national dish, “ravi toto” (cassava leaves, pork and rice).

More than 83% of SALOHI households cultivate cassava; slightly more so in the South and South East (88%). Figure 23 shows the variation in area cultivated by household, for each geographic zone.

Figure 29: Variation in average cassava area cultivated per household, by geographic zone.

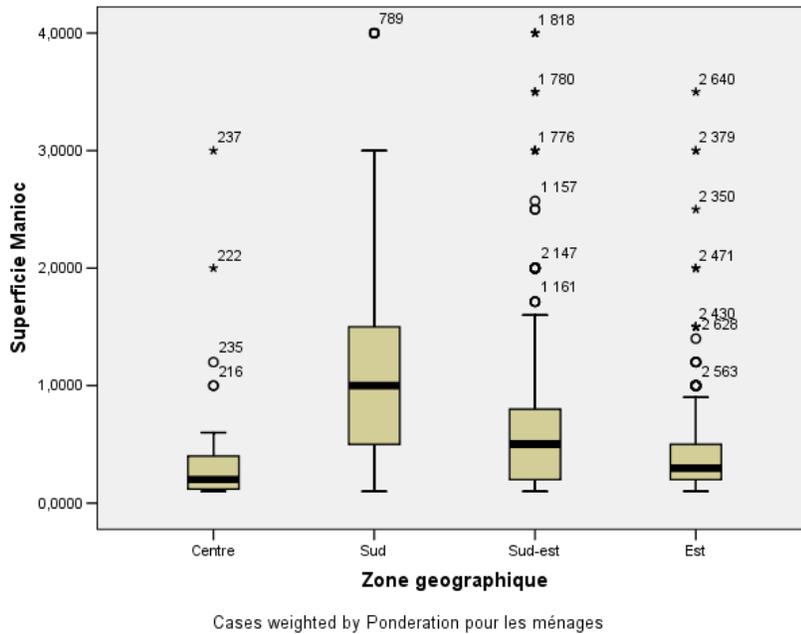


Figure 30: Variation in household cassava yield by geographic zone.

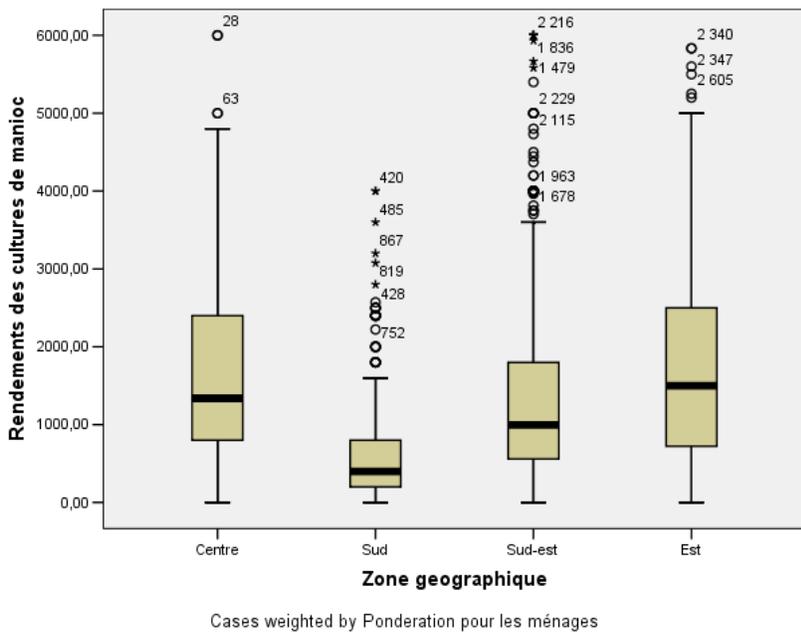


Table 64 summarizes the total cassava area cultivated, the volume produced, and yield, by geographic zone and intervention zone.

Table 64: Average cassava yield per household by geographic zone and NGO intervention zone.

Zones	Total area (ha)	Total harvest (kg)	Average yield (kg/ha)	Median price (AR/kg)	Number of HH
Center	77	132.290	1.716	300	393
South	452	204.095	452	600	417
South-East	293	683.234	2.328	200	943
East	109	234.164	2.149	200	347
ADRA	242	345.886	1.429	200	791
CARE	111	174.637	1.570	200	255
CRS	522	652.297	1.250	500	883
LOL	56	80.664	1.441	200	171
Total	931	1.253.783	1.347	300	2.100

e) Beans and pulses

Beans and pulses are important sources of protein, iron and fats. When grown in rotation or association with other crops, they also contribute to soil fertility. Their leaves as well as their pods and seeds can be consumed. Beans are cultivated by 28% of households in the SALOHI zone, but most especially by households in the Center (78 %).

Table 65: Average household yield for beans and other pulses, for households cultivating between 0.5 ha and 1.25 ha, by geographic zone and NGO intervention zone.

Zones	Total area (ha)	Total harvest (kg)	Average yield (kg/ha)	Median price (AR/kg)	Number of HH
Center	41	18.653	455	1 600	413
South	18	4.508	254	950	46
South-East	30	9.965	327	1 583	247
East	5	716	140	1 600	17
ADRA	60	22.189	372	1 600	549
CARE	13	3.875	303	1 600	47
CRS	22	7.647	353	950	122
LOL	0,2	132	607	1 000	6
Total	94	33.842	360	1 584	723

No matter what crop is cultivated, the area cultivated in the South is generally greater, but the yield is poor. The climate, soil and cultural techniques are less favorable in that zone. In the Center and East, area cultivated is smaller and yields are higher.

In addition to information on the area cultivated and yield, SALOHI baseline survey staff asked farmers their opinion of their harvest last season. Surprisingly (since 2009 was widely described as a good rice year in Madagascar), 70% of farmers described the season as bad, 20% said it was average and only 10% said it was good. Data in Table 66 summarizes these results.

More than 70% of households in the South, South East and East described their last harvest as bad, compared to 42% in the Central Plateau. The main reasons for poor harvests were lack of water or drought (55% of households, or 99% of households in the South), or flooding (44% of households on average, including 66% of households in the South East, 45% in the East and 33% in the Center). Other reasons include insects (28% of households, or 52% of households in the South), hail (15% of households). Many farmers also cited cyclones and strong winds.

Table 66: Percentage of household heads and their opinion of their last crop harvest, and the reasons given for bad harvests, by NGO Intervention Zone and Geographic Zone.

Description of the last harvest	ADRA	CARE	CRS	LOL	CENTER	SOUTH	SOUTH EAST	EAST	TOTAL
Mauvaises récoltes	56,5	79,2	76,3	81,0	41,8	74,3	80,3	72,5	69,7
Récoltes moyennes	25,7	14,9	17,9	10,9	33,7	23,2	13,4	15,3	19,8
Bonnes récoltes	17,8	5,8	5,8	8,1	24,5	2,5	6,3	12,2	10,5
TOTAL	100,0								
Causes of poor harvests	ADRA	CARE	CRS	LOL	CENTRE	SUD	SUD-EST	EST	
Drought	43,0	74,0	63,0	21,1	32,0	98,9	33,2	71,8	54,8
Flooding	32,1	45,1	42,3	88,8	32,7	0,9	65,6	45,0	44,2
Hail	18,7	0,8	13,8	32,3	9,2	1,1	29,2	1,4	15,0
Crop diseases	6,8	2,9	3,2	1,8	10,4	0,4	3,8	4,7	4,1
Insectes	25,4	34,5	31,3	6,3	10,9	51,6	21,9	27,0	27,7
Lack of resources	15,7	7,5	13,4	14,6	26,0	9,6	8,5	19,7	13,3
Other	31,0	25,8	29,8	29,8	20,3	7,6	43,9	24,5	29,5
Number of households who had a harvest (good and bad)	583	302	918	192	234	397	914	449	1994

Animal Husbandry

As mentioned previously, 69% of households in the zone practice animal husbandry as one of their principal economic activities. 77% of those 69% practice it as a secondary activity. 90% of households in the Center, 79% in the South, 75% in the South East and 68% in the East practice some form of livestock raising.

Table 67: Percentage of households who practice animal husbandry. Percentage of households according to the type of animal husbandry practiced, NGO Intervention Zone and Geographic Intervention Zone.

	ADRA	CARE	CRS	LOL	CENTER	SOUTH	SOUTH EAST	EAST	TOTAL
Practice animal husbandry	81,8	69,9	76,8	72,0	89,5	78,9	75,0	68,0	77,3
Type of animal husbandry									
Fishculture	11,6	0,7	1,8	0,0	15,0	0,0	3,1	3,4	5,2
Poultry	94,1	88,2	95,4	93,5	92,8	89,9	96,5	93,8	93,8
Cattle	40,0	39,3	43,4	34,1	51,0	82,5	21,9	21,2	40,8
Swine	46,5	27,1	11,3	28,4	52,5	4,3	29,3	21,7	28,1
Goat	0,7	20,6	29,8	0,5	0,6	72,3	0,4	0,0	15,1
Bees	4,2	2,7	7,4	3,4	4,8	12,9	2,0	4,3	5,3
Other	0,8	0,0	0,7	0,9	1,1	1,3	0,4	0,0	0,7
Number of households who practice animal husbandry	850	276	913	183	506	455	879	381	2221

Poultry raising is the most common form of animal husbandry practiced ; on average, 94% of households have poultry. Cattle and goats/sheep are raised in the South (82% and 72% of households, respectively). In the Central Plateau, more than half of all households have cattle, and swine.

Table 68: Percentage of households who practice animal husbandry, who know and practice different animal husbandry techniques, by geographic zone.

Technology	CENTER		SOUTH		SOUTH EAST		EAST	
	Know	Practice	Know	Practice	Know	Practice	Know	Practice
Vaccination	92,6	82,4	99,5	94,9	73,7	44,5	72,6	30,1
Hygiene	44,9	30,6	18,4	6,3	31,2	25,2	24,7	16,5
Forage	24,0	5,5	7,7	1,3	3,3	1,2	6,8	1,1
Complementary feeding	29,1	27,1	7,5	3,0	33,4	29,2	25,9	24,1
Shelter	43,9	24,4	18,6	13,8	48,5	43,5	65,4	49,2
Management techniques	32,5	22,0	31,8	31,6	6,1	4,4	28,4	25,9
Number of households who practice animal husbandry	850		276		913		183	

Farmers in the Central Plateau know and practice a larger number of animal husbandry techniques. Vaccination is widely known and practiced, especially in the Central Plateau and the South, where cattle are widely vaccinated. Forage production is not very widely known (or practiced) in any region. Knowledge of complimentary feeding practices is not bad (26%) and almost all farmers who know the technology say they practice it (except in the South, where it is not widely disseminated).

Very few farmers have benefited from technical assistance in animal husbandry techniques (5% on average, and a maximum of 9% in the Central Plateau), which explains to a certain extent the low level of knowledge of productive practices.

5.3. Farmers' Associations and Organizations (OP)

The SALOHI results framework posits that regrouping farmers and helping them to identify and improve their marketing strategies will help them get better prices for their production, and strengthen their livelihood systems. Individual farmers are almost always at the mercy of intermediate buyers, who profit from the difference in prices between farm gates and markets, and often buy farmers' crops before they are even harvested (standing in the field) during the hungry season, providing much needed credit during this difficult period.

Results from the baseline survey indicate that participation in farmers' organizations is very low. Only 16% of household heads stated that a member of their household belonged to some sort of organization or association. This varies by zone, with 23% of households in the East, 15 – 17% in the Center and South East (respectively), and 10% of households in the South participating in farmers' groups.

The farmers' groups that exist are mostly informal. Only 3% are formal cooperatives, but that varies from 9% in the East to 1% in the Center and the South-East. Very few of the existing farmers' associations offer credit or agricultural services. Households in LOL zones are more likely to be members of OP's (25%) whereas those in ADRA zones are least likely to be members (13%).

Table 69: Percentage of households with at least one household member who is also a member of a farmers group (OP). Percentage of farmers' groups by principal type of activity.

Zones	MHH	FHH	TOTAL	Activities of Farmer Organizations	MHH	FHH	TOTAL
ADRA	12,5	12,4	12,5	Agriculture	63,3	53,6	61,5
CARE	17,8	12,1	16,8	Animal husbandry	11,8	5,1	10,5
CRS	18,4	17,2	18,2	Fishing	2,6	4,4	3,0
LOL	25,0	24,4	24,8	Artisinal production	4,6	8,5	5,3
				Health	3,6	5,0	3,9
CENTER	16,1	10,5	15,4	Nutrition	3,9	4,0	3,9
SOUTH	10,8	6,5	9,9	Savings	13,4	13,3	13,4
SOUTH EAST	16,6	19,6	17,2	Other	23,8	29,0	24,8
EAST	22,9	23,2	22,9	Number of farmers' groups	384	85	469
TOTAL	16,6	16,2	16,5				

Few farmers participate in farmers' associations; on average, only 16.5% of households. Levels of participation do not vary between MHH and FHH. However, it does vary by zone, from 10% in the South to 23% in the East.

