

**WORLD VISION PACIFIC TIMOR-LESTE
BASELINE SURVEY RESULTS**



***MAKIRA MATERNAL CHILD HEALTH
AND NUTRITION PROJECT***



**Dr. Raul Schneider,
Health Manager WVPDG
July 2012**

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ACKNOWLEDGEMENTS

This baseline study is the result of research and field assessments carried out in Makira Province, Solomon Islands by WV Solomon Islands staff from WV National Office, WV Makira Office, Health Workers from the Health Centre catering for the villages involved in the survey and community members of these villages.

A special thanks to the continuous support provided by the WV Makira Area manager, Bridget Sitai, Steven Waketaku MCHN Project Manager, Health Coordinator George Hagi, DME team Makira, WV Solomon Islands Operations Manager Jared Berends, Country Program Director Andrew Catford and Krystal John, Program Officer.

The assessment team would like to thank WV Australia for funding the assessment and the WV Maternal and Child Health and Nutrition Project in Makira, particular thanks goes to World Vision Australia Ian Grant, Country Program Manager Rural PNG & Vanuatu, LAMP Team, International Programs WVA; Isabel Calvert, Pacific Regional Program Advisor and Sue England Senior Maternal, Newborn & Child Health Advisor.

AFFIRMATION

Except as acknowledged by the references in this document to other authors and publications, the information described herein consists of WV PTL’s own work and contributions from the Makira MCHN Project Team, Makira Area Management and the communities where the baseline took place. The intellectual properties of the design rest with communities about which the baseline was written.

ACRONYMS

ANC: Antenatal care
AIDS: Acquired Immune deficiency syndrome
ARI: Acute respiratory infection
BCG: Bacillus of Calmette and Guerin
BF: Breast feeding
CBO: Community based organisation
CF: Complementary feeding
CMAM: Community based Management of acute malnutrition
DHS: Demographic Health Survey
DPT: Diphtheria, Tetanus, Pertussis
HAZ: Height for age Z-score
HiB: Haemophilus influenzae type b
MCHN: Maternal Child Health and Nutrition
MDG: Millennium Development Goals
MoH: Ministry of Health
MUAC: Middle Upper arm circumference
NGO: Non-Governmental Organisation
PDoH: Provincial Department of Health
PNC: Post-Natal Care
PNG: Papua New Guinea
PTL: Pacific Timor Leste
STH: Soil transmitted helminths
TT: Tetanus Toxoide
ttC: Timed and targeted Counselling
UNICEF: United Nations Children's Fund
WASH: Water Sanitation and Hygiene
WHO: World Health Organization
VHV: Village Health Volunteers
WAZ: Weight for age Z-score
WHZ: Weight for height Z-score
WV: World Vision
WVA: World Vision Australia
WVPDGO: World Vision Papua New Guinea Office
WVNZ: World Vision New Zealand

EXECUTIVE SUMMARY

BACKGROUND

Global estimates suggest that malnutrition (measured as poor anthropometric status) is associated with over 30 % of all deaths among children (Levels and trends in Child Mortality UN Inter-agency Report 2010) According to the latest DHS indicator report from the Ministry of Health and Medical Services malnutrition rates in children under 5 years show 32 % of children stunted, 4.2% wasted and 11.8% underweight. According to the Solomon Islands National Statistics office DHS report the maternal mortality ratio in the Solomon Islands is 100 deaths per 100,000 and the under-5 child mortality rate is 38 per 1,000, however, the 2008 report presented by UNICEF (Solomon Islands Maternal, Newborn and Child Survival) shows maternal mortality at 220 per 100,000 and under five mortality at 70 per 1,000 (infant mortality rate stands at 53 per 1,000) Likewise UNICEF figures on malnutrition tend to differ from those reported on the DHS with 34% of children under 5 reported to be stunted, 21% underweight and 7% wasted. What is clear is that the Solomon Islands are currently mostly off track in the race to achieve Millennium Development Goals 4 and 5 by 2015 (*2011 Pacific Regional MDG's Tracking Report, Pacific Islands Forum Secretariat*)

The Malaita MCHN Project has been designed to address the health and nutrition of mothers and children under the age of five years in 15 villages in the Province of Malaita, an island located in the east section of the Solomon Islands.

OBJECTIVES

To assess maternal and newborn care, nutritional practices, care of the sick child in children under the age of 5 and access to water and sanitation of those people who live in the target area

METHODOLOGY

Information through quantitative (through questionnaires) and qualitative surveys (focus group discussions and observation checklists) were obtained. Anthropometrical measurements (weight and height) and biochemical measurements (haemoglobin values) were taken in children under 5 years and pregnant women. This was a random sample type of survey which interviewed 170 children under 5 years, 170 mothers of those children, 26 pregnant women, 116 mothers and 46 grandmothers and one senior health worker using focus group discussions.

RESULTS

A total of 170 children were interviewed, 86 girls and 84 boys. The average age was 21.9 months. Of these 60% presented some form of malnutrition: 20.6% were underweight (WAZ), 30.6% were stunted (HAZ) and 8.9% were wasted (WHZ).

The following results were found for pregnant women and mothers of children under 5 as per the 7-11 intervention package actions.

Pregnant women (-9 months to delivery)

1. Adequate diet: 60% (n=102) of women interviewed indicated that they had not taken an extra meal while they were pregnant.

2. Iron/Folate supplements: 97% (n=165) of the women interviewed said they had received iron/folate supplements during their pregnancy however only 1.1% (n=2) consumed more than the minimum recommended dose of 100 tablets per pregnancy. Anaemia rates among pregnant women (n=26) was 61.5%, of this total 35% had mild anaemia and 27% presented moderate anaemia. Mean haemoglobin value was 10.06 g/dL

3. Tetanus toxoide immunisation: 90.6% (n=154) of women received tetanus toxoide injections while they were pregnant. 47% (n=80) of women had an immunisation card with them at the time of the interview.

4. **Malaria prevention:** 73.3% (n=19) of the pregnant women indicated that they had slept under a mosquito net the night prior to the interview.
5. **Healthy timing and spacing of delivery:** 36.5% (n=62) of women indicated that they are using some form of contraception. The most common was the Depo Provera injections (55% n=33)
6. **De-worming:** 46.5% (n=79) of women surveyed had received a dose of albendazol while pregnant.
7. **Facilitate access to Maternal Health Services:** 95.3% (n=162) of the women interviewed went to antenatal care checks at least once during their pregnancy, but 51.1% attended to the minimum 4 or more recommended by WHO. 12.9% (n=22) of women delivered their child at home, and the same percentage of women had their deliveries attended to by unskilled birth attendant or relative.

Children 0-24 months

1. **Appropriate breastfeeding:** 97.1% (n=165) of children had been breastfeed, 92.4% (n=157) received colostrum, 51.8% (n=88) of children were exclusively breastfed until the age of 6 months.
2. **Essential newborn care:** Not identified in this survey.
3. **Hand washing:** Knowledge of hand washing: 79% (n=135) mothers mentioned it was important to wash hands after using the toilet and 71% (n=121) mentioned it was important to wash hands before eating. Only 25.3% (n=43) of mothers reported that they had washed their children hands during the 24 hour period prior to the interview, and only 0.6% (n=1) had hand washing facilities close to the latrine.
4. **Appropriate complementary feeding:** 48.2% (n=82) had received complementary feeding too early (before the age of 6 months).
5. **Adequate iron:** 75.7% (n=53) of children suffered form anaemia
6. **Vitamin A supplementation:** 49.4% (n=84) of children 6 to 59.99 months of age had received Vitamin A supplementation according to their mothers.
7. **Oral re-hydration Therapy/Zinc:** 33% of children suffering from episodes of diarrhoea over the 2 weeks prior to the survey had received ORS.
8. **Care seeking for fever:** Of the 19.4% (n=33) of children with symptoms of acute respiratory infections, 79% (n=26) were treated by a qualified health worker and given antibiotics.
9. **Full immunisation for age:** 44.3% of children 12-59.99 months of age had completed their immunisation schedule.
10. **Malaria Prevention:** 80.6% (n=137) of households had mosquito nets on their beds but only 62.4% (n=106) of the children had slept under the mosquito net the night prior to the interview.
11. **De-worming (children +12 months):** 44.9% (n=67) of children between 12 and 24 months had received a dose of albendazol.

Water and Sanitation in the community:

1. **Diarrhoea prevalence:** 15.9% (n=27) in children under 5 years and 5.9% (n=10) in children over 5 years and adults reported over the two weeks prior to the survey.
2. **Eye and skin infections reported:** 22.9% (n=39) of children presented signs of skin infections (mainly yaws, scabies and streptococcal pyoderma). Sign of eye infections were observed in 18.2% (n=31) of children.
3. **Knowledge regarding causes of diarrhoea and hand washing:** 7.6% (n=13) could not mention one cause of diarrhoea, only 46.5% (n=79) mentioned dirty water. 48.2% (n=82) of women mentioned it is important to wash hands before eating.
4. **Types of toilets used:** 61.2% (n=104) practiced open defecation.
5. **Main sources of water:** Rain water (during wet season) and surface water (during the dry season) were the main sources of water. Approximately a third of the population used public taps through the year.

6. Water collection and treatment: Women (88.2%; n=150) were mostly responsible for collection water. 29.4% (n=50) of households treated their water (mostly by boiling it) before consumption.

7. Soap use: 75% (n=127) of women reported to have used soap the day before the interview. Of these 77.1% (n=131) used it to wash clothes, 73% (n=126) to bathe and 57.1% (n=97) to bathe their children.

8. Location of hand washing facilities: These were mainly located in the kitchen (48.2%; n=82) and outside the yard (28.2%; n=48) and 62.9% (n=107) of containers observed were covered by lids.