Although farmers' groups are generally focused on agriculture (62%), they may also include other types of activities such as animal husbandry (11%), the production of artisanal products (5%), health (4%), and savings (13%) and loans. "Other" types of activities include social, cultural and religious based activities.

The profile of the types of activities conducted by farmers groups which include women from FHH does not differ significantly from that of groups whose members are from MHH, except they are slightly less likely to be focused on agriculture (54% vs. 63%) or animal husbandry (5% vs. 12%), and more likely to include health and artisanal activities.

The profile of farmers' groups does not change too much by geographic zone, either (Table 70). Farmers groups in the South East are less likely to include livestock, and more likely to include "other" activities. Groups in the South are more likely to include artisanal activities (16%), whereas groups in the East are more likely to include fishing and health (7% and 8% respectively). Farmers groups in the Central Plateau are the most likely to include savings components (23%).

Table 70: Percentage of farmers groups, by type of activity, NGO intervention zone and Geographic Zone.

Principal activities	ADRA	CARE	CRS	LOL	CENTRE	SUD	SUD-EST	EST	TOTAL
Agriculture	65,9	61,6	68,9	27,6	65,6	58,3	66,0	53,3	61,5
Livestock	12,5	17,4	9,6	2,4	15,5	28,7	3,0	11,1	10,5
Fishing	0,0	3,3	4,6	3,1	0,0	5,0	1,0	7,1	3,0
Artisanat	2,1	0,9	8,6	5,2	3,2	15,7	1,6	7,9	5,3
Health	2,3	5,9	5,0	1,1	0,0	1,5	3,5	8,2	3,9
Nutrition	3,5	7,9	4,1	0,0	0,0	6,3	4,7	4,1	3,9
Savings	19,6	20,2	10,8	2,3	22,6	15,3	6,9	16,7	13,4
Other	23,7	23,9	13,1	67,5	19,2	7,7	32,8	23,3	24,8
Number of OP	127	66	213	63	84	56	201	128	469

Although household participation in professional farmers' associations is very low, their participation in community activities is better. On average, 63% of households reported that they participated in community events (Table 71).

Table 71: Percentage of households who participate in community activities, and the percentage, among participating households, who mentioned each different type of activity in which they participated, by NGO Intervention Zone and Geographic Zone.

	ADRA	CARE	CRS	LOL	CENTER	SOUTH	SOUTH EAST	EAST	TOTAL
Participate in community activities	68,7	60,9	61,9	48,0	65,1	46,7	60,3	83,2	63,0
Types of activities									
<i>Community meetings</i>	31,5	78,3	53,8	16,6	28,4	59,4	25,2	82,7	45,7
<i>Collective cleaning</i>	14,1	43,7	52,6	26,8	17,2	60,8	15,6	61,9	34,5
<i>Infrastructure maintenance</i>	76,8	66,4	58,9	66,1	77,7	48,1	75,0	58,9	67,4
<i>Nurseries</i>	0,2	4,5	0,8	3,2	0,5	1,1	1,4	1,7	1,2
<i>Community reforestation</i>	0,7	10,0	3,4	1,4	1,3	3,2	2,2	5,6	3,0
<i>Other</i>	15,1	15,5	7,1	18,3	9,3	11,4	17,2	7,1	12,1

Community mobilization is very important in the East (83%), and relatively low in the South (47%). The community activity which mobilizes the most is infrastructure maintenance (67%). Very few households participate in community reforestation efforts or community nurseries. This information could have important implications for Food For Assets activities planned in the East, and sustainable land use plans anticipated under SO3. It also implies that, even if current infrastructures are not well maintained, at least there is a culture of community contribution to ensure infrastructure maintenance, which can be exploited to improve the management of Infrastructure Management Associations (IMAs).

5.4. Agricultural Production, Food Access and Malnutrition.

5.4.1. Hypotheses, dependent and independent variables.

In this section we will explore the relationship between certain agricultural production factors and yield, on the one hand, and their relationship to food access and malnutrition in children under five. The Program framework formulates several hypotheses regarding yield and food access. We will analyze three of them which reflect the underlying program strategy in terms of increasing household access to food:

- Farmers who use improved production practice have higher yields than those who use only traditional production practices.
- Farmers who have access to irrigation produce more food and are less vulnerable to shocks than those without access to irrigated land.
- Dependence on rice and traditional food practices contribute to food insecurity in Madagascar. Households who consume a more diversified diet will suffer from fewer months of inadequate household food provisioning, and have less malnourished children.
- The impact of participation in farmers groups on food access

Several dependant variables are defined by these hypotheses. These include yield, food production, vulnerability to shocks, number of months of adequate household food provisioning, and malnutrition. Independent variables (risk factors) include the use of improved production practices, access to irrigation and dietary diversification.

5.4.2. Production practices, area, volume and yield

Farmers in our sample were asked about the agricultural production techniques they know and use. A total of 15 modern practices were included in the survey. We chose five of them to focus on for the purpose of this analysis, based on the principal production constraints in the zone. Namely, crop rotation, use of improved seeds, use of organic or chemical fertilizers, weeding and irrigation/water management. Farmers who use all five of these techniques were classified as adopters. All other farmers are classified as traditional farmers (non adopters).

Because rice culture is widely practiced throughout SALOHI zones, we chose to link these production practices with rice yields. As we did in the previous section, we have used simple 2 X 2 cross tabs to test these statistical associations.

The median value of each independent variable was calculated in the total sample, and used as a dividing line. The median rice area cultivated is 0.45 ha, the median production is 249 kg and the median yield is 240 kg/ha. The area, harvest and yield below these values were considered relatively low, and the results above these values relatively high.

Rice farmers who adopt improved/modern production practices as defined above represent only 3.8% of the 2700 households surveyed. On average the producers who apply improved production practices cultivate less land (0.53 ha vs. 0.68 ha), but harvest more rice (551 kg/household vs. 386 kg/household). The production and yield are relatively better when farmers use improved techniques (Figure 24).

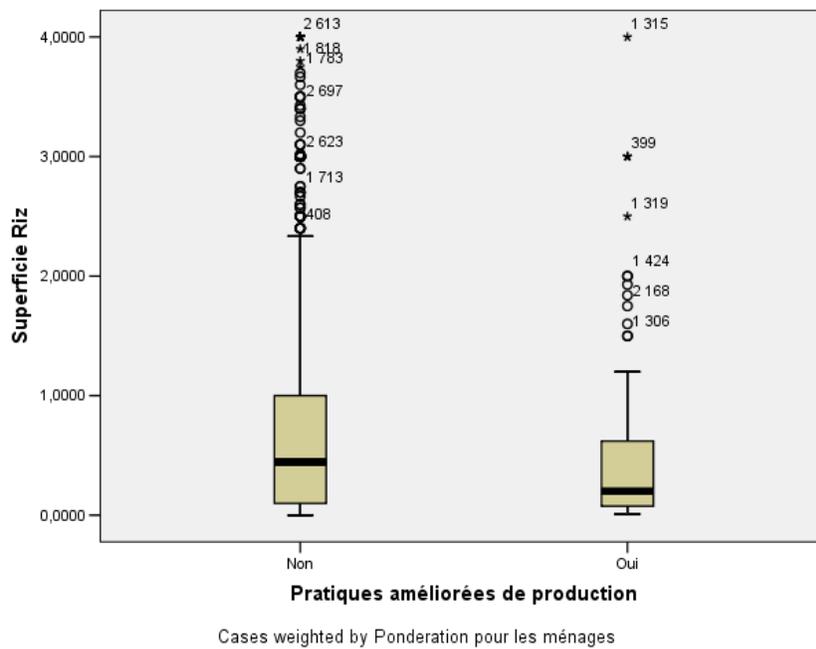
Table 72: Statistical associations between modern production practices, area, volume and yield of rice

		Area cultivated		Quantity of rice harvested		Yield of Rice	
		Small	Large	Low	High	Low	High
Improved production practices	<5	49,8	50,2	50,3	49,7	51,1	48,9
	5+	63,6	36,4	41,1	58,9	23,9	76,1
Odds Ratio (OR)		0,569		1,449		3,319	
Lower Limit CI (95 %)		0,27		0,77		1,84	
Upper limit CI (95 %)		1,192		2,719		5,988	
Relative Risk (RR)		0,784		1,223		2,135	
Lower Limit CI (95 %)		0,59		0,85		1,39	
Upper limit CI (95 %)		1,045		1,766		3,275	

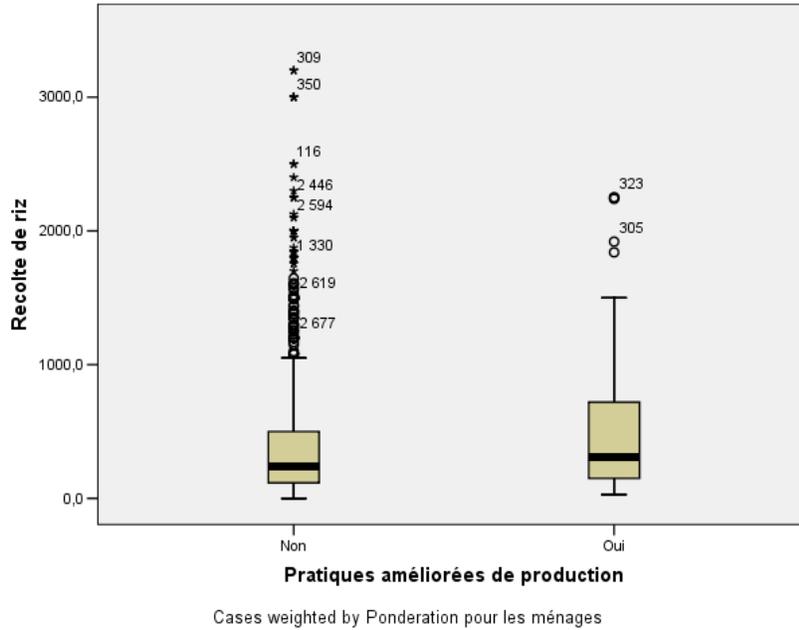
The limits of the confidence intervals show that only differences in yield are statistically significant. The probability that rice yields are relatively lower for farmers who don't use modern techniques is three and a half times to six times higher than farmers who use all five techniques.

Figure 31: Variation in area, total rice production and rice yields per household, depending on production practices.

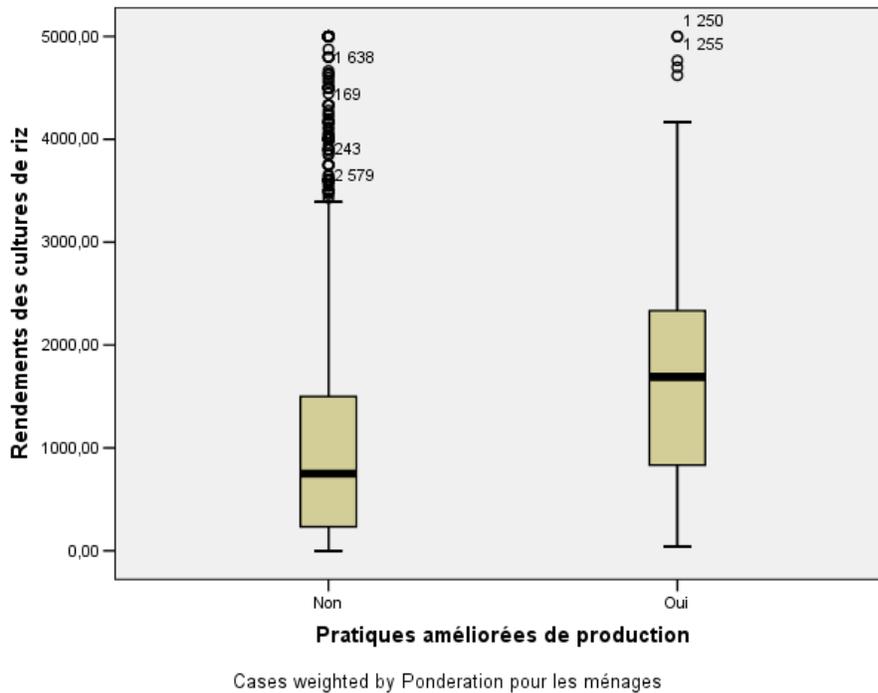
a) Variation in rice area cultivated by household



b) Variation in total rice production per household



c) Variation in average household rice yield



The rice area cultivated by non-adopter or traditional farmers in the SALOHI zone is relatively low (OR = 0,642 and RR = 0,818). On the other hand, the chance that the volume of rice production will be smaller in households who don't practice modern crop production techniques is 1.5 times higher than those farmers

who practice modern techniques. However, in the last two cases (area and total harvest), these differences are not statistically significant.

5.4.3. Access to irrigation, agricultural production and household vulnerability

Responses to questions regarding irrigation allowed SALOHI staff to identify 600 farmers (29 % of the sample) who benefit from some form of irrigation. Does access to irrigation ensure that household production will be better? Does increased production lead to an increase in the number of months of adequate household food provisioning, and less vulnerability to food security shocks?

Food insecurity was defined and operationalised in this report by survival strategies, more or less severe, which households adopt during times of food insecurity. The median value of the Coping Strategies Index, which we use here to measure the vulnerability of households to shocks, is 24. We used this value to separate vulnerability levels (above and below the median = greater and less vulnerability). Table 71 shows the statistical association between access to irrigation, production volume, and vulnerability.

Table 71: Statistical association between access to irrigation, volume of production and vulnerability

		Quantity of rice harvested		Last agricultural season		Vulnerability	
		Below	Above	Bad	Good	High	Low
Access to irrigation	No	50,7	49,3	73,1	26,9	52,5	47,5
	Yes	44,9	55,1	57,6	42,4	43,7	56,3
Odds Ratio (OR)		1,264		1,994		1,422	
Lower Limit CI (95 %)		0,92		1,47		0,96	
Upper limit CI (95 %)		1,747		2,705		2,096	
Relative Risk (RR)		1,130		1,268		1,201	
Lower Limit CI (95 %)		0,95		1,12		0,97	
Upper limit CI (95 %)		1,343		1,436		1,484	

More than half (51%) of rice farmers who do not have access to irrigation harvested rice below the mean, vs. 45% of farmers with irrigation. The Odds Ratio and RR are more than 1, but they are not statistically significant. When we ask the impressions of rice farmers themselves on their last harvest, we find that 73% of farmers who don't have access to irrigation described the last agricultural season as bad, vs. 58% of households who did have access to irrigation. In this case, the statistical association concludes that these associations are statistically significant. In other words, the probability that a farmer who doesn't have irrigation believes he suffers from a poor agricultural season is 2.0 to 2.5 times higher than a farmer who has irrigation.

Households that have an irrigation system are less vulnerable to food security risks than those who do not. The Coping Strategies Index is higher than the median value for 44% of households with irrigation, vs. 53% who don't, but this difference is not statistically significant.

5.4.4. Household dietary diversity (HDDS), Number of months of adequate food provisioning, and malnutrition.

The last hypothesis to test stipulates that greater dietary diversity leads to more months of adequate food provisioning, and better nutritional status. We already calculated the HDDS and the HFIAS, the CSI and the level of malnutrition for children under five years of age. Malnutrition levels are dichotomized starting from >-2.

The data in Table 72 indicate that there is a significant association between the HDDS and HFIAS. A little more than 76% of households who had a low HDDS also had a very low score on the HFIAS. The Odds Ratio indicates that the risk for households with low HDDS to suffer from a lack of food is three and half times more than households which have a higher HDDS. The relative risk is almost 2 times greater, and it is statistically significant. Thus, households that have less dietary diversity have a smaller period of adequate household food provisioning than households with greater dietary diversity.

Table 72: Statistical association between HDDS, average number of months of adequate household food provisioning and malnutrition in children under five years of age.

		HFIAS		Months of adequate food availability	
		High	Low	Low	High
HDDS	Low	76,1	23,9	100,0	0,0
	High	46,5	53,5	53,9	46,1
Odds Ratio (OR)		3,654			
Lower Limit CI (95 %)		2,88			
Upper limit CI (95 %)		5,237			
Relative Risk (RR)		1,635		1,854	
Lower Limit CI (95 %)		1,44		1,65	
Upper limit CI (95 %)		1,855		2,083	

		Malnutrition (Children 2 to 5 years)					
		H/A		W/A		W/H	
		Yes	No	Yes	Non	Yes	No
HDDS	Low	46,5	53,5	33,1	66,9	6,0	94,0
	High	47,6	52,4	41,7	52,3	7,2	92,8
Odds Ratio (OR)		0,957		0,690		0,831	
Lower Limit CI (95 %)		0,68		0,48		0,46	
Upper limit CI (95 %)		1,347		1,000		1,509	
Relative Risk (RR)		0,977		0,793		0,841	
Lower Limit CI (95 %)		0,81		0,62		0,48	
Upper limit CI (95 %)		1,172		1,008		1,471	

In contrast to other indicators, HDDS does not appear to have a relationship with malnutrition in children two to five years of age. The analysis indicates that the children from households with low dietary diversity are no more likely to be malnourished than children from households with a high dietary diversity. The odds ratio indicates that that children from households with a low dietary diversity score are even slightly less likely to be malnourished, although the results are not statistically significant. Thus far, only breastfeeding has had a significant influence on malnutrition.

5.4.5. Participation in farmers’ organizations and agricultural production

SALOH I proposes to promote farmers’ organizations to strengthen local capacity to organize the market, control prices and to respond to market forces in terms of quantity and quality of products. The development of farmers’ associations allows members to further reap the benefits and rewards of the technical assistance they will receive from the program. Thus, we assume that farmers who participate in farmers’ organizations have more knowledge, skills and experiences in terms of agricultural production. These skills should translate into increased agricultural production, when compared to people who don’t participate in such organizations.

We will test this hypothesis, considering the participation in farmers groups as a risk factor for production (using the annual volume of rice harvested as a proxy indicator). Results are presented in Table 73.

Table 73: Association between group membership and agricultural production.

		Quantity Of rice harvested	
		Low	High
Belong to a farmers’ group	No	51,1	48,9
	Yes	46,7	53,3
Odds Ratio (OR)		1,191	
<i>Limite inférieure de l’IC à 95 %</i>		0,82	
<i>Limite supérieure de l’IC à 95 %</i>		1,727	
Relative Risk (RR)		1,093	
<i>Limite inférieure de l’IC à 95 %</i>		0,90	
<i>Limite supérieure de l’IC à 95 %</i>		1,328	

The percentage of ouseholds who don’t belong to an organization and who had a relatively low harvest is greater than the households who belong to a farmers’ group: 51% vs. 47%. However, the relative risk is low, and the difference between the two is not statistically significant.

5.4.6. Food Security and Agricultural Productivity

Households who produce more food should have better access to food (fewer lean season months). This hypothesis is tested comparing the percentage of households with low and high harvests with the average number of months of household food insecurity (Table 74).

Table 74: Association between level of agriculture production and the length of the lean season.

		Length of lean season	
		High	Low
Amount of rice harvested	Low	47,2	52,3
	High	35,7	64,1
Odds Ratio (OR)		1,599	
<i>Limite inférieure de l'IC à 95 %</i>		1,15	
<i>Limite supérieure de l'IC à 95 %</i>		2,222	
Relative Risk (RR)		1,316	
<i>Limite inférieure de l'IC à 95 %</i>		1,07	
<i>Limite supérieure de l'IC à 95 %</i>		1,615	

The risk to have an average number of months of food insecurity is 1.5 times higher if the amount of rice harvested is low. The values of the Confidence Intervals at 95% indicate that the relative risk and the Odds Ratio are statistically significant.

5.4.7. Number of months of food insecurity and the nutritional status of children under five

Table 75: Association between the level of malnutrition and the number of months of food insecurity.

		Malnutrition (children 0-59 months)					
		Height/Age*		Wt/Age		Wt/Height	
		Yes	No	Yes	No	Yes	No
Number of months of food insecurity	High	43,1	56,9	32,5	67,5	7,3	92,7
	Low	45,5	54,5	36,1	63,9	9,3	90,7
Odds Ratio (OR)		0,910		0,855		0,764	
<i>Limite inférieure de l'IC à 95 %</i>		0,71		0,69		0,55	
<i>Limite supérieure de l'IC à 95 %</i>		1,165		1,058		1,057	
Relative Risk (RR)		0,949		0,902		0,781	
<i>Limite inférieure de l'IC à 95 %</i>		0,83		0,79		0,58	
<i>Limite supérieure de l'IC à 95 %</i>		1,089		1,036		1,053	

*Children 6-59 months

Like dietary diversity and malnutrition, the test of the relationship between nutritional status and the number of months of food insecurity does not confirm the hypothesis that an increase in the number of months of food insecurity is associated with increased malnutrition. **So, how do those households who are suffering from a lack of food manage to keep their kids well nourished? That will be a critical question for the SALOHI operational research team, during program implementation.**

Section 6: Household and Community Resilience

The SALOHI program is focused mainly in areas where regular and frequent natural disasters occur: cyclones and floods in the east, and drought in the south. One of the principal consequences of these shocks is food insecurity caused by the destruction of crops and productive infrastructure, like irrigation. The capacity to prevent and manage natural disasters must be strengthened in communities and households in these zones. This is the third and last strategic objective of the SALOHI program.

To achieve this objective, the SALOHI team plans to strengthen local early warning systems, support communities to develop disaster prevention and mitigation plans and sustainable land use management plans, develop community infrastructure (including roads, irrigation/water management systems and erosion control), strengthen urban social protection centers, and reinforce local capacity to manage and govern.

A « Community Vulnerability Index» was developed by the SALOHI team to measure changes in community resilience. This index, which is a composite index of six indicators, will be used in each SALOHI community to help them track improvements in their capacity to plan for, respond to and recover from shocks. During the baseline, the SALOHI team collected information household and community vulnerability to natural disasters, their capacity to react to them, and the impacts of these shocks to their livelihoods.

6.1 Prevalence of natural disasters and socio-economic shocks

A community questionnaire was used in each of the 120 Fokontany surveyed, using focus groups and community leaders. This tool allowed the team to collect information on community access to social services, community accessibility, governance and the frequency and severity of shocks at the community level.

Almost all communities surveyed (98) were victims of natural disasters or shocks. The most common shocks were drought, floods and cyclones. All communities surveyed that were affected by some sort of shock were affected by more than one. This data is summarized in Table 76.

Table 76: Percentage of communities who have been affected by different types of shocks in the past.

Zones	Prevalence of shocks	Types of shocks				
		Cyclone and Flood	Cyclone and Drought	Drought and Flood	Cyclone, Flood and Drought	Other (hail, locusts, fire, etc.)
ADRA	93,3	53,3	23,3	16,7	13,3	71,4
CARE	100,0	36,7	20,0	23,3	20,0	33,3
CRS	96,4	30,0	20,0	6,7	6,7	20,7
LOL	100,0	66,7	36,7	26,7	26,7	46,7
Center	100,0	52,9	17,6	11,8	5,9	64,7

Zones	Prevalence of shocks	Types of shocks				
		Cyclone and Flood	Cyclone and Drought	Drought and Flood	Cyclone, Flood and Drought	Other (hail, locusts, fire, etc.)
South	95,8	38,5	19,2	15,4	15,4	32,0
South-East	96,3	55,6	31,5	20,4	20,4	48,1
East	100,0	30,4	21,7	21,7	17,4	26,1
Total	97,5	46,7 56 / 120	25,0 30 / 120	18,3 22 / 120	16,7 20 / 120	42,7 51 / 120

One in six communities was affected by cyclones, floods *and* drought (!). Almost half of communities surveyed were affected by cyclones and floods (2/3 of LOL communities). Communities in the Central Plateau and ADRA zones were frequently affected by hail, insects and fire.

The consequences of these shocks are numerous and diverse. In almost all communities (95%), harvests were lost and cultivated land destroyed (57%). Erosion and loss of crop land was a particular problem in ADRA zones (96% of ADRA communities lost productive crop land). Almost half of SALOHI communities lost material goods (45%), especially in the South East. 38% of communities reported environmental degradation as a consequence of shocks, particularly in the South East (where all LOL zones are located; 60%). In the South, almost 70% of households mentioned the loss of livestock. 12% of communities reported loss of life due to natural disasters, but this was much higher in the Central Plateau (24%) than in the East (4%).

This data reinforces the importance of community resilience, and community capacity to respond to and recover from shocks within the SALOHI program, and emphasizes the types of disaster prevention and mitigation activities needed to respond to them. Infrastructure to control floods and droughts and improved natural resource management will be critical to limit shocks. In addition, this data provides insights into the indicators that can be used to measure increased community capacity to withstand shock. Reducing not only the frequency of shocks but the impact of each shock will indicate success in achieving this Strategic Objective.

Table 77: Socio-economic consequences of natural disasters on SALOHI communities. Percentage of communities affected by different types of consequences to shocks.

Consequences	ADRA	CARE	CRS	LOL	Center	South	South- East	East	TOTAL
Loss of harvest	96,4	89,7	96,4	96,7	94,1	95,7	98,1	87,0	94,8
Destruction of crop land	96,4	51,7	39,3	43,3	100,0	47,8	53,8	43,5	57,4
Loss of material goods	39,3	31,0	53,6	56,7	35,3	43,5	51,9	39,1	45,2
Loss of livestock	17,9	51,7	46,4	36,7	11,8	69,6	32,7	39,1	38,3
Environmental degradation	14,3	31,0	32,1	60,0	23,5	26,1	46,2	26,1	34,8
Loss of life	14,3	10,3	10,7	13,3	17,6	17,4	9,6	8,7	12,2
Other	25,0	10,3	3,6	20,0	23,5	13,0	17,3	4,3	14,8

Households also experienced socio-economic shocks (Table 78). The most common socio-economic shock was increased food prices. Almost half of communities, especially those in the East (80%) and South (67%) mentioned price increases and loss of revenue (37%). Diseases, epidemics and death of an economically active family member affected almost one in three households, especially in the South and East. Crop and livestock diseases affected one in four households, and agricultural input prices affected approximately one in ten of households (especially in the South and East). Insecurity, theft and violence affected an additional 8% of communities.