MAIN RECOMMENDATIONS

- **Anaemia:** The high levels of anaemia in children under 5 years of age and pregnant women require a rapid response. Build health staff capacity for anaemia prevention and treatment. Through the Village Health Worker network keep a record of all pregnant women and newborns in each community. Focus on community empowerment for the improved nutrition of mothers and children. Identify together with the health centres patients (mothers, pregnant women and children under 2) who suffer from anaemia for appropriate treatment and/or referral.
- **Immunisation:** Support the implementation within the first 12 months of the project of an immunisation outreach service to the 15 villages in the project area, which also includes Vitamin A and de-worming at least once for all children under 5, in order to catch up and completely update the immunisation status of all children.
- **Outreach activities:** Coordinate and support the local health centre to conduct quarterly outreach growth monitoring services to all 15 villages for the next 12 months. This includes collection of birth weight data as part of our monitoring process from all births in Health Centres in the project area and those home births that can be identified upon the visits to the villages. Within the outreach antenatal care to pregnant women should be done ensuring iron folate, malaria prevention and de-worming treatments are provided and immunise all pregnant women against tetanus.
Health staff: Support Health centre staff to learn about and record the MUAC and/or Body Mass Index at the first antenatal visit to the HC for all pregnant women in the project area. Engage VHV to keep track of all pregnant women in the community and encourage eating at least one extra meal a day, taking iron folate tablets, full immunization and a plan for delivery in an appropriate Health facility in order to avoid unnecessary complications. Encourage the appointment of female birth attendants were possible as these are preferred by the women who deliver at the health centre. Develop a project model, such as the timed and targeted counselling model, which will ensure that all pregnant women and children under 5 are registered and tracked in the community through the use of the existing VHV system.
- **Family Planning:** In partnership with the health centre introduce suitable family planning model such as healthy timing and spacing of pregnancy (HTSP) messaging into the project area.
- **Nutrition:** Investigate the possibility of incorporating some immediate implementation of practices through the Trials of Improved Practice (TIPS) model. Work with the communities to develop an inventory of available nutritionally rich foods (especially those with high iron and contents) which will optimise complementary feeding. This would involve the creation of IEC materials for educational purposes. Educate and support mothers and the whole community on the importance of colostrum feeding, exclusive breast feeding until the age of 6 months and appropriate complementary feeding practices after 6 months.
- **Infectious diseases:** Mothers must be able to identify danger signs such as symptoms of dehydration and acute respiratory infections and fever. Ensure that their child is treated by a

health worker who will be able to medicate accordingly if necessary. Distribute treated mosquito nets to those household that do not have them and together with the community identify causes for the high rates of acute respiratory infections, eye and skin infections and diarrhoea.

- **Relationships and advocacy:** Develop relationships with the Provincial Health Department by engaging with them to discuss barriers to antenatal care and delivery in health centres. Work together with the community to address difficulties that do not allow them to access antenatal care and other health services. WV to act as a link encouraging increased cooperation and interaction between the health workers and the mothers. Support the HC staff to develop a data set of birth weights recorded for facility births across the project area in order to begin an analysis of low birth weight babies born and to use to raise awareness of this issue.
- **Hygiene and Sanitation:** Promote hygiene and sanitation practices especially hand washing frequently and explain to mother the importance of this simple preventive measure. Encourage use of latrines and explain the dangers of open defecation. Discuss possibility of upgrading the toilet facilities in the village. Increase the knowledge of mothers, children and the community as a whole on routes of transmission of water borne diseases, skin (scabies, ringworm) and eye infections (trachoma), malaria and other diseases common to the area which are caused by the use of contaminated water and lack of hygiene. Work closely with men and women to encourage hygiene and sanitation practices in their communities.

I. BACKGROUND

The Solomon Islands is the third largest country in the South Pacific after Papua New Guinea and Fiji with a population of about 500,000. The population is scattered across more than 5,000 villages on 350 inhabited islands and speaks over 80 distinct languages (Rhodes 2007). About 80% of the population lives in rural areas, and 40% is under the age of 15. The population growth rate is currently estimated at about 3%; one of the highest in the developing world (ADB 2010).

Global estimates suggest that malnutrition (measured as poor anthropometric status) is associated with over 30 % of all deaths among children (Levels and trends in Child Mortality UN Inter-agency Report 2010)

According to the latest DHS indicator report from the Ministry of Health and Medical Services malnutrition rates in children under 5 years show 32 % of children stunted, 4.2% wasted and 11.8% underweight. According to the Solomon Islands National Statistics office DHS report the maternal mortality ratio in the Solomon Islands is 100 deaths per 100,000 and the under-5 child mortality rate is 38 per 1,000, however, the 2008 report presented by UNICEF -Solomon Islands Maternal, newborn and child survival- shows Maternal mortality at 220 per 100,000 and under five mortality at 70 per 1,000 (infant mortality rate stands at 53 per 1,000) Likewise UNICEF figures on malnutrition tend to differ from those reported on the DHS with 34% of children under 5 reported to be stunted, 21% underweight and 7% stunted.

What is clear is that the Solomon Islands are currently off track in the race to achieve Millennium Development Goals 4 and 5 by 2015 (2011 Pacific Regional MDG's Tracking Report, Pacific Islands Forum Secretariat)

In 2000 the Solomon Islands government signed on to the Millennium Development Goals (MDG's) and agreed to reach set targets, including MDG's 4 and 5 covering mothers and children's health by 2015. Solomon Islands is still currently off target in the race against time to achieve these. Infant and child mortality seem to be declining but slowly and with mixed data, maternal mortality however seem to be persistent.

Solomon Islands was ranked poorly by the United Nations (UN) in its indexes of development progress. It ranked 142 in the UN Human Development index which categorises the country as a low human development country. Within the Human Poverty Index of the Pacific Development Member countries Solomon Islands was rated second worse (49.1) after Papua New Guinea. (UNDP, Solomon Islands MDG, 2005) Based on the UNDP definition, the human poverty index is a composite of the percentage of (i) people not expected to survive to age 40, (ii) adults who are illiterate, (iii) underweight children, and (iv) people without access to safe water and health services. Using this index, PNG (52.2), Solomon Islands (49.1), and Vanuatu (46.4) can be grouped with such countries as Bangladesh, Ivory Coast, Mali, and Mozambique. (A Pacific Strategy for the new Millennium, Asia Development Bank, 2000)

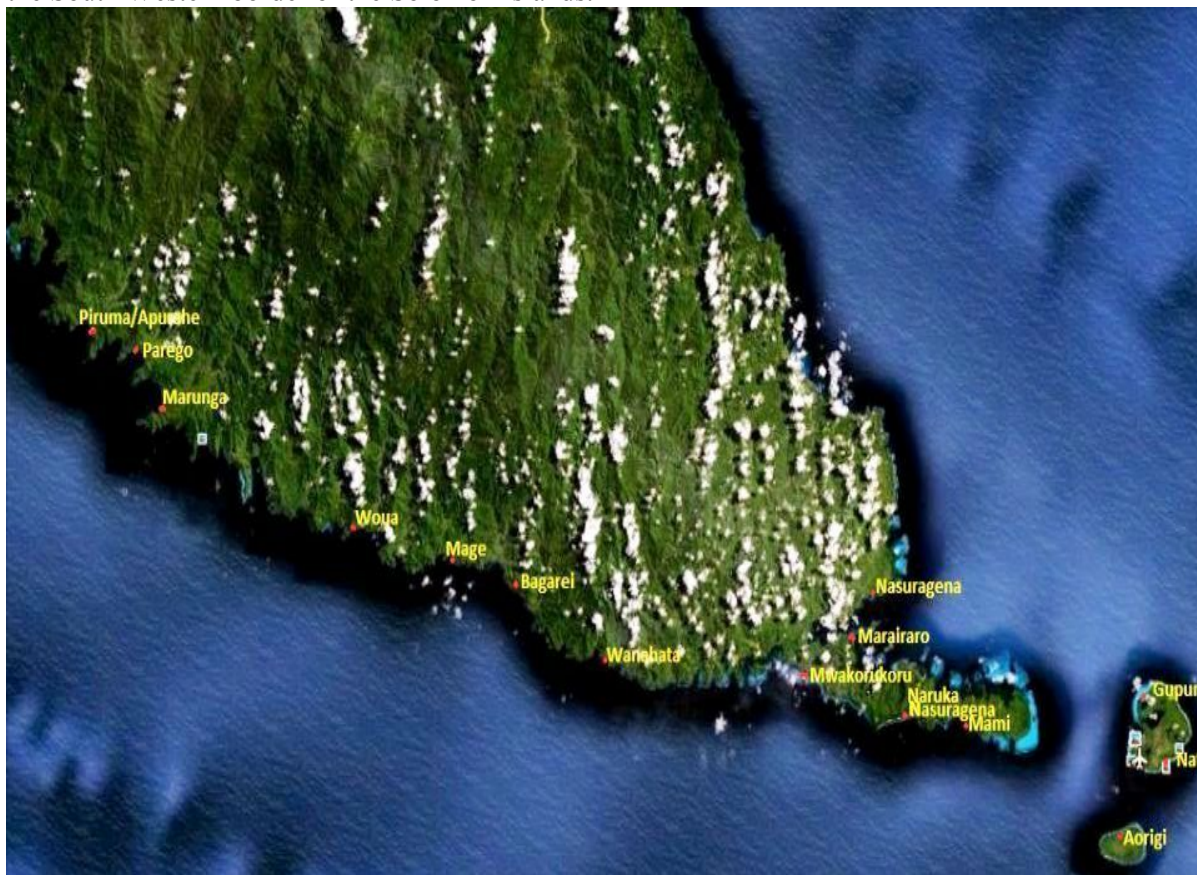
The lack of, and were available, contradictory epidemiological and statistical data for the country makes background research difficult.

Children in the Solomon Islands are reported to have insufficient access to animal and plant protein, inappropriate caring practices and insufficient access to health services, education, water and sanitation and these are all contributing factors to the elevated level of nutritional problems seeing. Children in the Solomon Islands die from preventable and/or easily treatable illnesses such as diarrhoeal diseases (9% of under 5 mortality), malaria, measles, pneumonia (10%), low birth weight and under-nutrition. Maternal mortality is high due to lack of transport from the remote villages to the Health facilities, distances to well equipped health institutions and geographical barriers (mountainous dense jungle with high rainfall) Antenatal checks are irregular for those living in the more remote areas, or altogether inexistent. Many mothers will deliver their

children at home with no skilled assistance if they live far from health services or cannot find or afford transport.

Acknowledging the intergenerational cycle of malnutrition, not only the children are suffering but also in the pregnant and lactating women, show that by improving the mother's health their children's health will also improve. High fertility rates (3%), deliveries unattended by skilled birth assistants, women's workload and nutritional deficits (eg: protein and iron) are risk factors that impact heavily on the mother and child morbidity and mortality.

The Makira MCHN Project has been designed to address the health and nutrition of mothers and children under the age of five years in 15 villages in the Province of Makira, an island located in the South Western border of the Solomon Islands.



Source: Google maps 2012

The 13 villages have been divided into 2 areas:

The mainland or East sector contains the villages of Apurahe, Parego, Waihaga, Woua, Wanahata, Bagarei, Marunga and Mage; while the Islands or West sectors is made up of the villages of Aorigi, Gupuna, Natagera, Naruka and Mwakorukoru.

The Mainland area that composes the villages under study has a population of 2023 people in 381 households while the Island region has a population of 3843 in 574 households. The total estimated total population of the region under study is of 5866 people.

These villages were chosen strategically after careful consultation with the Provincial Department of Health staff who indicated that this area was possibly were most of the malnourished children in the province were located due to their geographical remoteness and difficult and distant access to the existing health services. It is also an area where no other NGO is operating and has very basic services from the government due to the remoteness of the location.

World Vision has worked on water and sanitation projects in the area in the past and has noted severe needs for Mother and Child Health awareness and support which were not being provided. The areas targeted are also very poor and in most cases, as mentioned isolated, often requiring several hours travel by banana boats in the open sea to access the target communities.

Over late 2011 and early 2012 Makira has been hard hit by several cyclones which have destroyed substantial farming crops in the area increasing the problem of under-nutrition particularly for children.

The Makira MCHN Project was designed to better understand the health and nutrition issues, knowledge, perceptions and attitudes of the target population. The project has not only focused exclusively on Water and Sanitation, Maternal and Child Health and Nutrition, but is also trying to build stronger relationships in communities to foster shared learning, experimentation and a shift in the organisation's perceived role from that of a "service provider" to "facilitator" for the empowerment of the community.

II. OBJECTIVES

The general objective of the survey is to assess maternal and newborn care, nutrition practices, care of the sick child in children under the age of 5 and access to water and sanitation of those people who live in the area of South Makira Province.

The specific objectives are:

- a. To assess the nutritional status (prevalence of stunting, underweight, wasting and anaemia) among children under 5 years.
- b. To assess the prevalence of diarrhoea and other infectious diseases among children under 5 years.
- c. To assess the immunization coverage of children under 5 years.
- d. To assess accessibility to Insecticide Treated Bed Nets (ITN) among children under 5 years old.
- e. To assess antenatal care practices that the mother accessed or adopted during pregnancy (TT injection, Iron Folate tablets, extra meals taken, Antenatal checks, place of delivery)
- f. To assess if contraceptive methods are being used in these communities.
- g. To assess the prevalence of exclusive breastfeeding among children aged 0-5 months.
- h. To assess the dietary intake among children under 5 years and their mothers.
- i. To assess the anaemia rates among pregnant women identified in the area.
- j. To assess sanitation practices and knowledge of the community (hand washing, soap use, toilet use, water sources)
- k. To assess the quality, medical stock and equipment available at the Health Centre

III METHODOLOGY

3.1. Study design and population under study

The baseline study employed both quantitative and qualitative methodologies. The quantitative study was a random sample type survey. A pre-determined number of households were randomly selected in the village and those houses which had a child under the age of five were surveyed. The mother of the youngest child living in that household was interviewed.

Qualitative study included focus group discussions with mothers of the children living in that area, grandmothers and health staff of the Health Centre that caters for that population.

3.2. Tool of survey Development

Four tools were used in the survey, a quantitative survey, a focus groups discussion guideline, a pregnant women identification checklist and a health centre observation checklist. The quantitative household questionnaire was developed by WV Pacific Development Group with help from WV Indonesia, WV Australia and WV Asia Pacific Regional Office, and the Focus group discussion question guide to engage mother, grandmothers and health workers in discussions with the interviewer in order to collect qualitative data that would complement the quantitative data collected previously. An observation checklist was used for the Health Centre and part of the water and sanitation section of the survey. The pregnant women identification checklist was used to gather information on pregnant women identified during the field visits. The questionnaires covered 5 main areas; Household identification data, Maternal and Newborn care, Breastfeeding and Nutrition, Care of the sick child and Water and Sanitation components. Field testing to test validity of tools was conducted before the survey. Initially, questionnaires were constructed in English and subsequently were translated by the interviewer in Pidgin or Tok pleis (local dialects used in that tribe). The questionnaires were pre-tested in 6 households in the settlements of Honiara immediately after the 3 day training sessions. Revisions and clarification of questions were made as necessary.

3.3. Sampling Unit and Sample size

A total of 170 surveys covering children under 5 years of age, 170 surveys from mothers and 75 Haemoglobin tests from pregnant women were collected from the 11 locations. Focus group discussions were conducted with 46 grandmothers and 116 mothers. One health worker from the Health Centres in Parego was also interviewed.

3.4. Procedure of data collection

Methods used to collect data included:

1. Interviews

A structured, pre-tested questionnaire was used to obtain data on the general characteristics of the subjects, antenatal care practices of the mother, location of delivery, immunization of the child, contraceptive methods used by the mother, breastfeeding practices and complementary feeding. 24-hour food recall was conducted to obtain food intake of children <5 years. Mother's knowledge on the basic care of a sick child, use of mosquito nets and Water and Sanitation knowledge and practices of the community in general were also part of the questions asked. Interviewers were made up of WV Makira office staff, community members and Health staff which are currently employed by the government to manage the Health Centre and Aid Post around the target communities. To maintain precision all interviewers received 3 days intensive training with practical exercise prior to data collection.

2. Anthropometric assessments

Anthropometric assessment included weigh and length measurement for children under 5 years old. Body weight was measured using SECA 770 weighing scale to the nearest 0.10 kg and length using baby length board to the nearest 1 mm.

Assessments were carried out by trained WV staff and health workers recruited from the Health Centre adjacent to these villages. To maintain precision, anthropometrist, as all staff involved received 3 days intensive training with practical exercises prior to data collection.

3. Biochemical assessments

Haemoglobin assessment was performed for all children under 5 years surveyed and pregnant women identified. Finger prick blood sample using sterile, disposable lancet was taken and haemoglobin value was obtained using Hemocue test kits (HB +201 model).

4. Focus Group Discussions

Focus Group Discussions took place in each village in order to gather qualitative data that would strengthen the quantitative survey data. Discussions were conducted with 46 Grandmothers, 116 mothers and one health worker taking place separately with each group. The questions that were asked to this group related to the questionnaire used for the quantitative data collection. The question guide for the data collected has been added on the Appendix.

5. Checklist

Observation checklist were used to assess soap availability, hand washing devices and covered containers in the household. A separate checklist was also used for the Health Centre taking into account basic equipment necessary for antenatal checks, immunisation, basic birthing equipment, medication available and neonatal consultations.

3.5. Organization of data collection on the field

Data collection was carried out between the 6th and 21st April 2011. The study was conducted in 13 villages: Apurahe, Paregg, Waihaga, Woua, Wanahata, Bagarei, Marunga, Mage, Aorigi, Gupuna, Natagera, Naruka and Mwakorukoru.

The target region was divided into 2 areas (Mainland and Islands sectors) of South-Western Makira Province, Solomon Islands.

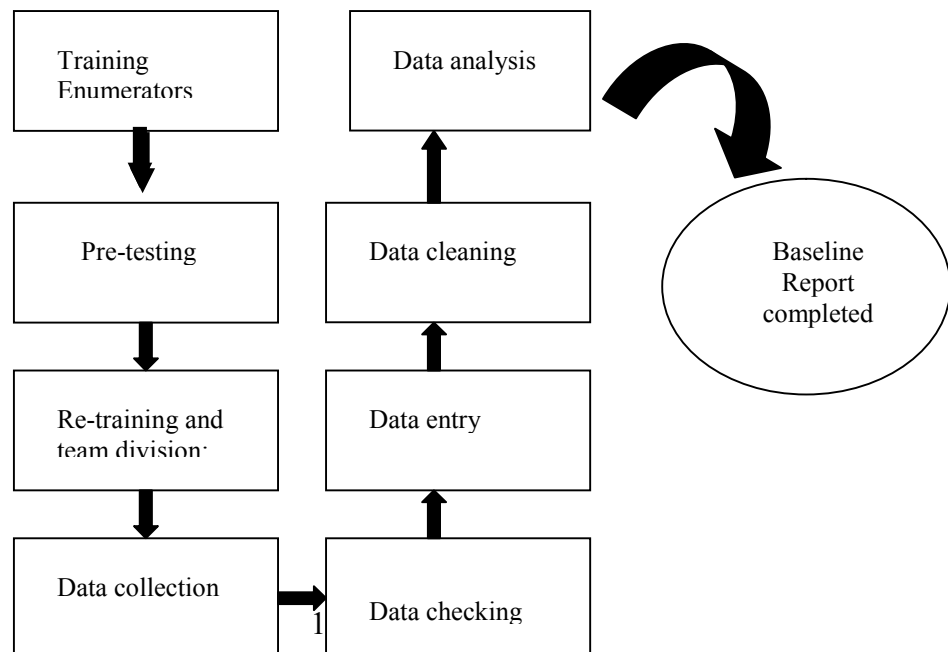
The study was divided into 4 major groups; (1) children under 5 years old (2) mothers of these children (3) Pregnant women (4) whole community for Water and Sanitation survey.

Although not part of the indicators for this project haemoglobin values for pregnant women identified in these villages was also collected. The personnel during data collection consisted of 10 people which formed 2 teams of 5. One interviewer, one recorder and an anthropometrists.

Two separate focus group discussions were arranged in each area with mothers and grandmothers of the village were these were collected.

The contacts with the villages were done through the WV Makira office staff. WV Solomon Islands has been operating in these locations for several years implementing different projects. Dates were set with the communities so that they would be available for interviews. Accommodation for the field staff was also provided by the village as necessary. Before the interview respondents received detailed explanations about study purpose and procedure. Once they agreed to participate, they were requested to sign informed consent. Permission to do biochemical measurements was given by the Provincial Health Department

3.6. Flow of Organization of data collection in the field



3.7. Data analysis

Data was entered into SPSS version 16. Data was checked for its accuracy and consistency at the field by field coordinator and supervisors. Data is presented in number and percentages or mean \pm SD. Significance was explored using Pearsons chi-square tests for categorical values. Anaemia was categorized following the guidelines as shown in table 3.7.1 as per WHO guidelines.

Table 3.7.1. Cut-off for determination of anaemia (WHO, 2005)

Subject	Mild Anaemia	Moderate Anaemia	Severe Anaemia
Children 6-24 months	10-10.9 g/dL	7.0-9.9 g/dL	< 7.0 g/dL
Pregnant Women	10-10.9 g/dL	7.0-9.9 g/dL	< 7.0 g/dL

Some variables on knowledge and practices on health and nutrition were assessed using open-ended questions during focus group discussions. Those variables were recorded into categories according to its theme/answer in order to obtain the magnitude. When the data was multiple answers, the frequencies and percentages were calculated based on all possible answers.