Table 78: Socio-economic shocks experienced by communities in the last 12 months.

Socio-economic shocks	ADRA	CARE	CRS	LOL	Center	South	South- East	East	TOTAL
Food price increases	12,2	77,2	72,2	28,8	11,8	67,1	39,1	80,3	47,4
Loss of revenue	11,3	60,8	53,3	23,3	13,5	58,3	24,7	61,9	36,5
Crop diseases	26,1	30,5	29,8	0,8	20,2	35,1	21,2	32,5	26,0
Livestock disease	20,1	24,5	22,2	2,7	15,0	7,8	25,4	26,5	26,0
Agricultural input prices	1,9	5,7	18,7	4,9	3,0	19,2	3,7	19,0	9,6
Water management	1,7	32,1	4,1	6,1	3,1	4,3	3,6	22,2	7,3
Lack of work opportunities	0,9	7,3	5,5	9,6	1,5	3,2	4,7	8,2	4,4
Lack of labor	6,0	14,2	8,0	4,2	9,3	8,7	3,9	13,7	7,8
Loss of work	0,3	3,5	2,3	1,1	0,2	2,5	1,5	2,4	1,6
Epidemic	4,5	10,5	12,6	0,7	2,9	1,6	11,1	15,0	8,3
Serious illness or accident	11,7	34,0	26,3	19,0	12,4	51,1	12,4	18,9	21,4
Death of an active household member	3,6	2,9	3,3	4,4	4,9	3,5	3,6	1,6	3,4
Insecurity/violence	8,3	10,3	4,4	4,6	13,9	6,4	3,6	5,8	6,6
Theft of productive capital	0,1	0,8	1,0	1,5	0,2	0,2	0,3	2,5	0,7

6.2 Management of natural disasters by households and communities.

Certain shocks are inevitable, and cannot be controlled. However, we can help communities and households prepare for them, reduce their effects on the community, and recover from them quickly. The development of Early Warning Systems (EWS) to collect information on the signs of slow onset shocks and communicating this information in a timely fashion to local leaders can help local authorities identify their needs and respond to them more quickly. Combined with Disaster Preparation and Mitigation Plans (DPMP), EWS can help communities limit the impacts of shocks.

6.2.1 Disaster Preparation and Mitigation Plans (DPMP)

We asked households that were victims of disasters or shocks in the past year, what they did when confronted by the consequences of these shocks (Table 79). Coping strategies are numerous, and vary by zone. Most households change their food ration (88%), either by eating foods which are less expensive, or less appreciated. This is a less common practice in the Central Plateau compared to other zones, but it is still widely practiced (70%). In about half of SALOHI households, they reduce the number meals per day (55%) or consume more wild foods (51%). Again, these are less common practices in the Central Plateau. About 1/3 of households borrow food, borrow money, or buy food on credit. These practices are more common in the East than the Center or South. About one in five households use savings; this is an especially important coping strategy in the South (where 47% of households use savings). 28% of households resort to increased agriculture day labor or temporary employment after shocks, especially in the Center (42%) and South East (40%). Eating seeds reserved for the next cropping season or consuming a crop prematurely is a common response to shocks in the South (39%), but much less common in the Center (8%). Many households sell productive assets, including chickens (33%), small stock (18%), or cattle (12%). Sales of chickens and cattle are more common in the South and East. Sales of jewelry and furniture are also more common in the South (21-22%, vs. 5-6% overall). Temporary or permanent migration is not a common practice (less than 5% of households). However, reducing expenditures on health and education is practiced by 15% of households, especially those in the East (29%).

In general, households in the Central Plateau resort more often to daily wage labor (agricultural or non). Households in the South resort to the sale of productive assets, and use of savings. In the East, the most common coping strategy (even before consuming less expensive food) is the sale of livestock. Households in the South East are slightly more likely to migrate (6%) than households in other SALOHI zones.

Table 79: Household responses to shocks. Household responses to shocks and natural disasters, in the year preceding the survey.

Coping Strategies	Geographic Zones				TOTAL
	Center	South	South-East	East	
Eat less expensive food	70,5	89,4	90,9	95,9	88,0
Reduce the number of meals per day	20,3	85,7	57,2	48,4	54,6
Eat wild foods	4,6	60,9	63,4	57,1	51,2
Borrow food	25,8	22,6	37,0	49,1	34,6
Buy food on credit	18,9	21,5	30,3	41,7	28,8

Coping Strategies	Geographic Zones				TOTAL
	Center	South	South-East	East	
Borrow money	19,5	33,2	41,2	30,2	33,6
Use savings	19,7	46,5	15,1	23,4	23,8
Sell poultry	31,5	67,0	23,4	22,5	33,3
Sell cattle	3,8	51,6	1,9	97,0	12,4
Sell agriculture tools	0,3	2,7	1,1	0,7	1,2
Sell jewelry or kitchen utensils	0,6	21,7	3,1	0,5	5,8
Sell furniture or equipment	0,3	21,0	1,5	0,9	5,0
Sell small stock (pigs, goats, sheep)	20,1	53,9	6,5	5,7	18,2
Sell land	0,0	7,4	2,5	0,6	2,7
Intensify sale of agriculture day labor	41,7	17,1	25,8	33,4	28,4
Look for other sources of day labor	31,8	12,4	40,5	14,6	28,3
Eat seeds for next season	8,4	39,2	27,3	29,5	26,8
Eat crops before the harvest (premature)	12,6	45,6	38,9	38,4	35,5
Migration of some household members	2,7	0,9	5,7	1,4	3,4
Migration of the entire household	0,0	0,9	1,4	0,0	0,8
Reduce health and education expenses	8,4	14,3	12,0	29,1	15,2
Rent out crop land	1,2	1,2	3,8	2,8	2,6
Other	14,4	0,3	13,9	21,5	12,8

6.2.2 Early warning system and community based disaster management

In SALOHI zones, more than half of communities surveyed (56 %) do not have an early warning system, despite the fact that they are almost all affected by shocks. ADRA communities in particular lack EWS (28 of 30 communities, or 93%), as do communities in the Central Plateau (94%). In other NGO intervention zones, 40 – 60% of communities lack EWS (Table 80).

We asked key informants in each community if groups or organizations existed which helped them in case of shocks or natural disasters. These groups we called community intervention systems, or DCIs. Only one community in four was able to identify an organization or association capable of helping them in times of shock.

Not all of these EWS and DCI are functional. On average 56% of EWS and 45% of DCI are actually operational. The rest are either not very functional, or defunct.

Table 80: Percentage of communities in which an early warning system (EWS) or a community intervention system (DCI) exists. Percentage of EWS and DCI which are considered functional, by community key informants.

Exist EWS and/or DCI	ADRA	CARE	CRS	LOL	Center	South	South-East	East	TOTAL
Existence EWS	6,7	55,2	56,7	60,0	5,9	61,5	42,6	59,1	44,5
Existence DCI	6,7	40,0	17,2	36,7	11,8	26,9	22,6	39,1	25,2

Exist EWS and/or DCI	ADRA	CARE	CRS	LOL	Center	South	South-East	East	TOTAL
Functional EWS									
Not at all	-	5,9	5,9	11,1	-	12,5	8,7	-	7,4
Not very functional	50,0	52,9	41,2	16,7	-	43,8	21,7	57,1	37,0
Functional	50,0	41,2	47,1	61,1	100,0	43,8	56,5	42,9	50,0
Very functional	-	-	5,9	11,1	-	-	13,0	-	5,6
Functionality DCI									
Not at all	-	25,0	-	20,0	-	28,6	18,2	11,1	17,2
Not very functional	100,0	50,0	80,0	10,0	-	57,1	9,1	66,7	37,9
Functional	-	25,0	-	70,0	100,0	14,3	63,6	22,2	41,4
Very functional	-	-	20,0	-	-	-	9,1	-	3,4

6.3 Access to basic social services and accessibility

Access to social services and markets as well as all community assistance which comes from outside the community are important factors in mitigating the consequences of disasters. They are also important factors in measuring resiliency - the capacity to recover after shocks. Moreover, access to health services and access to potable water strengthen human capital and capacity. Market access is also a critical factor in household food security, especially once household food production has been depleted.

6.3.1 Accessibility and use of health services

The results of the household survey shows that access to health services is problematic. Only 11% of households have access to a primary health center in their locality; 30% walk up to 5 km to the nearest health center, and 49% travel more than five km. 39% of women reported that they walk 1 hour to get to the nearest health center; 16% walk two hours, and 12% walk at least three hours.

Access to health care varies considerably by zone. Women in LOL zones have better access to health care – 78% have a health center less than 5 km from their home (compared to less than 50% in other NGO zones). As a result, 58% of households in LOL zones travel less than one hour to reach their nearest health care provider. This is an opportunity that should be exploited by the LOL team, to facilitate improvements in basic health care services and disease prevention.

In general, households in the Center and South East have better access to health services – 54% of households in the Central Plateau and 53% in the South East have access to health services within a five km radius, compared to 42% in the South and 22% in the East. The time required to reach a health center is relatively long, no matter what zone you live in. 88% of households in the East have to walk at least one hour to reach the nearest health center, vs. 59% in the South, 61% in the Center and 64% in the South East.

Table 81: Access to health services. Percentage of households, by distance and time to walk to the nearest health center. Percentage of women surveyed who said that a community health volunteer exists in their community.

	ADRA	CARE	CRS	LOL	Center	South	South-East	East	TOTAL
Distance to nearest health center									
In village	7,9	18,4	7,8	26,3	7,4	16,6	11,3	7,9	10,9
< 5 km	35,6	20,7	33,3	51,9	47,2	25,5	41,4	14,2	34,1
5 à 10 km	32,4	31,1	45,9	17,5	38,5	28,8	26,2	64,1	36,5
> 10 km	13,8	13,7	11,8	3,9	6,2	19,4	12,0	10,7	12,1
Don't know	10,3	16,0	1,2	0,4	0,7	9,7	9,1	3,1	6,4
Time to market									
0 hours (less than 1 hour)	29,2	32,5	30,8	58,2	38,7	40,6	36,3	11,8	32,9
1 hour	39,8	34,5	42,7	24,5	46,0	30,4	32,2	54,7	39,0
2 hours	14,0	22,9	16,2	11,7	10,5	9,6	16,4	26,6	15,8
3 + hours	17,0	10,1	10,3	5,6	4,8	19,4	15,1	6,9	12,3
Existence of Health Volunteers	54,1	66,6	79,7	72,4	53,9	65,2	69,4	82,0	68,0

The types of health services available to SALOHI households at the community level include Primary Health Centers Type 1 (in 48% of communities) and Type 2 (in 56 % of communities). Community health volunteers exist in 68% of SALOHI communities, and are more common in CRS zones (80%) and the East (82%), and less common in ADRA zones and in the Center (54%). This has important implications for SALOHI activities, including community based growth monitoring and promotion (which relies on Community Health Volunteers or SECCALINE agents) and preventive health care services including home visits and peer counseling.

Table 82: Percentage of communities in which different types of health services are offered. Percentage of communities in which the population uses these health services. Reasons for infrequent use of health services.

	ADRA	CARE	CRS	LOL	Center	South	South-East	East	TOTAL
Closest health services									
Community Health Volunteer	16,7	6,7	10,0	0,0	17,6	15,4	3,7	4,3	8,3
Basic Health Center, Type 1	43,3	43,3	90,0	16,7	47,1	61,5	37,0	60,9	48,3
Basic Health Center, Type 2	53,3	66,7	20,0	83,3	47,1	50,0	64,8	47,8	55,8
Clinic	6,7	13,3	0,0	6,7	5,9	15,4	5,6	0,0	6,7
Frequently use health services	63,3	63,3	73,3	80,0	76,5	61,5	74,1	65,2	70,0
Reasons for lack of use									
Distance	20,0	26,7	16,7	6,7	11,8	23,1	13,0	26,1	17,5
Lack of care needed	3,3	3,3	3,3	3,3	5,9	3,8	1,9	4,3	3,3
Cost	20,0	26,7	16,7	6,7	11,8	30,8	13,0	17,4	17,5
Poor quality care	3,3	3,3	0,0	0,0	0,0	3,8	1,9	0,0	1,7
Poor treatment by health staff	6,7	3,3	0,0	0,0	0,0	3,8	3,7	0,0	2,5

Focus group members indicated that health care services are frequently used in 70% of communities, especially in LOL zones (80% of communities) and the South East (74% of communities). In those communities where health services are not frequented (30%), the most common reasons include distance

(18%) and cost (18%). The quality of care and the welcome of staff were not significant deterrents to use of health services in SALOHI communities. This information is critical to better understand how to strengthen linkages between health care service providers and their target populations, and to inform Food For Assets programming (if distance is one of the largest constraints to the use of health care services, road improvements could have a positive impact on the use of health services).

6.3.2 Access to drinking water and water source management

Questions regarding drinking water were asked of both women (who do much of the water collection in rural areas in Madagascar) and focus groups of key informants. Women were asked to describe the principal water source for the household. Most households use surface water (rivers, lakes or ponds; 49%) and natural springs (20%). Traditional wells are used by 16% of households. Less than 1% of households used bore holes or water pumps, but 9% used faucets (Table 83).

ADRA households (46%) and households in the Central Plateau (71%) use natural springs much more than households in other zones (<10%). Households in the South East (62%) and East (63%) use surface water more than households in the South (42%) or Center (15%). Traditional wells are used widely in the South (37%) and in LOL (41%) zones (Table 83).

Table 83: Percentage of households who use different sources of drinking water, by NGO intervention zone and geographic zone.

Principle source of drinking water	ADRA	CARE	CRS	LOL	Center	South	South-East	East	TOTAL
Surface water	40,9	49,0	56,8	44,9	15,2	41,7	62,1	62,7	48,9
Natural springs	46,4	6,5	4,7	3,8	71,4	1,0	10,7	6,9	19,9
Traditional wells	1,0	25,5	21,4	41,3	0,6	37,3	12,4	19,0	16,3
Faucets	10,8	2,6	9,7	4,1	11,6	11,3	9,2	1,6	8,6
Well water with a pump	0,4	12,9	3,7	2,7	0,7	0,7	3,8	9,4	3,7
Impluvium	-	2,9	1,3	0,1	-	4,7	-	-	1,0
Bore hole	-	0,1	0,2	2,8	-	0,5	0,6	-	0,3
Rain water	0,3	-	-	-	0,5	-	-	-	0,1
Other	0,2	0,6	2,2	0,3	-	2,7	1,2	0,4	1,1

51% of the communities surveyed have public water points, which are free in 74% of communities. User fees are charged in 16 communities out of 120 surveyed. Water management committees exist for 23/60 communities that have public water points. This information should be used to guide health and sanitation activities, hygiene messages and inform disease prevention protocols.

Community focus groups indicated that out of 484 public water points, 436 are operational (90%) and 215 (44%) are protected from erosion. 75% of these water points are located in the South East and the Center. The percentage of water points which are operational is higher in the Center (99%) and South East (94%) than in other zones (73 – 78%). More water sources are protected from erosion in LOL zones (79%) and CARE zones (69%). Only 15% of water points in the Center are protected from erosion. This information is

important for natural resource management planning, environmental impact monitoring, and resource user group governance, as well as health and sanitation activities.

Table 84: Number of public water points and the percentage of these points that are functional, and the percentage that are protected from erosion, by zone.

Zones	Number of public water points	Number of functional public water points	Percentage of water points which are functional	Number of water points protected from erosion	Percentage of public water points protected from erosion	Number of FKTY
ADRA	290	288	99,3	82	28,3	30
CARE	78	63	80,8	54	69,2	30
CRS	63	45	71,4	37	58,7	30
LOL	53	40	75,5	42	79,2	30
Center	129	127	98,5	19	15,7	17
South	76	55	72,4	58	76,3	26
South-East	233	218	93,6	112	48,1	54
East	46	36	78,3	26	56,5	23
Total	484	436	90,1	215	44,4	120

6.3.3 Access to market

Markets are community meeting places, as well as places where families can purchase and sell food and other supplies. Market access is first and foremost physical – is there a regular market within walking distance of the community, throughout the year? – but also economic (does the household have sufficient purchasing power to make use of this market)? This section will discuss communities’ physical access to markets.

Table 85: Market access. Distance to the closest market and travelling time from SALOHI communities (percentage of communities).

	ADRA	CARE	CRS	LOL	Center	South	South-East	East	TOTAL
Distance to market									
In village	10,0	26,7	23,3	23,3	11,8	17,4	20,8	30,8	21,0
< 5 km	26,7	33,3	13,3	36,7	29,4	21,7	30,2	26,9	27,7
5 - 10 km	40,0	26,7	40,0	23,3	29,4	43,5	32,1	26,9	32,8
10 km+	23,3	13,3	20,0	16,7	29,4	17,4	17,0	15,4	18,5
Time to walk									
< 1 hour	22,2	36,4	13,0	34,8	26,7	21,1	27,9	27,8	26,3
1 – 2 hours	51,9	45,5	56,5	39,1	40,0	52,6	51,2	44,4	48,4
2 hours +	25,9	18,2	30,4	26,1	33,3	26,3	20,9	27,8	25,3

Data from the baseline survey indicates that SALOHI communities are located some distance from the nearest market. On average, 21% of SALOHI communities have a local market. In most cases, community members walk 5 – 10 km (33%), or 1 – 2 hours (48%). 50% of SALOHI communities are located more than 5 km from the nearest market. This is especially marked in the South (61% of communities are more than 5 km from the nearest market), and the Center (59%)(Table 85). This information has important implications for livelihoods approaches, agro-enterprise development, and Food For Assets programming.

6.3.4 Community Access

Communities need to be accessible all year, particularly when there are risks of natural disasters, and communities need aide and assistance. In addition, access to social services and market access (which has a major impact on livelihoods and coping strategies) are greatly affected by roads and other transportation networks.

We asked community members if their community was accessible all year long, and by what means. The information collected indicates that 71% of communities surveyed (85 out of 120) are accessible all year. Communities in the Center and South East are more difficult to reach – 35% of their communities are not accessible all year, vs. 23% of communities in the East and 17% of communities in the South. Only 53% of LOL zones are accessible all year, vs. 63% of CRS communities, 73% of ADRA communities and 93% of CARE communities (Table 86). This information has important implications for Food For Assets priorities, and for program monitoring and logistical support needs.

Table 86: Percentage of rural communities accessible all year, and principal transportation routes (multiple responses possible).

	ADRA	CARE	CRS	LOL	Center	South	South-East	East	TOTAL
Accessible by:									
National road	13,3	23,3	13,3	26,7	23,5	26,9	16,7	13,0	19,2
Regional road	13,3	6,7	6,7	13,3	17,6	3,8	11,1	8,7	10,0
Commune road	40,0	26,7	33,3	66,7	29,4	38,5	55,6	21,7	41,7
River	0,0	13,3	13,3	23,3	0,0	23,1	14,8	4,3	12,5
Ocean	0,0	0,0	0,0	6,7	0,0	0,0	3,7	0,0	1,7
Rural feeder road	63,3	53,3	60,0	0,0	58,8	50,0	53,7	65,2	55,8
Bike path	33,3	30,0	30,0	46,7	29,4	15,4	40,7	30,4	31,7
Accessible all year	73,3	93,3	63,3	53,3	64,7	82,6	64,8	76,9	70,8

SALOHI communities are accessible by a number of different transportation routes. Most communities rely on rural feeder roads (56%), which are not maintained by the government and are dependent on community users' associations for maintenance. 42% are accessible by communal roads, and 32% are accessible by bike paths. In addition, some communities are accessible by both roads and/or river or ocean access (usually via dugout canoes). One out of five communities is accessed using a national (paved) road.

6.4 Governance and Community Management

Local governance is an important environmental factor that affects household food security, and the food security status of the entire community. Local governance affects the efficacy of early warning systems and disaster mitigation, the types of responses to shocks, resources available to respond to shocks, market access, economic opportunities, health system functioning, and the availability of productive inputs. In the SALOHI program, governance includes not only commune level leadership and local authorities' capacity and willingness to involve local stakeholders in decisions that affect their lives and livelihoods, but also transparent management of collective resources (infrastructure management associations, agri-businesses/cooperatives, village savings and loans, etc.), and the equitable distribution of benefits.

During the survey, we asked key informants in the community about the degree to which local leaders consulted them in decisions which affected their food security, the types of consultations between community members and local authorities, and the representation of women and marginalized groups in the decision making process. We also asked them about the existence of local development plans, and the degree to which they have been implemented.

6.4.1 Community consultations

In each community there exists several types of leaders – political, administrative, traditional, religious, etc. All of these leaders take decisions which affect the lives and livelihoods of local populations. The degree to which they consult each other, exchange ideas and coordinate their actions can have a significant impact on local food security.

For this reason, the SALOHI team asked key informants about the degree of consultation and coordination between local leaders, and the effectiveness of local leadership consultative systems. Data in Table 87 indicates that in almost all communities (111/120, or 93%), in all zones, local leaders consult one another on a regular basis. This process was considered moderately functional or effective in 69/111 communities (63%), and very effective in 27 communities (roughly 25%).

In the majority of communities (110/120, or 92%), there are also consultative mechanisms for local leaders and the population. These mechanisms are considered functional in 73/110, or 66% of communities, and very effective in 20/110, or 18% of communities.

There are some differences across NGO intervention zones. Consultative mechanisms are slightly less common in CARE zones (83%), and slightly more functional in CRS zones (93%). This represents an opportunity for CRS staff to make use of and capitalize on local consultative structures, and a challenge for CARE staff to develop new ones.

6.4.2 Consideration of the opinions and needs of the population by local decision makers

In order for early warning systems and disaster management systems to have an impact on local communities and elicit a response from local authorities, it is important that local decision makers consult with and take into consideration the needs of the local population. Fortunately, it appears as though the

opinions and the needs of the population are taken into consideration by decision makers (112 communities out of 120 surveyed, or 93%). There are some slight differences by zone – in CARE and CRS zones the percentage is somewhat lower (<90%) and in ADRA zones it is quite high (100% of communities felt their needs were taken into consideration). Communities in the South were also slightly less like to say that their needs are taken into consideration by local leaders (88%).

Women’s representation in decision making structures was low. 70% of communities said that women were not at all represented or not very well represented. Only 7% of communities felt that women were well represented in local decision making structures. Again, there were variations depending on the zone. 45% of CARE communities and 40% of communities in the South said women were not at all represented, compared to 23% in LOL zones, and 26% of communities in the South East. 45% of communities in the South East said women were well represented in local decision making structures, which is an opportunity which partners can exploit to promote more equitable participation in local decision making structures.

Table 87: Percentage of communities in which consultative mechanisms exist between leaders, and between leaders and the population. Percentage of consultative mechanisms and their level of functionality. Percentage of communities in which the needs and opinions of the community are taken into consideration. Percentage of communities and the degree of women’s representation in decision making.

	ADRA	CARE	CRS	LOL	Center	South	South - East	East	TOTAL
Consultation between leaders	93,3	90,0	93,3	93,3	88,2	92,3	92,6	95,7	92,5
Not at all functional	0,0	0,0	0,0	3,6	0,0	0,0	2,0	0,0	0,9
Somewhat functional	17,9	11,1	7,4	10,7	20,0	12,5	10,2	9,1	11,8
Functional	53,6	74,1	74,1	50,0	73,3	75,0	49,0	72,7	62,7
Very functional	28,6	14,8	18,5	35,7	6,7	12,5	38,8	18,2	24,5
Consultation between leaders and the community	100,0	83,3	90,0	93,3	100,0	88,5	90,7	91,3	91,7
Not at all functional	0,0	0,0	3,7	7,1	0,0	4,3	4,1	0,0	2,7
Somewhat functional	16,7	20,0	3,7	10,7	17,6	8,7	10,2	19,0	12,7
Functional	73,3	68,0	74,1	50,0	76,5	78,3	59,2	61,9	66,4
Very functional	10,0	12,0	18,5	32,1	5,9	8,7	26,5	19,0	18,2
Consideration of community needs	100,0	86,7	89,7	96,7	100,0	88,0	94,4	91,3	93,2
Representation of Women in decision making									
Not at all represented	34,5	44,8	23,3	23,3	29,4	40,0	30,2	26,1	31,4
Somewhat represented	31,0	48,3	56,7	23,3	41,2	52,0	24,5	60,9	39,8
Well represented	24,1	6,9	16,7	40,0	17,6	4,0	35,8	13,0	22,0
Very well represented	10,3	0,0	3,3	13,3	11,8	4,0	9,4	0,0	6,8

6.4.3 Participation of local authorities and community leaders in commune level consultations

Good governance involves community representation in the decision making process, at the commune level and at the administrative level. During the baseline the survey team asked key informants if community

leaders and representatives from community based organizations participate regularly in communal advisory meetings, where decisions affecting household livelihoods are made.

31% of communities stated that community leaders do not participate in commune level advisory meetings. More ADRA communities (46%) and CARE communities (40%) reported this problem than communities in other NGO zones. There was no real difference between geographic zones. However, 57% of LOL communities and 39% of communities in the South East reported constant participation of community leaders in commune advisory meetings (Table 88). Similarly, participation of community organizations in commune advisory meetings was lowest in ADRA communities, and in the East, and highest in LOL communities.

Table 88: Percentage of communities depending on the level of participation of community leaders and community organizations in commune advisory meetings.