The anthropometrics indices used to interpret the anthropometric measurements were Z-scores for weight-for-age, height-for-age and weight-for-height for the children, which were analysed with ENA for SMART - Software for Emergency Nutrition Assessment using the 2005 WHO Child Growth Standards. Low weight for age Z-scores describe underweight. Low height-for-age Z-scores describe stunting and stunted as outcomes, while low weight-for-height Z-scores describe wasting with the outcome as wasted (WHO, 2005)

Table 3.7.2. The classification of nutritional status for children

Z Score	Cut off	Classification
Weight-for-age	< -2 SD	Underweight
Height-for-age	< -2 SD	Stunting
Weight-for-height	< -2 SD	Wasting

3.8. Ethical approval

Permission to conduct this study was obtained from the National Ministry of Health and Medical Services and village chiefs. Subjects or care giver of subjects were assessed only after they give their informed consent. The participation of the subjects in the study was voluntary. All data was treated confidentially and was used only for the study purposes.

IV. RESULTS

4.1. CHILDREN UNDER FIVE YEARS OF AGE

4.1.1. General characteristic of the children under five years of age

The survey collected data from 13 villages in the South Western region of Makira Province. The total numbers of subjects were 170 children under five years of age, 170 mothers and 26 pregnant women. One hundred and sixteen children and mothers were interviewed from the islands (68.2%) and 54 children and mothers were interviewed from the mainland (31.8%)

Table 4.1.1 General characteristics of the children under five years old according to age group and area of residence

Village	0-5.99 months		6-11.99 months		12-23.99 months		24-59.99 months		Total
	n	%	n	%	n	%	n	%	
Apurahe	2	1.2	4	2.4	1	0.6	5	2.9	12 (7.1%)
Wouwa	0	0	0	0	2	1.2	1	0.6	3 (1.8%)
Bwagere	1	0.6	0	0	4	2.4	3	1.8	8 (4.7%)
Wanahata	0	0	2	1.2	1	0.6	1	0.6	4 (2.4%)
Mwakuro	1	0.6	0	0	8	4.7	4	2.4	13 (7.6%)
Marunga	0	0	0	0	3	1.8	4	2.4	7 (4.1%)
Waihaga	1	0.6	0	0	2	1.2	4	2.4	7 (4.1%)
Aorigi	3	1.8	5	2.9	6	3.5	13	7.6	27 (15.9%)
Naruka	5	2.9	6	3.5	4	2.4	13	7.6	28 (16.5%)
Gupuna	4	2.4	4	2.4	9	5.3	3	1.8	20 (11.8%)
Natager	2	1.2	11	6.5	7	4.1	8	4.8	28 (16.5%)
Parego	0	0	1	0.6	3	1.8	4	2.4	8 (4.7%)
Mage	2	1.2	1	0.6	0	0	2	1.2	5 (2.9%)
Total	21	12.4	34	20.0	50	29.4	65	38.2	170 (100%)

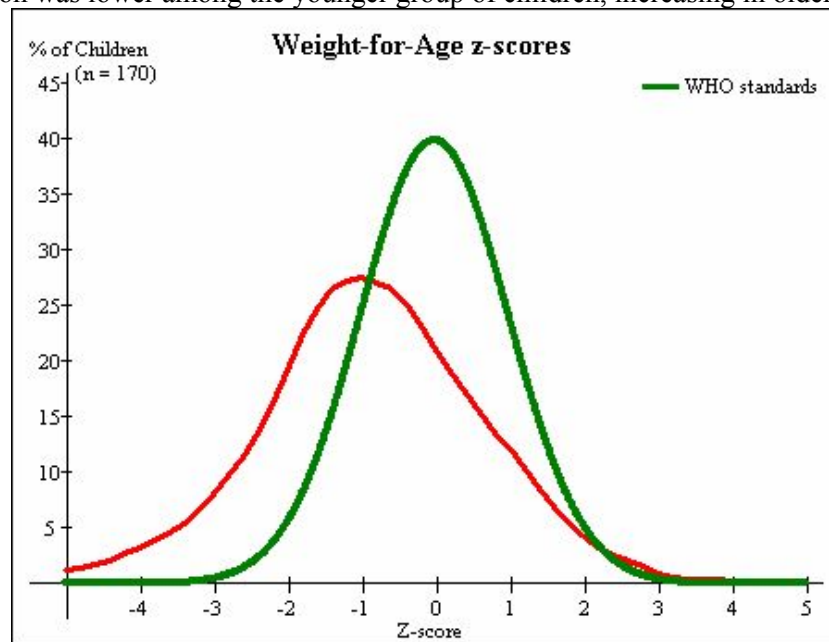
There were a total of 84 boys and 86 girls surveyed. The largest number of children was observed in the 24 to 60 month's old age group (38.2%) which was almost the same (32.4%) of those on the 0-12 month old group. The mean age of the children was 21.96 months (SD 15.38). The most populous villages were Naruka, Natager and Aorigi which accounted for 83 of the surveyed children or 48.9% of the total.

4.1.2. Nutritional status of the children under five years old

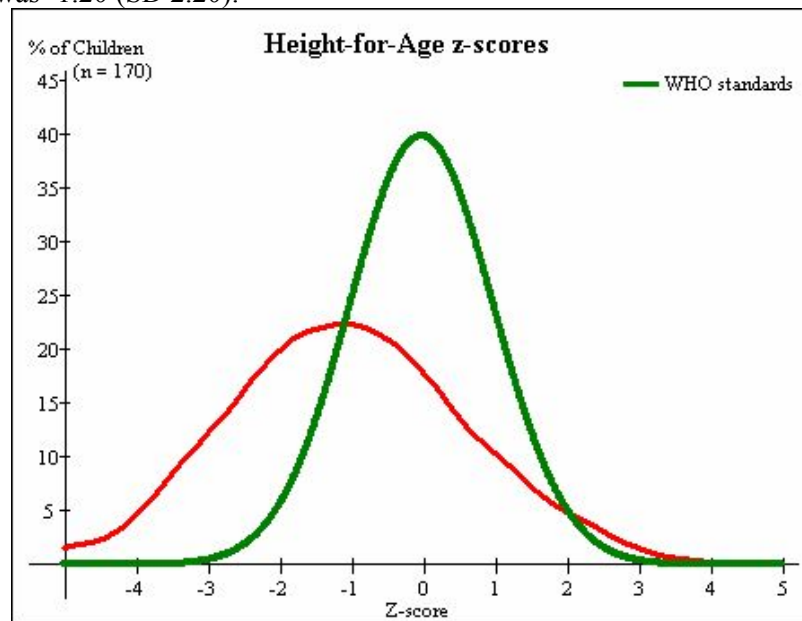
One hundred and two children surveyed (60%) presented some form of malnutrition, be it underweight, stunting or wasting according to the Z-score system to evaluate malnutrition used by WHO. Malnutrition was more evident as the child got older. Sixty seven percent of children (n=44) ages 24 to 60 months suffered some form of malnutrition. Overall malnutrition was higher in the Islands (80%) compared to the Mainland (20%)

Prevalence of severe and moderate underweight was high, presenting 20.6 % (n= 35) of those surveyed (CI 95% 14.5- 26.7). Underweight was higher in boys (26.2%) than girls (15.1%).

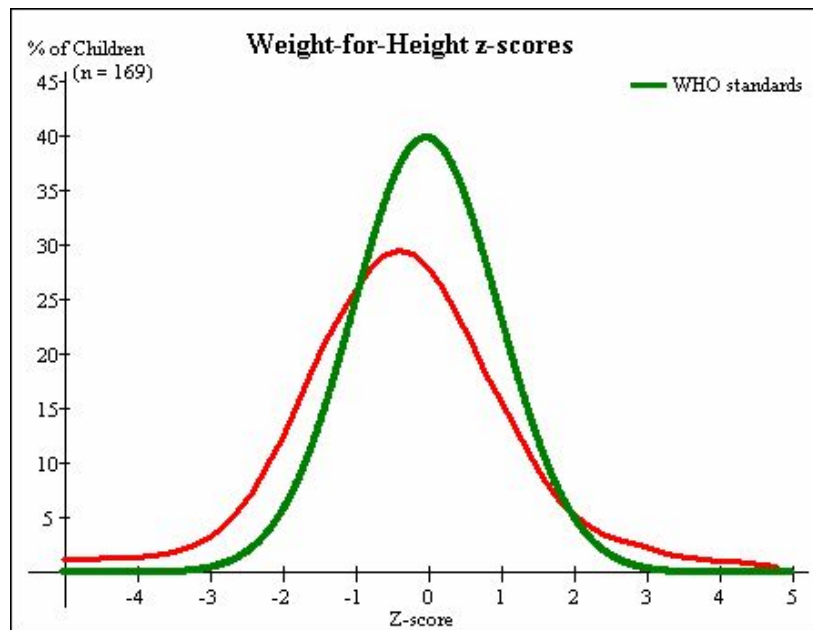
The mean value of the Weight for Age Z-score (WAZ) was -0.79 (SD 1.68). The prevalence of under-nutrition was lower among the younger group of children, increasing in older children.



Severe and moderate Stunting was recorded at 30.6 % (CI 95% 23.7- 37.5) and therefore a serious public health problem in these communities. The prevalence of chronic under-nutrition (stunting) was also higher in boys (35.7%) than in girls (25.6%). The mean value of the Height for Age Z-score (HAZ) was -1.20 (SD 2.20).



Prevalence of severe and moderate wasting at 8.9% (CI 95% 4.6- 13.2) was classified as high according to WHO 2005 standards. Prevalence of wasting was high in the 0-5.99 month age group (9%) then decreased slightly to 5.8% to increase to an average of 9.6% for the older age groups. The mean value of the Weight for Height Z-score (WHZ) was -0.20 (SD 1.88). Wasting was most evident in the Islands with over 86% of wasted cases located in this area.



4.1.2. Nutritional status of the children under five years old according to age group, sex and area of residence

Nutritional Status	Total		Underweight (WAZ <-2 SD)		Stunting (HAZ <-2SD)		Wasting (WHZ <-2SD)	
	n	%	n	%	n	%	n	%
Total	102	60	35	20.6	52	30.6	15	8.9
Gender								
Boys	61	72	22	26.2	30	35.7	9	10.8
Girls	41	48	13	15.1	22	25.6	6	7.0
Age group								
0-5.99 m	7 of 21	33.3	3	14.0	2	9.0	2	9.0
6-11.99 m	18 of 34	52.9	7	20.5	9	26.4	2	5.8
12-23.99 m	33 of 50	66	10	20.0	18	36	5	10.0
24-59.99 m	44 of 65	67.6	15	23.0	23	35.4	6	9.2
Area								
Mainland	22 of 170	12.9	8	22.9	12	23.1	2	3.8
Islands	80 of 170	47.1	27	77.1	40	76.9	13	86.7

4.1.3 Prevalence of severe under-nutrition among children < 5 years old

The prevalence of severe under-nutrition among the children < 5 years old studied was high according to WHO 2005 standards.