	ADRA	CARE	CRS	LOL	Center	South	South-East	East	TOTAL
Participation of community leaders									
None	46,5	40,0	16,7	23,3	26,7	30,8	29,6	39,1	31,4
Yes, sometimes	7,1	16,7	26,7	10,0	13,3	23,1	13,0	13,0	15,3
Yes, often	21,4	40,0	33,3	10,0	26,7	38,5	18,5	30,4	26,3
Yes, always	25,0	3,3	23,3	56,7	33,3	7,7	38,9	17,4	27,1
Don't know	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
Participation of community organizations									
None	62,1	51,7	37,0	41,4	50,0	42,9	46,2	56,0	48,2
Yes, sometimes	10,3	20,7	22,2	10,3	18,8	14,3	11,5	24,0	15,8
Yes, often	6,9	27,6	22,2	6,9	6,3	28,6	13,5	16,0	15,8
Yes, always	17,2	0,0	7,4	34,5	25,0	9,5	21,2	4,0	14,9
Don't know	3,4	0,0	11,1	6,9	0,0	4,8	7,7	0,0	5,3

6.4.4 Existence and implementation of Local Development Plans (PCD).

Data in Table 89 indicates that only 52 communities out of 120 surveyed have a local development plan. More LOL communities (70%) have local development plans than in other zones (27% - 40%). Unfortunately, a quarter of these plans have not been implemented, 44% poorly implemented. Only a few (7%, in the South East and East) have been fully implemented. It might be worth exploring those communities where PCD's have been implemented, and using them as role models for new SALOHI communities.

Table 89: Percentage of communities with commune development plans (PCD), and their level of execution/implementation.

	ADRA	CARE	CRS	LOL	Center	South	South-East	East	TOTAL
Existence of Local Development Plan	26,7	36,7	40,0	70,0	35,3	42,3	50,0	34,8	43,3
Level of implementation/execution									
Not at all	-	60,0	20,0	18,8	-	45,5	20,0	33,3	25,6
Low level of implementation	57,1	40,0	30,0	50,0	66,7	45,5	40,0	33,3	44,2
Average/somewhat implemented	42,9	-	30,0	25,0	33,3	9,1	30,0	16,7	23,3
High level of implementation	-	-	20,0	6,3	-	-	10,0	16,7	7,0

6.5 Evaluation of Community Vulnerability

6.5.1 Dimensions and indicators of community vulnerability

The goal of the SALOHI program is to reduce household food insecurity and improve the capacity of communities and households to recover from shocks (resilience). As already indicated, three strategic objectives have been identified which, together, should lead to reduced food insecurity:

1. To improve the nutrition and health status of children under five;
2. To strengthen the livelihoods of food insecure households; and
3. To increase community resilience to food security shocks

Community vulnerability will be evaluated taking into consideration these three dimensions of food insecurity, plus governance, which is a cross-cutting category within the SALOHI program.

The classic approach to evaluating food security involves measuring 1) the frequency or the intensity of risk, 2) the susceptibility to risk, and 3) the capacity to respond to risks or withstand shocks. Susceptibility to risk is measured by the gravity of the consequences of the risk on the target population. For example, up to what point is a community affected by a cyclone or by a drought? Using only the data from the current study, it is difficult to measure community susceptibility to risk using all four dimensions of food insecurity. However, we can propose indicators on the frequency and intensity of risks at the community level, and indicators related to community capacity to withstand shocks using data from the survey. The indicators proposed are naturally based on the SALOHI program design and proposed strategies.

a) Risk indicators and resilience indicators related to health

The results framework contains an implicit hypothesis that poor health practices affect human capital and productive capacity. The two impact indicators are the percentage of children 6 – 59 months of age who suffer from stunting, and the percentage of children 0 – 59 months who suffer from underweight. In this community vulnerability exercise, we will add the percentage of children 0- 59 months of age who are emaciated, due to the diversity of factors that affect malnutrition in the SALOHI zone.

The responses that the program anticipated to improve the health and nutrition status of children include the implication of mothers and caretakers in growth monitoring and promotion activities for children under five, the adoption of recommended nutritional practices (including breastfeeding practices), the adoption of recommended personal and food hygiene practices, and the adoption of practices to prevent disease. Community capacity to respond to health risks will be evaluated with respect to the indicators linked to these practices.

b) Risk and resilience indicators linked to livelihoods.

The SALOHI program will contribute to the strengthening of household coping strategies through improved agricultural production, support to producer groups and the development of agri-business, and the promotion of village savings and loans. We will use two livelihoods indicators: crop yield, and the period of adequate household food provisioning. Rice, maize and cassava are selected key crops for crop yields, because they are the most commonly cultivated crops and their production will be targeted by the SALOHI program. We will evaluate community vulnerability with respect to these two indicators and with respect to community capacity in terms of access to irrigation, adoption of modern techniques and crop diversification.

Table 90: Dimensions of community vulnerability, indicators of risk and resilience.

Risk factor	Risk indicator (frequency and intensity of risk)	Indicators of resilience (capacity to respond to risk)
Health and nutrition status	<ul style="list-style-type: none"> - Prevalence of malnutrition in children 0 – 59 months of age - Morbidity in children 0 – 59 months of age 	<ul style="list-style-type: none"> - Access to health services - Breastfeeding practices - Participation in growth monitoring - Hygiene practices (personal and food)
Livelihoods	<ul style="list-style-type: none"> - Average yield (rice, cassava, maize) - Average number of months of adequate food access 	<ul style="list-style-type: none"> - Access to irrigation - Use of modern production techniques - Crop diversification
Natural disasters	<ul style="list-style-type: none"> - Incidence of flooding - Incidence of drought - Incidence of cyclones - Incidence of hail - incidence of landslides 	<ul style="list-style-type: none"> - Early Warning System - Disaster Management and Mitigation structure - Year round community access
Governance	<ul style="list-style-type: none"> - Consultation between leaders within the community - Consultation between the population and community leaders 	<ul style="list-style-type: none"> - Consideration of population’s needs by local leaders - Representation of women in decision making process - Representation of community groups or leaders in commune advisory meetings.

c) Risk and resilience indicators linked to natural disasters

Diverse types of natural disasters affect communities in the SALOHI intervention zone. Three principal types of natural disasters affect SALOHI communities – cyclones, floods and drought. SALOHI responses to these natural disasters include developing early warning systems (especially for slow onset disasters, like drought), and disaster prevention and mitigation plans (which include sustainable land use plans infrastructure projects, and governance activities).

d) Risk and resilience indicators linked to governance

Governance or the risk of bad governance is measured with two indicators – consultation between leaders within the same community, and consultation between leaders and the general population. Three indicators of risk of poor governance have been selected – consideration of the population’s needs by local leaders, representation of women in decision making, and representation of community groups or leaders in commune advisor meetings.

6.5.2 The Community Vulnerability Index

The index is multi-dimensional, taking into consideration the four dimensions of vulnerability defined above. It also takes into consideration the frequency or the intensity of risk and resilience (community capacity to respond to, and resistance to shocks). For each indicator (of risk and resilience) we chose two modalities (low or high). Low risk or high risk, low resilience or high resilience. We could have developed a more elaborate system, with several levels. However, we chose to keep the index as simple as possible. Taking into consideration both risk and resilience allows us to better understand community vulnerability within the different SALOHI zones. We developed for each community a risk index and a resilience index, then we compared these indices to identify the vulnerability status of SALOHI communities.

Judgments on the level of indicators (low, high) were not easy to make, given that no benchmarks exist. A simple way to calculate these levels is to choose a level for each SALOHI intervention zone as a point of comparison. Once the value of the indicator relative to a given community is above the average for the zone, it is considered high (or low, in the opposite case). The inconvenience of this method is that we classify in the same category communities which have very different levels above and below the mean, and we have no way to classify communities that equal the mean. However, it does provide us with a general framework with which we can classify community vulnerability using our baseline data, and allows us to better understand community vulnerability in the SALOHI zone.

6.5.3 Community Vulnerability

The 120 communities (Fokontany) in which the survey was conducted were randomly selected from a list of 120 communes which the SALOHI program will target. They are representative of the situation at the beginning of program implementation, but not necessarily the direct beneficiaries of the SALOHI program. Some NGOs had not yet chosen their Fokontany when the baseline was started.

The evaluation of vulnerability is not an end in and of itself. These results should help identify the most vulnerable communities, and to develop appropriate intervention strategies. The exercise should include all 544 Fokontany where SALOHI staff will operate. We apply the method to groups of communities defined by geographic zones, so that all the results obtained apply to relatively homogeneous zones. The vulnerability levels for communities in the Center, South, South-East and East of Madagascar are presented in Table 91, using data already calculated and presented in this report.

Table 92 reports the values of indicators for each geographic zone and indicates if the risk or the resilience is high or low, compared to the values calculated for the overall SALOHI program. Certain indicators need to be clearly defined:

- The risk of disease is defined as the percentage of children under five who were sick in the two week period prior to the survey ;
- The risk of different types of natural disasters is defined by their incidence, measured by the percentage of households who were victims of these catastrophes in the last year;
- The risk of the lack of consultation between community leaders and the general population is defined as the low level of functionality of these consultation opportunities, measured by the percentage of communities in which these instances were described as not at all functional or not very functional.
- Access to health is measured by the percentage of women who have access to a health center in a 5 km radius.
- Exclusive breastfeeding is defined as the percentage of children 0 – 6 months of age who are exclusively breastfed since birth.
- The adoption of modern crop production techniques is defined by the percentage of farmers who practiced five technologies: crop rotation, soil fertilization (chemical or organic), use of improved seeds, irrigation and weeding.
- The indicator for crop diversification is the average number of crops produced per household.

Table 91: Vulnerability in SALOHI ones. Evaluation of the level of risk and the level of resilience by geographic zone.

	Center	South	South-East	East	Center	South	South-East	East
Indicators of risk (13)	Indicator values				Level of risk			
Chronic malnutrition (44,4)	64,2	28,2	47,6	43,0	High	Low	High	Low
Underweight (34,5)	46,2	22,7	39,0	29,8	High	Low	High	Low
Emaciation (8,4)	5,2	10,2	8,4	8,9	Low	High	Low	High
Morbidity (44,2)	29,9	50,7	49,2	38,5	Low	High	High	Low
Rice yield (560)	1544	205	557	301	Low	High	High	High
Maize yield (344)	809	286	472	367	Low	High	Low	Low
Cassava yield (1347)	1716	452	2328	2149	Low	High	Low	Low
Duration of lack of food access (4,3)	3,2	5,0	4,5	4,4	Low	High	High	High
Incidence of flooding (54,3)	63,4	0,5	84,8	65,4	High	Low	High	High
Incidence of drought (56,0)	32,3	96,5	46,0	78,8	Low	High	Low	High
Incidence of cyclones (59,1)	69,6	3,0	82,1	41,3	High	Low	High	Low
Consultation leaders/population	17,6	13,0	14,3	19,0	High	Low	Low	High
Consultation between leaders (12,7)	20,0	12,5	12,4	9,1	High	Low	Low	Low
Number of high risk factors					6	7	7	6
Indicators of resilience (14)					Capacity to respond			
Access to health services (45,0)	54,6	42,1	52,7	22,1	High	Low	High	High
Exclusive breastfeeding (55,4)	57,0	25,6	67,6	53,1	High	Low	High	High
Participation in growth monitoring	51,0	51,9	51,9	69,5	Low	Low	Low	High
Personal hygiene (4,4)	1,4	1,1	5,6	8,5	Low	Low	High	High
Food hygiene (8,6)	9,0	6,1	7,5	12,8	High	Low	Low	High
Access to irrigation (23,4)	44,2	2,0	21,5	26,3	High	Low	Low	High
Adoption of crop production techniques (5,3)	10,9	3,7	4,6	1,3	High	Low	Low	Low
Crop diversification (3,6)	4,9	3,1	3,5	3,2	High	Low	Low	Low
Early Warning System (44,5)	5,9	61,5	42,6	59,1	Low	High	Low	High
Disaster Response Plan (25,2)	11,8	26,9	22,6	39,1	Low	High	Low	High
Year round access (70,8)	64,7	82,6	64,8	76,9	Low	High	Low	High
Consideration of local needs (93,3)	100,0	88,0	94,4	91,3	High	Low	High	Low
Representation of women (30,7)	25,1	42,9	25,0	40,0	Low	High	Low	High
Community representation	60,0	46,2	57,4	47,8	High	Low	High	Low
Number of high resilience factors					8	4	5	8

It should be noted that « low risk » does not mean no risk. It simply means that the level of the indicator is lower than the average for the SALOHI program. Similarly “high resilience” does not mean that community capacity does not need to be strengthened.

Table 91 gives us a panoramic view of the strengths and weaknesses of each group of communities relative to their survival strategies. In general, all SALOHI communities suffer from a relatively equal number of risk factors (6 – 7 out of 13). However, the Center (8) and the East (8) seem to have a greater number of high resilience factors (compared to 4 in the South and 5 in the South East), resulting in a lower vulnerability

level overall. The comparison of each risk with the responses to that risk permits us to define the specific strategies for each community group. For example, communities in the Center have a high risk in terms of malnutrition, but at the same time, they have better access to health services and an important percentage of mothers who practice exclusive breastfeeding. Nonetheless, women in the Central Plateau do not sufficiently participate in growth monitoring activities, nor do they adopt sufficient personal hygiene practices. Thus, we could focus on these activities in that zone (for example, growth monitoring and promotion and IEC/BCC campaigns targeting personal hygiene). In addition, communities in the Center have low levels of governance (high risk of poor governance) and a high risk of cyclones and flooding. However, they have low resilience in terms of both governance (especially with reference to the representation of women in decision making) and early warning/disaster response. Activities focusing on these areas might have the greatest impact.

Overall, a large number of high risk factors and a large number of low resilience factors are pertinent indicators of community vulnerability. This is in effect one presentation of a coin with two sides – risk on one side, and capacity to resist/withstand risk on the other. We can interpret these two realities using the following schema, in which we evaluate each group of communities in SALOHI zones:

Figure 32: Vulnerability level of SALOHI communities (grouped by geographic zone)

		Resilience	
		Low	High
Risk	Low		
	High	South South- East	Center East

In reality, all the communities are low, in terms of resilience. The Center and the East are less so than the South and South East, but they have only eight high resilience factors out of 14 (57%). They need to strengthen their resistance to shocks/resilience for the six other factors. All the risk factors in Table 91 can be reduced with effective programming, apart from natural disasters, in which case we can only strengthen community capacity to respond to them.

Section 7: Conclusions and Recommendations for the SALOHI Program

Based on the data collected, it is clear that there are many challenges but also many opportunities which the SALOHI team should exploit during program implementation. Some of these challenges and opportunities are summarized below:

Challenges

1. Despite significant long term support to one of the largest nutritional projects in the world (Office National de Nutrition, or ONN), **nutritional knowledge** in SALOHI communities is very low, and nutritional practices are poor. Participation in growth monitoring activities does not seem to have a significant impact on or association with nutritional status. Is it because growth promotion is too often overlooked in the rush to measure and weigh children, or is it something more fundamental? The SALOHI team should take an innovative approach to growth monitoring, promoting local capacity and local materials to ensure that whatever approach is decided upon can be maintained in the absence of scalable scales, and balanced balances. In the short term, screening with MUAC tapes should be introduced rather than continuing to rely on Salter scales. An increased focus on growth promotion using targeted and well researched communication pathways and messages might help. Integrating nutritional capacity building opportunities into IMCI home visits, livelihoods activities, VSL meetings, and disaster risk reduction activities will be vital to ensure that ambitious stunting targets are met. Alternatively, helping mothers to identify stunted children using simple tools like home wall growth charts (made with pencils) could prove more successful than traditional approaches. However, scales are still useful to identify children for PD hearth sessions. In addition, the existence of the wealth of experience, data and documentation at ONN should be exploited by all SALOHI partners, to improve program strategies, and benefit from lessons learned.
2. **Personal hygiene practices** are abysmal. Hand washing practices, access to potable water, latrine usage and food hygiene practices have a direct impact on childhood illness, which have a direct impact on malnutrition. It will take a well thought out, effective communication strategy to change knowledge, attitudes and practices with regards to hygiene. Fortunately, partners like PSI, SanteNet2 and RANO HP can provide much needed technical and communication support. It will take a full scale, concerted effort to break through this barrier! However, once an integrated strategy is successfully developed and launched, there is room to make tremendous advances! Starting from practically 0, there is nowhere to go but up!
3. Although prenatal care coverage is not bad in the sense that most women receive at least three prenatal care visits, the quality of those visits is not meeting national standards. Only 41% of women received iron folate supplements during prenatal care visits, and 38% of women surveyed could not name one **pregnancy danger sign**. The Pregnant and Lactating Women Support Group Program (FARNG) pilot tested in Guinea and scaled up into Sierra Leone offers a great opportunity to combine community based nutritional counseling opportunities with key messages for pregnant mothers and information sharing within the community to promote not only improved prenatal care practices and coverage, but also post natal care visits, lactation advice, support for immediate and exclusive breastfeeding, and complimentary feeding. The key to the success of these groups lies with creating complete community buy in early on (traditional leaders, husbands, grandmothers, midwives, health professionals, health volunteers, and children, sisters and brothers), and keeping the meetings simple, short and sweet, with concrete results. This one activity could help the SALOHI team to influence multiple indicators (ANC coverage, knowledge and consumption of foods rich in vitamin A and iron, iron folate supplementation, immediate and

exclusive breastfeeding, post natal coverage, complimentary feeding, and malnutrition!). However, we need to think of a new Malagasy name for the program....

4. **Crop yields are very low**, and are statistically correlated to the number of months of household food security (one of SALOHI's key indicators), and the adoption of at least five recommended technologies is strongly associated with significant increases in yield. The good news is, there are several existing technologies which have been tried and tested in Madagascar that can quickly double, triple or even quadruple current yields. The bad news is, they are not catching on. What are the constraints to adoption of these technologies? What specific criteria do we need to use to evaluate each innovation we bring to our farmers? How do these constraints differ by geographic zone, and household type (MHH and FHH)? This is a challenge, an opportunity, and an area for further research (see below)!
5. Many farmers interviewed expressed negative **attitudes towards credit, and farmers' groups/cooperatives** which could limit the impact of these two activities. It will be very important to conduct focus group discussions in target communities to understand exactly how people perceive VSL opportunities and constraints, as well as the benefits and risks of working in groups. Site visits to existing sites and groups could really jump start discussions, and bring quick results.
6. SALOHI zones are definitely well targeted. They suffer from **frequent shocks** (97% of households affected!) with significant impacts (especially on the environment), which will definitely pose challenges to the design and effective implementation of development activities. Already the effects of this year's cyclones are affecting program planning. It will be very important to set up a functional, efficient, simple community based early warning system as soon as possible, to facilitate transitions from emergency response back to development as quickly as possible. This also means that infrastructure design and maintenance schedules should take into account the need to withstand certain forces, and to work with mother nature rather than against her. Initial SALOHI activities should focus on securing and maintaining existing productive assets, preventing damage from future shocks, and developing new productive assets to help households prepare for growth.
7. **Up to 90% of the target population lacks food** at certain times of the year. This will have huge impacts on Food For Assets programming, and commodity programming in general. Whereas in many cases you can discourage households who are relatively food secure from participating in FFA programs using ration wages, in this case programming teams may need to accept and anticipate very high rates of participation in FFA activities.
8. **Female Headed Households** are particularly vulnerable, and have fewer assets and fewer resources than Male Headed Households. They should be targeted, where appropriate, for FFA and FFT activities, in addition to livelihoods, health and nutrition and disaster risk reduction activities. It will be important to take into consideration their physical capacity, child care needs, literacy/education levels, and cultural norms to develop appropriate FFA and FFT interventions which involve both men and women.
9. **Chronic malnutrition levels are quite high (60% in Central Plateau)**, and vary considerably by zone. This indicates that the underlying causes of malnutrition in each zone differ, which will require different programmatic responses. For partners working in two or three (or even four!) zones, this will pose a particular programmatic challenge!
10. **Knowledge of HIV/AIDS still quite low** (<60% of women in LOL zones!). How is this possible?? Fortunately HIV/AIDS prevalence is quite low in Madagascar, but we need to be ready! Perhaps we should make it part of the Disaster Prevention and Mitigation Plans? :->

Opportunities

1. One of the greatest strengths of the SALOHI program is that it **responds directly to a real felt need** on the part of target beneficiaries, and it is a **multi-sectoral program** with huge **opportunities to link and integrate activities** to maximize impact. For example, linking growth monitoring and activities directly to the identification and rehabilitation of moderately malnourished children (FARN), to FFA assets (to satisfy short term household food needs), to VSL (to help mothers develop the savings they need to take their kids to the clinic when they are sick, and to buy medicines to reduce the impact of diseases), to agriculture activities and the production of complimentary feeds, to the production of foods rich in vitamin A and iron, to dietary diversification, to crop diversification, to livelihoods diversification. It's all a big tangled web to be woven, to create a dynamic, community based safety net for vulnerable households and family members.
2. There is relatively high prenatal care coverage (86%), a high percentage of children who are immediately breastfed (71%) and continue to be breastfed (55%), relatively good vaccination coverage(85%), good mosquito net coverage in endemic zones (97% in the East) and vitamin A supplementation/deworming (90%). This would indicate that **health care systems are functioning** fairly well in SALOHI zones, especially in the East and the Central Plateau. This is an opportunity which can be exploited by the SO1 team, to contribute to and support overall program implementation.
3. Most farmers have access to some **productive assets** - land, animals, seeds, tools –needed to participate in SALOHI activities.
4. Many farmers expressed a perceived need for **environmental protection** activities. Their fields and roads have been destroyed by erosion (wind, water, sand and soil) and disaster risk reduction activities should support that.
5. There are many **partners** willing to collaborate and coordinate with SALOHI staff, in the capital and in the field. UNICEF, WFP, RANO HP, SanteNet2, PSI, Conservation International, and WWF all operate in and around SALOHI zones. Identifying strategic synergies and opportunities to coordinate and collaborate can save resources, save time and increase impact. Field staff in particular should be encouraged to take advantage of these partnerships early and often.
6. There is an **existing tradition** of communal work days, especially for infrastructure maintenance. SALOHI staff should take advantage of traditional systems where they exist, seek to understand how they work (their strengths and weaknesses) and use them as models and guides to ensure appropriate maintenance of community infrastructure developed under the SALOHI program.
7. Finally, **communication** is key to behavior change (and we have a TON of behaviors to change!). ADRA is the only SALOHI partner with a specific communication focus, and specialist. Other SALOHI partners should look to ADRA for leadership in this area, identify resources to strengthen their own communication programs, and link with partners who have a comparative advantage in this area. Rather than relying on pre-packaged, one size fits all communication strategies and tools, use some of that incredible Malagasy creativity, and create targeted messages for each region which address the real barriers to adoption in that zone, as identified and verbalized by the specific population targeted. Make noise. Be seen and be heard. Repeat yourself. Sing (it's Karaoke time!).

Areas for further exploration

1. **Gender.** During the baseline survey a significant amount of data was collected, but the team had neither the time nor the skills required to analyze all the potential gender implications of this data, and to disaggregate the data to present it in this report. Qualitative data in particular was not fully

treated. In addition, during the roll out of SALOHI technical strategies and during staff meetings, it has been noted that gender remains a vague concept without clear guidance on how to use gender analysis tools to inform programming. A consultant will be hired within the next three months to help the SALOHI team mine existing baseline data for gender content, review M&E tools for gender sensitivity, and train SALOHI staff to use gender tools in their everyday work.

2. **Adoption.** SRI (Intensive Rice production System) is a package of technologies developed in Madagascar over 30 years ago which has proven potential to triple rice yields, and which has been adopted throughout the world with great success, but not here in Madagascar. "Semi Direct", a no till, legume based cover cropping system has also been widely promoted in Madagascar, but not so widely adopted. It is important that SALOHI staff continually dialogue with community partners to develop local solutions to local problems, using existing technology where possible, and developing and innovating when needed. The FFS approach is a good mechanism for that, but additional training might be needed to help field staff evaluate new technologies using local criteria, and to identify bottlenecks and adoption constraints as we go.
3. **Trigger indicators.** Some very interesting qualitative data was collected during the baseline survey on community resilience and traditional food security indicators and early warning signs, but additional work is needed to meld this information into a functional early warning system. A follow up workshop and meeting of the SO3 team should help push this process forward.

In general, the baseline survey confirmed many (but not all!) of the underlying hypotheses inherent in the program framework. Malnutrition levels in target zones are quite high, and closely linked to health status and hygiene practices, nutritional practices, agricultural production practices, and shocks. Baseline data indicates that up to 90% of households suffer from food insecurity during some time during the year, and target zones are appropriately selected. Specific challenges, including lack of physical access to some communities during the rainy season, the frequency and severity of shocks, lack of nutritional knowledge, poor hygiene practices, and very low crop yields will need to be addressed by SALOHI partners. Alternatively, high rates of immediate breastfeeding and continued breastfeeding, as well as access to land and productive resources are opportunities which can be exploited to facilitate program implementation.

SALOHI staff will take into consideration all of the information collected during the baseline study to improve program strategies, focus activities, and to measure and evaluate program impact over time. The survey provided SALOHI staff with an excellent opportunity to get to know the target population, and each other (team building). The baseline survey was structured in such a way as to promote participation, both by technical and M&E staff in the design, implementation and analysis of data, as well as community members in the interpretation of that data. An innovative strategy will be used to disseminate data down and back to the community level, to contribute to the development of a community based, participatory M&E system. Baseline data dissemination tools have been developed to simplify the data so that it is useful and relevant for field staff. The next step is to continue to disseminate the information gathered, and to ensure it is used effectively to guide program implementation. Over the next five years, SALOHI staff will continue to monitor and evaluate the feasibility, effectiveness, sustainability and cultural acceptability of each strategy and activity, to improve program implementation. Wish us luck!