Underweight children with a Z-score of between -2 and -3 SD presented 12.9 % (95% CI 7.9-18.0) of the total under 5 population, being more prominent among boys (15.5%) than girls (10.5%). Severely underweight children (Z-score < -3 SD) was 7.6% (95% CI 3.7- 11.6) and was more again more evident among boys (10.7%) than girls (4.7%).

Stunted children with Z-scores between -2 and -3 SD was 20% (95% CI 14- 26). Boys were more likely to be stunted than girls (21% vs. 13%) Severely stunted children (Z-score < -3 SD) was

10.6 % (95% CI 6- 15.2) but the percentages were almost the same between boys and girls (10.7% and 10.5%).

Wasted children with Z-scores between -2 and -3 SD was 4.7% (95% CI 1.5- 7.9). The percentage of wasted boys was higher than girls (6% vs. 3.5%). Severely wasted children (Z-score < -3 SD) was 4.1 % (95% CI 1.1- 7.1) and was slightly higher in boys (4.8 %) than girls (3.5%).

4.1.4. Prevalence of anaemia

Prevalence of anaemia was very high in the population under study. Of the 70 children tested only 24.3% (17 children) had normal haemoglobin levels (above 11g/dL), the other 75.7% presented anaemia at some level.

Table 4.1.4 Prevalence of anaemia according to gender, age group and area in children under 5

General description	n	No anaemia Hb ≥ 11gr/dL		Mild anaemia Hb 10-10.9 gr/dL		Moderate anaemia Hb 7-9.9 gr/dL		Severe anaemia Hb < 7gr/dL	
		n	%	n	%	n	%	N	%
Total	70 (100)	17	24.3	41	58.3	11	15.7	1	1.4
Gender									
Boys	35 (50.0)	8	22.9	19	54.3	8	22.9	0	0.0
Girls	35 (50.0)	9	25.7	22	62.9	3	8.6	1	2.9
Age group									
0-5.99 m	5 (7.9)	1	20.0	2	40.0	1	20.0	1	20
6-11.99 m	11 (17.5)	1	9.1	7	63.6	3	27.3	0	0.0
12-23.99 m	24 (38.1)	5	20.8	12	50.0	7	29.2	0	0.0
24-59.99 m	23 (36.5)	10	43.5	13	56.6	0	0.0	0	0.0
Area									
Mainland	41 (58.6)	10	24.4	24	58.5	7	17.1	0	0.0
Islands	29 (41.1)	7	24.1	17	58.6	4	13.8	1	3.4

The overall prevalence of anaemia is 75.7% in this study among children under five years of age. It is considered by WHO standards as very high and classified as a public health problem (WHO, 2001). The mean haemoglobin reading for all 70 children surveyed was 10.05 g/dL (SD 1.56).

The prevalence of anaemia was particularly evident among the younger children aged 0-11.99 months who together presented the highest prevalence of mild anaemia (p=0.007). Prevalence of anaemia dropped within children in the older age groups.

The group 0-5.99 months has average anaemia rates of 80% (n=4) and those children aged 6 to 11.99 months had a prevalence of 90.9% (n=10)

Only one girl under study presented very severe anaemia (3.7 g/dL)

There were no statistically significant differences between the anaemia prevalence when comparing the Island and Mainland region. The Mainland had 75.6% of children with some level of anaemia while the Islands had a prevalence rate of anaemia of 75.9% among all under 5 year old surveyed.

4.1.5 Diseases prevalence in children under five years old over the last 2 weeks

The definition of diarrhoea according to WHO is “three or more watery stools produced on the same day or presence of blood in the stool”. Almost sixteen percent of the mothers interviewed indicated that their child had suffered from loose stools during the last two weeks (n=27).

Boys had statistically significant higher prevalence of diarrhoea compared to girls (16.6% vs 7.6%)

The 13 cases recorded in children in the age group 12- 23.99 represent almost 26 % of the total population of children under 5 who had loose stools over the last two weeks. The prevalence of diarrhoea was lower in older children and the 6- 11.99 month age group (17.6%). The 0-5.99 month old children reported no cases of diarrhoea over the last two weeks. The Islands had the most reported cases of diarrhoea (18.1%) however this percentage is similar to those observed in the Mainland (11.1%) and therefore not statistically significant.

Table 4.1.5 Disease prevalence of the children under five years old in the last 2 weeks according to disease, gender, age group and geographical location

General description	Diarrhoea		Acute Respiratory Infection	
	n	%	n	%
Total	27 of 170	15.9	33	19.4
Gender				
Boys	14 of 84	16.6	21	25.0
Girls	13 of 86	7.6	12	14.0
Age group				
0-5.99 m	0 of 21	0.0	3	14.2
6-11.99 m	6 of 34	17.6	9	26.4
12-23.99 m	13 of 50	26.0	10	20.0
24- 59.99 m	8 of 65	12.3	11	16.9
Area				
Mainland	6 of 54	11.1	14	25.9
Islands	21 of 116	18.1	19	16.4

Acute respiratory infection is defined symptomatically as a child that presents cough, shortness of breath and fever being all present at the same time and for a period of at least 24 hours.

Almost 20 % of the mothers interviewed indicated that their child had suffered from symptoms of acute respiratory infections during the two weeks prior to the survey (n= 33).

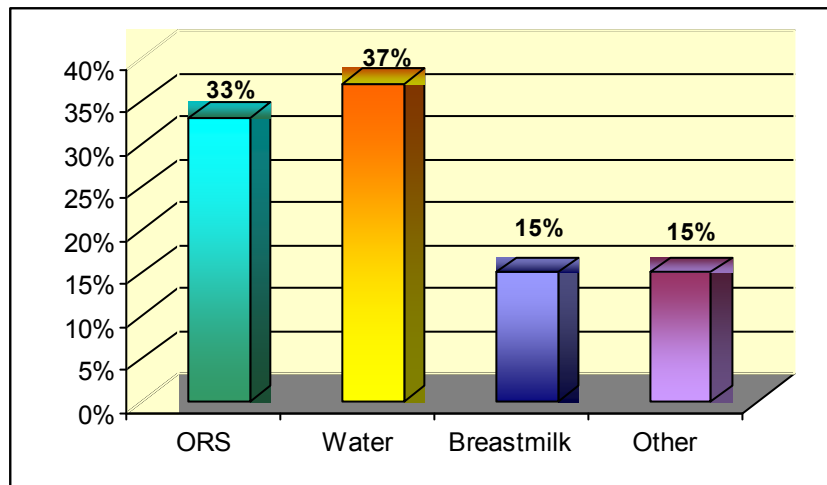
As with the reported cases of diarrhoea, boys had higher prevalence of ARI when compared to girls (25% vs. 14%)

Twenty six percent of children 6- 11.99 months presented symptoms of ARI over the past two weeks prior to the collection of data from the mothers, followed by the 20% of children who presented symptoms of ARI on the 12- 23.99 month age group. The younger children had less cases of ARI. The Mainland had less cases of diarrhoea (11.1 vs. 18.1% in the islands) but more cases of ARI (25.9% vs. 16.4 in the islands)

4.1.6. Treatment of Diarrhoea

A total of 27 children (16% of the total population under study) suffered from loose stools over the last two weeks previous to the baseline survey. A single or combinations of treatments were used. Nine children (33%) who reported having loose stool during the last two weeks were treated with oral re-hydration salts (ORS), 10 (37%) were given extra water to drink, 4 (15%) were given extra breast milk, and a further 4 mothers reported that they had treated their children using other methods such as giving them coconut water (15%) A single or combinations of remedies were used in each case.

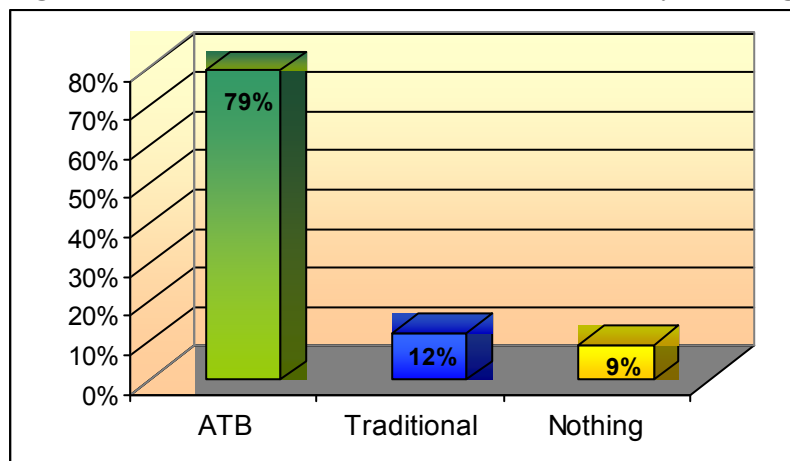
Figure 4.1.6 Treatment for diarrhoea in children under 5 years of age



4.1.7. Treatment of Acute Respiratory Infections

Of the 19.4% (n= 33) of children who showed symptoms associated to acute respiratory infections over the previous two weeks to the baseline survey, 79% (n= 26) were treated at the health institution and provided with prescription medication, namely antibiotics that were available at the health centre, usually a 7 day course of amoxicillin. Twelve percent (n= 4) were treated with traditional medicines in their village and 9% (n=3) were not treated with any medication but used methods such as washing the child with cold water.

Figure 4.1.7 Treatment for ARI in children under 5 years of age



4.1.8 Insecticide Treated Mosquito net use in children under 5 years

A high percentage (80.6%) of the children under 5 years surveyed had insecticide treated mosquito nets at home, however the usage of the mosquito nets the night prior to the survey indicated that only 62.4 % of the children slept under a mosquito net. There is no statistically significant difference between the usage of mosquito nets among the sexes, although we see more girls using them compared to boys. There is no statistically significant difference among use among the different age groups.

Table 4.1.8 Insecticide Treated Mosquito net use in children < 5 years

General description	IT Mosquito net at home		Use of mosquito net last night	
	n	%	n	%
Total	137	80.6	106	62.4
Gender				
Boys	63	75.0	45	42.5
Girls	74	86.0	61	57.5
Age group				
0-5.99 m	17	81.0	17	81.0
6-11.99 m	29	85.3	19	55.9
12-23.99 m	35	70.0	28	56.0
24-59.99 m	56	86.2	42	64.6
Area				
Mainland	52	96.3	48	45.3
Islands	85	73.3	58	54.7

4.1.9 Prevalence of breastfeeding and nutrition practices among children under 5 years old

Breastfeeding was commonly practiced by mothers of children under five years old with 97.1% (n=165) of the population having been breastfed up to at least the age of six months.

Colostrums within the first hour of birth was given to 92.4% (n=157) of children. Exclusive breastfeeding up to the age of six months was only practiced with 51.8 % (n=88). The average age for the introduction of complementary feeding was 5.12 months (SD 3.12) The Mainland reported more children not being exclusively breastfed until 6 months compared to the almost 57% reported to be exclusively breastfed in the Islands region.

Table 4.1.9 Prevalence of breastfeeding and nutrition practices among children aged < 5 years

Breastfeeding practice	Ever breastfed		Colostrum		Breastfeeding within first hour		Exclusive breastfeeding (6 months)	
	n	%	n	%	n	%	n	%
Total	165	97.1	157	92.4	120	70.6	88	51.8
Gender								
Boys	81	96.4	81	96.9	62	73.8	44	52.4
Girls	84	97.7	76	88.4	58	67.4	44	51.2
Age group								
0-5.99 m	21	100.0	20	95.2	15	71.4	8	38.1
6-11.99 m	34	100.0	31	91.2	25	73.5	14	41.2
12-17.99 m	48	96.0	44	88.0	35	70.0	33	66.0
18-23.99	62	95.4	62	95.4	45	69.2	33	50.8
Area								
Mainland	52	96.3	49	90.7	37	68.5	22	40.7
Islands	113	97.4	108	93.1	83	71.6	66	56.9

4.1.10 Immunization for children older than 12 months

Most (95.8%; n=163) of the children under study had an immunization card which the interviewer was able to see when they visited the home. In the total of 149 children over 1 year

old, 44.3% (n=66) had fully completed the immunization program, 52.3% (n=78) had only partial immunization and 4.6% (n=7) had had no immunization at all. There were a further 21 children which were younger than a year old and therefore were not analysed. On the 0-6 month age group 7 children had received no immunisation at all.

Out of the 149 children in the category 6-59.99 months 84 (49.4%) mothers stated that their children had received Vitamin A tablets and 82 (48.2 %) had never received Vitamin A tablets.

As the child got older the Vitamin A coverage increased. Within the 6-11.99 month age group 32.4% had received Vitamin A protection, on the 12-24 month 42% and on the group 24-59.99 month age group 77%

Table 4.1.10 Immunization for children older than 12 months

Immunisation	Mainland		Islands		Total	
	n	%	n	%	n	%
Child Immunization card						
Yes	53	98.1	110	94.8	163	95.8
Lost	0	0.0	3	2.6	3	1.7
Never had	1	1.9	3	2.6	4	2.3
Don't know	0	0.0	0	0.0	0	0.0
Immunization status						
Complete	27 of 46	57.0	39 of 101	38.0	66 of 149	44.3
Partial	21 of 46	43.0	57 of 101	56.0	78 of 149	52.3
None	0 of 46	0.0	7 of 101	6.0	7 of 149	4.6
Children<12 m	6 of 21	28.5	15 of 21	71.5	21 of 21	100.0

4.2 RESULTS FOR MOTHERS AND PREGNANT WOMEN

4.2.1 Antenatal care (ANC)

Of the 170 mothers interviewed 162 (95.3%) indicated that they had had at least one antenatal check during their pregnancy.

Of these 51% (n=86) of the women in this study had 4 or more antenatal check-ups during their whole pregnancy as advised by WHO. This includes the 21.1% (n=36) who did not know how many times they had gone for ANC. Only 4.7% (n=8) reported not having had at least one check up at a health institution during their pregnancy. Over twenty one percent of women (n= 36) did not remember how many times they had attended antenatal care checks during their last pregnancy.

Ninety women (52.9%) delivered their babies in a health centre. Fifty eight women (34.1%) delivered at the Hospital and twenty two women surveyed reported they had delivered at home (12.9%) Deliveries at home were more frequent in the Islands area compared to those women in the Mainland who were more inclined to deliver at the Health Centres.

One hundred and fifty one deliveries (88.8%) were conducted by a trained health staff or doctor, while 10.3 % (n=17) were done by an untrained birth attendant (village traditional birth attendant who has not received any formal midwifery training), neighbour or relative. Just over one percent of the women interviewed (n=2) reported that they received no help during delivery and did the procedure themselves.

Table 4.2.1 Antenatal care (ANC)

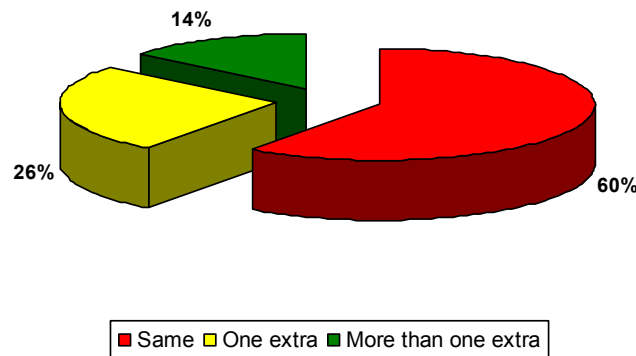
Antenatal Care and delivery	Mainland		Islands		Total	
	n	%	n	%	n	%
Antenatal checks						
Yes	53	98.1	109	94.0	162	95.3
No	1	1.9	7	6.0	8	4.7
Delivery						
Health Centre	36	66.7	54	46.6	90	52.9
Hospital	13	24.1	45	38.8	58	34.1
Home	5	9.3	17	14.7	22	12.9
Assistance for delivery						
Doctor	0	0.0	6	5.2	6	3.5
Trained health staff	49	90.7	96	82.8	145	85.3
Untrained birth attendant	1	1.9	2	1.7	3	1.8
Relative, neighbour	3	5.6	11	9.5	14	8.5
None	1	1.9	1	0.9	2	1.2

4.2.2. Women who take extra meals during their pregnancy

Of the 170 women surveyed 60% (n=102) indicated that they had not taken any additional food to their normal daily diet while pregnant. Twenty six percent indicated that they had taken one additional meal a day while pregnant (n=45) and 13.5% (n=23) indicated that they had taken more than one extra meal a day during their pregnancy.

Only 16.7% (N=9) of women in the Mainland reported consuming an extra meal a day while pregnant compared to the 31% (n=36) in the Islands region. Consuming more than one extra meal a day was also more frequent in the Islands region compared to the Mainland (16.4% vs. 7.4%)

Meals consumed while pregnant



4.2.3 Prevalence of anaemia in pregnant women according to village and gestational age

Twenty six pregnant women were identified in 9 villages (Parego, Piruma, Waihaga, Wouna, Marunga, Mwakuro, Naruka, Wanahata and Bwagarei).

The mean age of the women under study was 28.61 years (SD 6.46). The youngest woman was 17 and the oldest 45 years old. These women had an average of 2.15 children per woman interviewed (range 0-10).

Nineteen women (73.3%) reported that they had slept under a mosquito net the night previous to the interview, while 7 (26.9%) indicated that they had not.

The mean Haemoglobin (Hb) value was 10.06 g/dL, the lowest Hb value was 7.1 g/dL. A total of 10 women (38.5%) had normal Hb values, the other 61.5 % (n=16) presented some form of anaemia. Of the total, 34.6% (n=9) of these women fall under the category of mild anaemia (10-10.9 g/dL), and 7 women (26.9%) present moderate anaemia, there were no reported cases of pregnant women with severe anaemia in this study.

Of these pregnant women 1 (3.8%) are currently on their 1st trimester of gestation, 8 (30.8%) are on their 2nd trimester and 17 (65.4%) are on the 3rd trimester. The only women in her first trimester of pregnancy (8 weeks) presented moderate anaemia (7.8 g/dL).

Table 4.2.3. Prevalence of anaemia according to village and gestational age

Gestational age and anaemia prevalence	N	No anaemia		Mild anaemia		Moderate anaemia		Severe anaemia		
		Hb ≥ 11gr/dL		Hb < 10-10.9 gr/dL		Hb < 7-9.9 gr/dL		Hb < 7gr/dL		
		n	%	n	%	n	%	n	%	
Total	26	10	38.5	9	34.6	7	26.9	0	0.0	
Trimester of pregnancy										
1 st Trimester	1	0	0.0	0	0.0	1	100.0	0	0.0	
2 nd Trimester	8	4	50.0	1	12.5	3	37.5	0	0.0	
3 rd Trimester	17	6	35.5	8	47.1	3	17.6	0	0.0	

4.2.4 Iron Folate consumption

More than 97% (n=165) of the women reported that they had received iron folate tablets when they were pregnant. However, of these that had received some iron folate tablets 51.7 % (n=88) consumed less than 50 tablets or none during the whole pregnancy and while 48.3% (n=82) between 50 and a 100 tablets. None of the surveyed mother reported having consumed 100 or more tables during the course of their pregnancy.

Table 4.2.4 Iron Folate consumption

Iron Folate Intake	Mainland		Islands		Total	
	n	%	n	%	n	%
Received iron tablets						
Yes	53	96.3	113	97.4	165	97.1
No	2	3.7	3	2.6	5	2.9
Tablets consumed						
None	2	3.7	3	2.6	5	2.9
Less than 50	27	50.0	56	48.2	83	48.8
50-99 tablets	25	46.3	57	49.2	82	48.3
More than 100 tablets	0	0.0	0	0.0	0	0.0

4.2.5 Tetanus Toxoid Immunization during pregnancy

A total of 154 women (90.6%) reported having received the TT injections while they were pregnant, 9.4% (n=16) received none of the injections.

Of those women that did get the injections 48.8 % (n=83) received one and 25.9 % received two. Twenty one of the pregnant women did not know how many TT injections they had received while pregnant (12.4%)

Approximately half of the women (47.1%) had their immunisation cards with them (n=80), 48.2 % of mothers reported their card as lost or misplaced and only 4.1% (n=7) reported never having had an immunization card before.