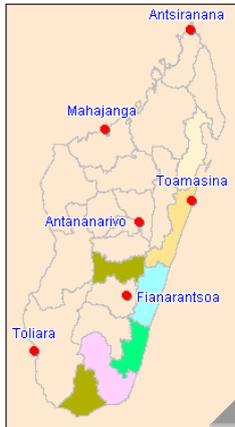
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Baseline summary results by geographic zone (HEALTH AND NUTRITION)

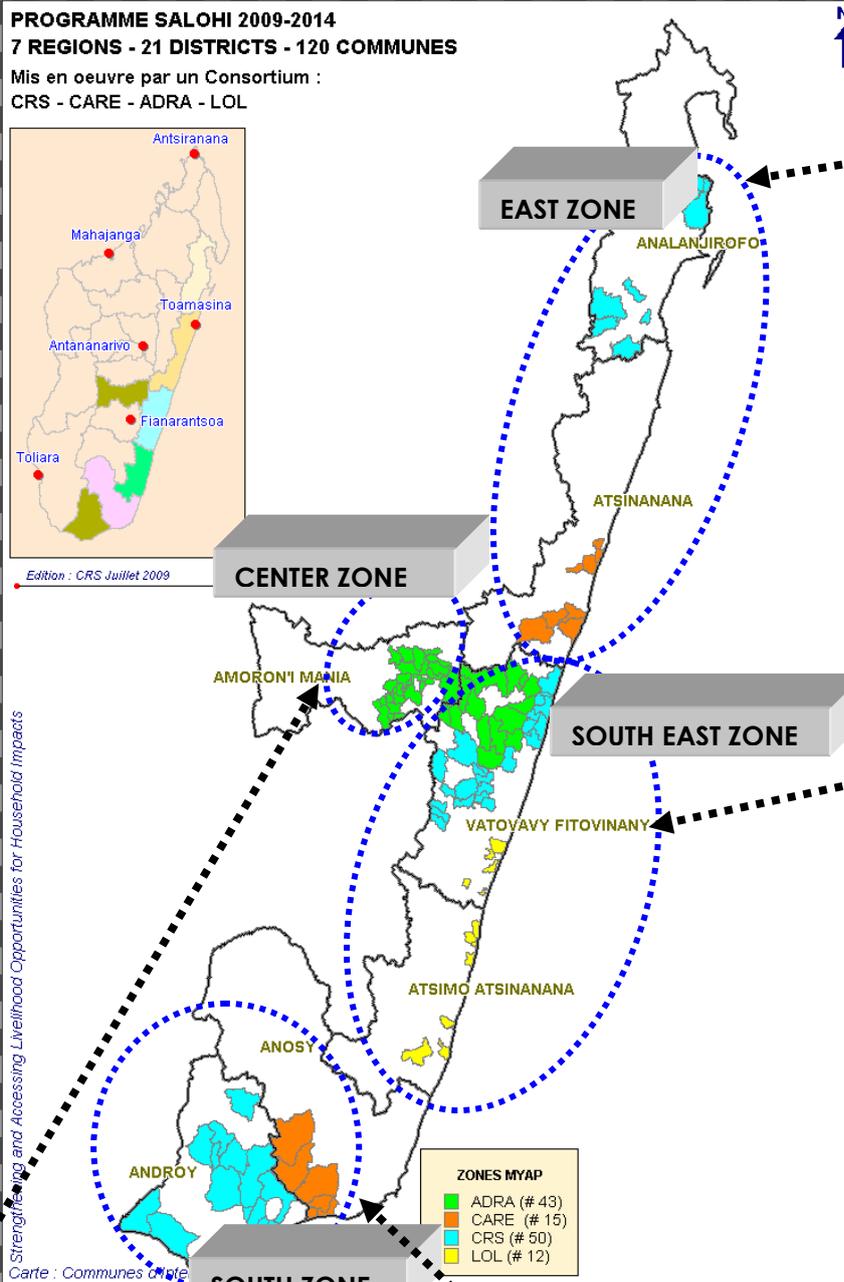
PROGRAMME SALOHI 2009-2014
7 REGIONS - 21 DISTRICTS - 120 COMMUNES
 Mis en oeuvre par un Consortium :
 CRS - CARE - ADRA - LOL



Edition : CRS Juillet 2009

Strengthening and Accessing Livelihood Opportunities for Household Impacts

Carte : Communes de Madagascar



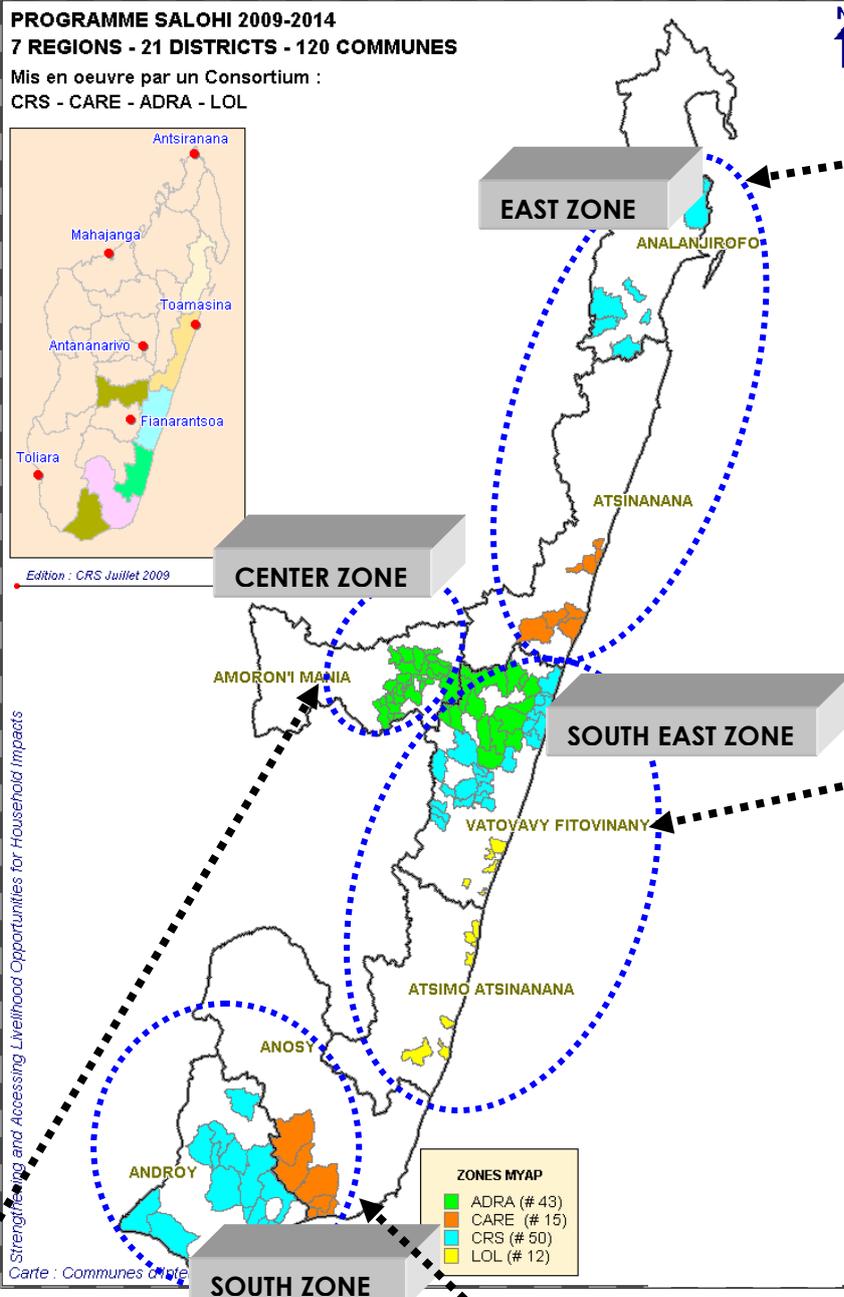
1- % of stunted children aged 6-59 months (HAZ<-2): **43%**
 2- % of underweighted children aged 0-59 months (WAZ<-2): **29,8%**
 3- % children 0 – 6 months of age breastfed within one hour of birth: **58%**
 4- % children 0 – 6 months of age exclusively breastfed: **55,2%**
 5- % of women who consume foods rich in vitamin A: **35,8%**
 6- % of women who consume food rich in iron: **14,5%**
 7- % of caregivers demonstrating/reporting proper personal hygiene behaviors: **8,5%**
 8- % of caregivers demonstrating/reporting proper food hygiene behaviors: **12,8%**

1- % of stunted children aged 6-59 months (HAZ<-2) : **47,5%**
 2- % of underweighted children aged 0-59 months (WAZ<-2): **39,0%**
 3- % children 0 – 6 months of age breastfed within one hour of birth: **70,4%**
 4- % children 0 – 6 months of age exclusively breastfed: **67,3%**
 5- % of women who consume foods rich in vitamin A: **30,0%**
 6- % of women who consume food rich in iron: **9,4%**
 7- % of caregivers demonstrating/reporting proper personal hygiene behaviors: **5,6%**
 8- % of caregivers demonstrating/reporting proper food hygiene behaviors: **7,5%**

1- % of stunted children aged 6-59 months (HAZ<-2): **64,2%**
 2- % of underweighted children aged 0-59 months (WAZ<-2): **46,2%**
 3- % children 0 – 6 months of age breastfed within one hour of birth: **84,4%**
 4- % children 0 – 6 months of age exclusively breastfed: **57,5%**
 5- % of women who consume foods rich in vitamin A: **33,7%**
 6- % of women who consume food rich in iron: **13,8%**
 7- % of caregivers demonstrating/reporting proper personal hygiene behaviors: **1,4%**
 8- % of caregivers demonstrating/reporting proper food hygiene behaviors: **9,0%**

1- % of stunted children aged 6-59 months (HAZ<-2): **28,1%**
 2- % of underweighted children aged 0-59 months (WAZ<-2): **22,6%**
 3- % children 0 – 6 months of age breastfed within one hour of birth: **78,3%**
 4- % children 0 – 6 months of age exclusively breastfed: **26,1%**
 5- % of women who consume foods rich in vitamin A: **52,6%**
 6- % of women who consume food rich in iron: **9,0%**
 7- % of caregivers demonstrating/reporting proper personal hygiene behaviors: **1,1%**
 8- % of caregivers demonstrating/reporting proper food hygiene behaviors: **6,1%**

Baseline summary results by geographic zone (LIVELIHOODS AND RESILIENCE)



1- Average number of months with adequate household food provisioning: **7,6**

2- Average Household dietary diversity score: **5,5**

3- Average yield of targeted food crops of participating farmers (kg/Ha):

- Rice : **329,9 Kg/Ha**
- Sorghum : -
- Maize : **302,6 Kg/Ha**
- Cassava : **1561,5Kg/Ha**
- Pulses : **38Kg/Ha**

4- % of communities that had disaster early warning systems in place: **59,1%**

5- % of water systems constructed which are protected from erosion: **56,5%**

1- Average number of months with adequate household food provisioning: **7,5**

2- Average Household dietary diversity score: **5,4**

3- Average yield of targeted food crops of participating farmers (kg/Ha):

- Rice : **455,3 Kg/Ha**
- Sorghum : -
- Maize : **390,0 Kg/Ha**
- Cassava : **1102,9 Kg/Ha**
- Pulses: **250,8 Kg/Ha**

4- % of communities that had disaster early warning systems in place: **42,6%**

5- % of water systems constructed which are protected from erosion: **48,1%**

1- Average number of months with adequate household food provisioning: **8,8**

2- Average Household dietary diversity score: **5,3**

3- Average yield of targeted food crops of participating farmers (kg/Ha):

- Rice : **1229,3 Kg/Ha**
- Sorghum : -
- Maize : **315,2 Kg/Ha**
- Cassava : **472,2 Kg/Ha**
- Pulses : **245,3 Kg/Ha**

4- % of communities that had disaster early warning systems in place: **5,9%**

5- % of water systems constructed which are protected from erosion: **15,7%**

1- Average number of months with adequate household food provisioning: **7,0**

2- Average Household dietary diversity score: **2,2**

3- Average yield of targeted food crops of participating farmers (kg/Ha):

- Rice: **256,8 Kg/Ha**
- Sorghum : **150 Kg/Ha**
- Maize : **315,2 Kg/Ha**
- Cassava : **472,2 Kg/Ha**
- Pulses : **245,3 Kg/Ha**

4- % of communities that had disaster early warning systems in place: **61,5%**

5- % of water systems constructed which are protected from erosion: **76,3%**



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This study is made possible by the support of the American People through the United States Agency for International Development (USAID), Office of Food for Peace (FFP). The contents of this report are the sole responsibility of the SALOHI program and do not necessarily reflect the views of USAID or the United States Government.