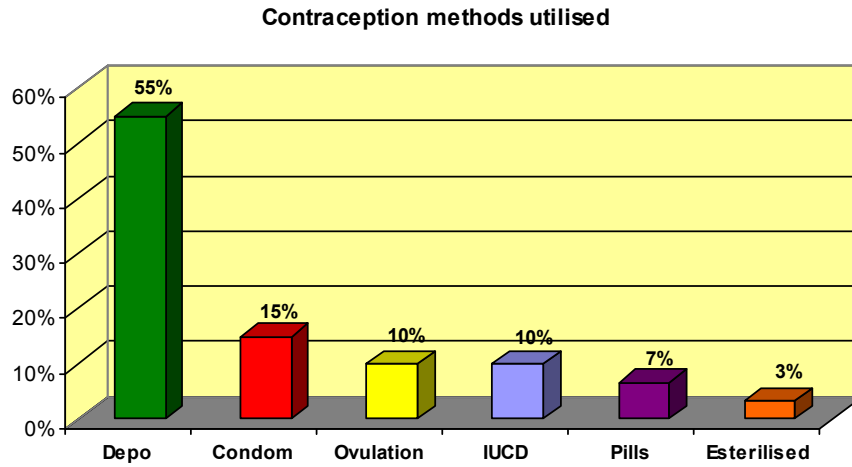
Table 4.2.5 Tetanus Toxoid Immunization during pregnancy

TT injections	Mainland		Islands		Total	
	n	%	n	%	n	%
TT injection						
Yes	48	88.9	106	91.4	154	90.6
No	6	11.1	10	8.6	16	9.4
Don't know	0	0.0	0	0.0	0	0.0
How many TT injection did you receive						
One	34	63.0	49	42.2	83	48.8
Two	8	14.8	36	31.0	44	25.9
More than 2	5	9.3	17	14.7	22	12.9
Don't know	7	13.0	14	12.1	21	12.4
Mother Immunization card						
Yes	33	61.1	47	40.3	80	47.1
Lost, misplaced	18	33.3	64	55.2	82	48.2
Never had	2	3.7	5	4.3	7	4.1
Don't know	1	1.9	0	0.0	1	0.6

4.2.6 Contraception use

Contraception use among mothers was reported at 36.5 % (n=62) of women indicated that they are currently using some form of contraception. Of those women that reported using some form of modern contraception method they indicated that the most commonly used is the Depo Provera injections (55%; n=33) followed by condoms (15%; n=9). The ovulation cycle calculations and Intrauterine contraception device were used by the same number of women (10%; n=6). Women also reported using daily oral contraception pills (combination of estrogens and progesterone) (6.6%; n=4) and fallopian tube ligation reported by 2 mothers interviewed (3.3%; n=2)

There was a statistically significant difference among the area using contraception. Intra-Uterine Contraceptive Devices and condoms were used more frequently as a birth spacing method in the Islands region.



4.3 RESULTS FOR WATER AND SANITATION PRACTICES

4.3.1 Cases of diarrhoea

A total of 21 households (12.4%) with children under 5 reported at least one episode of diarrhoea during the 2 weeks prior to the survey, 149 households with children under 5 (87.6%) did not present diarrhoea. Out of the fore-mentioned twenty one households (12.4%) who reported that one child under 5 years currently living there had presented an episode of diarrhoea over the previous two weeks, there were no more reported cases of households that had more than one child with diarrhoea at that time.

There was no statistical difference between the frequency of diarrhoeal cases reported between the Mainland and the Island region when using the one way Anova test.

Most of the diarrhoeal cases lasted less than 2 days (50% of the total positive cases), although the mainland region diarrhoeal symptoms lasted for longer than those in the Islands. In the Mainland 50% of the diarrhoea positive cases for the region reported lasted more than 3 days.

A total of 10 (5.9%) of households reported at least one case of diarrhoea in adults and children over 5 years. In the case of the older inhabitants of the households the highest prevalence of diarrhoeal disease was in the Mainland Region (11.1%) as opposed to the Islands with 4 reported cases (3.4%)

Table 4.3.1 Number of households who reported cases of diarrhoea in children over 5 years and adults divided by areas

Diarrhoea	Mainland		Islands		Total	
	n	%	n	%	n	%
Number of adults in the household with diarrhoea						
Total	6	11.1	4	3.4	10	5.9
None	48	88.9	112	96.6	160	94.1
One	6	11.1	4	3.4	10	5.9

4.3.2 Cases of skin and eye diseases

A total of 39 households (22.9%) with children under 5 reported at least one sign or symptom of skin disease during the 2 weeks prior to the survey, 131 households with children under 5 (77.1%) did not present skin affections.

Thirty-three households (19.4%) reported that one child under 5 years currently living there had presented signs of skin disease over the previous two weeks, 4 (2.4%) households reported 2 children under 5 with skin disease and 2 households (1.2%) reported 3 or more children in that house suffering from some form of skin affection.

There was no statistically significant differences in the frequency of cases of skin disease reported between the two regions.

In terms of eye infections and affections a total of 31 households (18.2%) with children under 5 reported positive cases for the period of the 2 weeks prior to the survey, 139 households with children under 5 (81.8%) did not present eye affections.

Twenty-three households (13.5%) reported that one child under 5 years currently living there had presented signs of eye disease over the previous two weeks, 3 (1.8%) households reported 2 children under 5 with diarrhoea and 5 households (2.9%) reported 3 or more children in that house suffering from some form of eye affection.

The number of eye affections reported was slightly higher in the Mainland region.

Table 4.3.2 Number of households who reported cases of skin and eye infections in children under 5 divided by areas

Skin and eye disease	Mainland		Islands		Total	
	n	%	n	%	n	%
Number of persons in the household that presented symptoms and signs of skin diseases						
Total positive	15	27.7	24	20.6	39	22.9
None	39	72.2	92	79.3	131	77.1
One	11	20.4	22	19.0	33	19.4
Two	2	3.7	2	1.7	4	2.4
3 or more	2	3.7	0	0.0	2	1.2
Number of persons in the household that presented symptoms and signs of eye disease						
Total positive	12	22.2	19	16.3	31	18.2
None	42	77.8	97	83.6	139	81.8
One	9	16.7	14	12.1	23	13.5
Two	1	1.9	2	1.7	3	1.8
3 or more	2	3.7	3	2.6	5	2.9

4.3.3 Knowledge regarding the causes of diarrhoea among mothers of children < 5 years

Only 7.6% (n=13) of the respondents were unable to mention at least one cause or route of transmission of diarrhoeal disease. Flies, having dirty hands, not washing hands before eating and consuming dirty water were the causes most mentioned by the mothers surveyed.

When using Pearson Chi-square tests there was a statistically significant difference when comparing the Island and Mainland regions on the knowledge of dirty water as a transmitter of diarrhoeal disease, being higher in the Islands (p=0.008), and on knowledge of flies as a transmitter of diarrhoeal disease, being higher in the Mainland (p=0.000)

Table 4.3.3 Knowledge regarding the causes of diarrhoea among mothers of children < 5 years

Causes	Not mentioned	Mentioned
Dirty water	91 (53.5)	79 (46.5)
Unwashed food	118 (69.4)	52 (30.6)
Dirty hands	84 (49.4)	86 (50.6)
Contaminated areas (dirty environment)	140 (82.4)	30 (17.6)
No hand washing before eating	88 (51.4)	82 (48.2)
No hand washing after using toilet	112 (65.9)	58 (34.1)
Flies	62 (36.5)	108 (63.5)
Don't know	157 (92.4)	13 (7.6)

4.3.4 Types of toilets used by the community

A hundred and four households surveyed were found to have no latrines of any type (61.2%) and practiced open defecation.

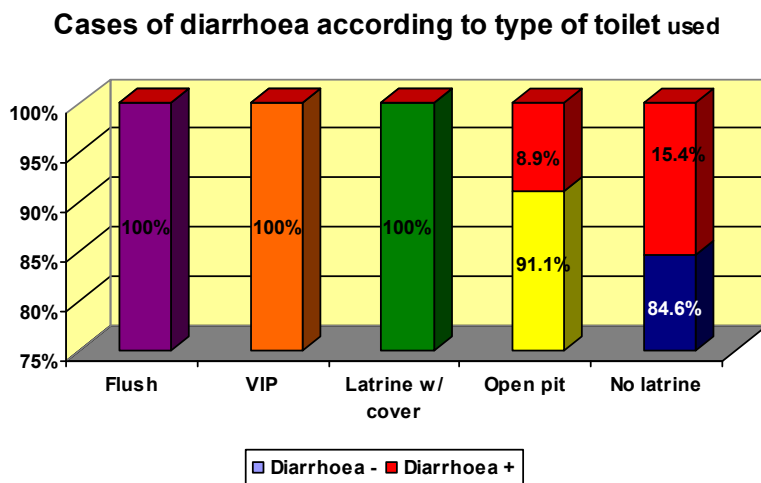
Fifty six households (32.9%) had an open pit toilet which they used regularly. Other type of toilets observed during this survey included 5 flush toilets (2.9%), four VIP toilets (2.4%) and one covered bush latrine observed in the Island (0.6%)

There was no statistically significant differences in the type and number of toilets between the Island and Mainlands (p=0.330)

Table 4.3.4 Types of toilets used by the community by area

Types of toilet	Mainland		Islands		Total	
	n	%	n	%	n	%
Type of toilet						
Flush toilet	1	1.9	4	3.4	5	2.9
VIP	0	0.0	4	3.4	4	2.4
Covered bush latrine	0	0.0	1	0.9	1	0.6
Open pit	17	31.5	39	33.6	56	32.9
Open defecation	36	66.7	68	58.6	104	61.2

All the 21 cases of reported diarrhoea in children under 5 (12.4%) were found in household that either practiced open defecation (76.2%; n=16) or had an open pit toilet (23.8%; n=5). However statistically no significant difference between the reported cases of diarrhoea among children under 5 years and the type of toilet that they had at home.



4.3.5 Knowledge regarding the importance of hand washing among mothers of children < 5 years

Only 5 (2.9%) mothers surveyed were unable to tell us of at least one activity when they considered it was important to wash hands.

Washing hands after using the toilet and before eating were mentioned frequently and considered important (79.4% and 71.2% respectively) Other times when the surveyed population though it was important to wash hands but mentioned less than the others was after cleaning the babies faeces (24.7%; n=42) and after touching animals (22.4%; n=38)

There was no statistically significant difference between the Mainland and Island region when comparing the knowledge of hand washing among the mothers.

Table 4.3.5 Knowledge regarding the importance of hand washing among mothers of children < 5 years

Causes	Mentioned - n (%)	Not mentioned- n (%)
After toilet use	135 (79.4)	35 (20.6)
After cleaning the babies faeces	42 (24.7)	128 (75.3)

Before and after feeding the baby	58 (34.1)	112 (65.9)
Before cooking	79 (46.5)	91 (53.5)
Before eating	121 (71.2)	49 (28.8)
After touching animals	38 (22.4)	132 (77.6)
Do not know	5 (2.9)	165 (97.1)

4.3.6 Main sources of drinking water during wet and dry season

The main sources of drinking water for the population during the wet season is rain water (40.6%; n=69) followed closely by public taps which contribute water to 31.8% of households (n=54). Other sources of water during the wet season are surface water from stream and rivers (17.6%; n=30) and unprotected wells (7.1%; n=12)

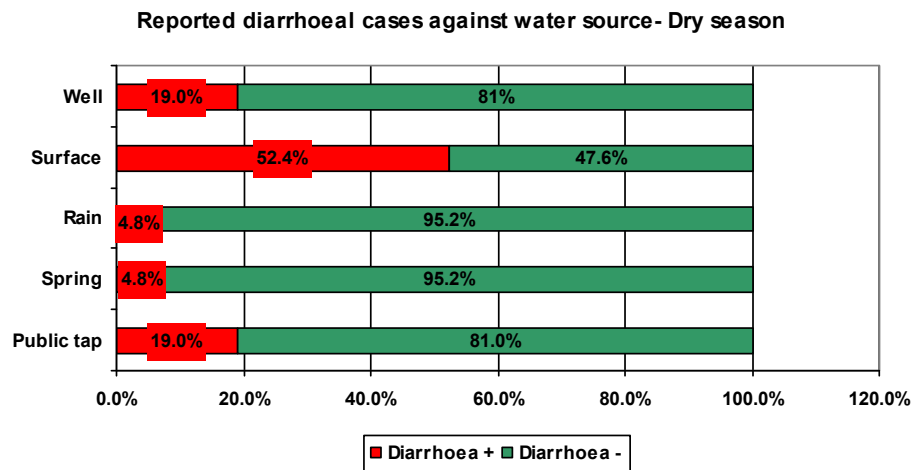
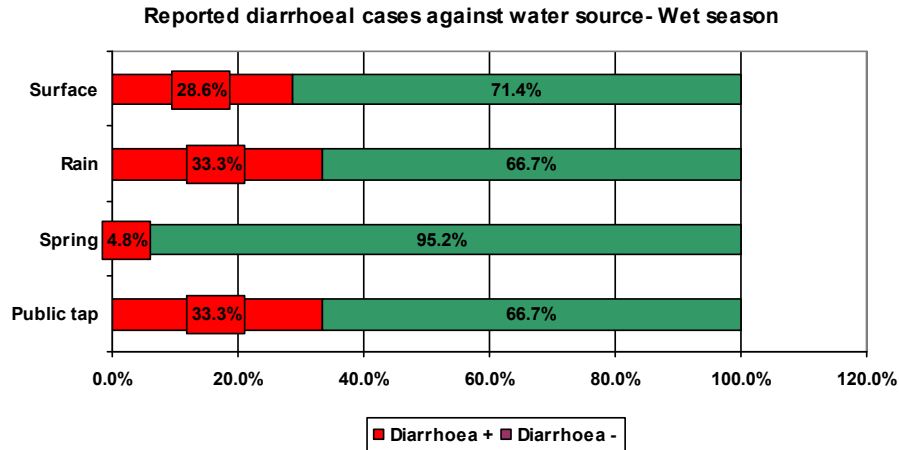
During the dry season the main source of water is surface water (43.5%; n=74) followed by public taps (31.8%; n=54). Unprotected wells, springs, boreholes and rain water are the other sources of water available.

Table 4.6.3 Main sources of drinking water

Sources of water	Mainland		Islands		Total	
	n	%	n	%	n	%
Wet season						
Public tap	21	38.9	33	28.4	54	31.8
Borehole	0	0.0	1	0.9	1	0.6
Unprotected well	1	1.9	11	9.5	12	7.1
Spring	1	1.9	3	2.6	4	2.4
Rain water	16	29.6	53	45.7	69	40.6
Surface water	15	27.8	15	12.9	30	17.6
Dry season						
Public tap	27	50.0	27	23.3	54	31.8
Borehole	0	0.0	4	3.4	4	2.4
Unprotected well	1	1.9	25	21.6	26	15.3
Spring	0	0.0	7	6.0	7	4.1
Rain water	1	1.9	3	2.6	4	2.4
Surface water	25	46.3	49	42.2	74	43.5

Rain water collection during the wet season is widely practiced in the Islands region (45.7%; n=53). During that time of the year the Mainland's main source of water is through public taps (38.9%; n=21), although rain water collection is also popular.

During the dry season the main source of water for the Islands is through the collection of surface water (42.2%; n=49) either from streams or rivers which flow close to the village. For the Mainland region the public taps (50%; n=27) and by surface water collection (46.3%; n=25)



4.3.7 Water collection and water treatment

The women are the one usually responsible for water collection in both regions (88.2% n= 150). Men collect water in some instances (8.2%, n= 14) Girls and boys account for the rest (3.6 % n= 6)

Very few of those interviewed treat water before consumption. From the 34.7% of those that treat their water prior to drinking the most common method used to achieve this is by boiling it (29.4%; n=50). Letting the water sediment was the next most used method of water treatment (9.4%; n=16)

4.3.8 Use of soap, hand washing facilities and container coverage at the household

Almost 75% of those interviewed indicated that they had used soap the day previous to the interview (n=127) The remaining 25.3% had not used soap (n=43)

During the 24 hour soap used recall 77.1 % of the women (n=131) mentioned they had used soap the day previous to the interview to wash clothes. Fifty seven percent (n=97) indicated that they had used soap for bathing and 44.7% (n=76) had used soap to bath their child. Washing hands

after toilet use, after changing the baby and washing children's bottoms with soap after toilet use were mentioned by less than 25% of mothers.

Table 4.3.8 Use of soap on 24 hour recall

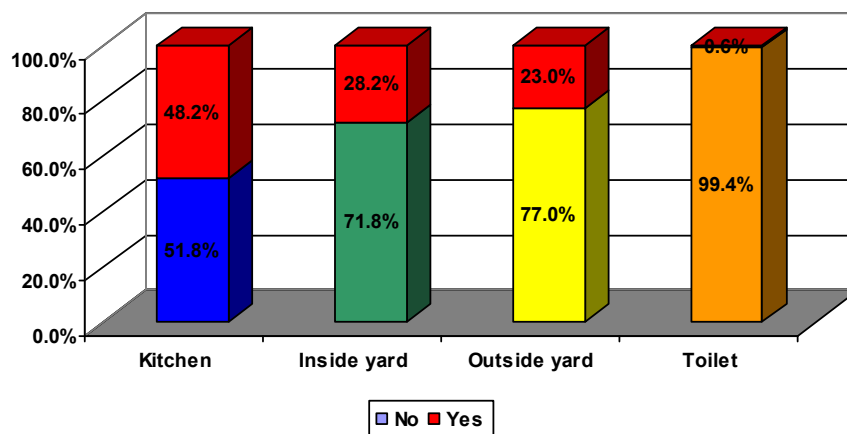
Use of soap – 24 hour recall	Used Soap	
	Yes - n (%)	No - n (%)
Washing clothes	131 (77.1)	39 (22.9)
Washing body	97 (57.1)	73 (42.9)
Washing children's body	76 (44.7)	94 (55.3)
Washing children's bottoms	39 (22.9)	131 (77.1)
Washing children hands	43 (25.3)	127 (94.7)
Washing hands after toilet use	25 (14.7)	145 (85.3)
Washing hands after changing the baby	25 (14.7)	145 (85.3)
Washing hands before feeding a child	27 (15.9)	143 (84.1)
Washing hands before preparing food	43 (25.3)	127 (74.7)
Washing hands before eating	39 (22.9)	131 (77.1)
Other uses of soap	8 (4.7)	162 (98.3)

When direct observation of soap availability took place the interviewers noted that 36.5% (n=62) of the households had soap available at the place where they washed hands, 32.9% (n=56) had other hand washing materials such as ash or lime juice and 30.6% (n=52) did not have anything to wash hands.

Hand washing facilities were observed mainly near the kitchen area (48.2%; n=82), inside the yard close to the home (28.2%; n=48) and outside the yard (23%; n=39) Only one household (0.6%) had a hand washing device close to the latrine.

When looking at water containers we found that 62.9% (n=107) households had all their water containers covered by a lid, 35.2% (n=60) had some containers covered by a lid and 1.8% (n=3) of households had no cover for their water containers.

Location of hand washing facilities



4.3.9 Relation between use of soap and cases of reported diarrhoea

A comparison between the use of soap, availability of hand washing facilities and reported cases of diarrhoea in children under 5 years shows that there is no significant difference between those that used soap for washing hands and those that did not. Seventeen percent of those that used soap had diarrhoea as opposed to 9.6% of those that did not use soap but also presented diarrhoea. There was no statistically significant difference between use of soap and diarrhoeal cases reported.

4.4 RESULTS FROM FOCUS GROUP DISCUSSIONS

4.4.1 Results of Focus Group Discussions with Grandmothers

A total of 46 grandmothers participated in the focus group discussions representing the villages of Waihaga, Piruma, Parego and Marunga.

Most grandmothers said that almost all the children in the villages where the focus group discussions took place were born at the Health Centres, except for some cases in Piruma. Unlike the practices followed in Southern Malaita, where it is believed that if the mother gives birth within the village boundaries this will contaminate the men, causing them to become weak or sick there does not seem to be such practices in South Makira. Women are encouraged by all to do antenatal care and deliveries at their closest health facility.

Grandmothers understood the importance of delivering in a health facility and over the last few years the delivery rates in health facilities such as the one located at Parego Health Centre have increased. At the end of the discussions grandmothers agreed that whenever possible the births were taking place at the health centre but the main limiting factor in the cases where mother were giving birth at home were related to the distance to the health centre and also depended on when and where the mother was when she felt the first stage of contractions. At community level there is no previous planning towards delivery. Sometimes the contractions come suddenly, expulsion period is short, transport is not available and the health facility is not within walking distance. These are factors that mark the decisions as to where the baby will be born. In these cases, and especially if there is a woman present who has skill at delivering babies (formally trained or not), the child is delivered at home. In the village only women can assist during deliveries, men are not involved in any part of the birthing process.

Grandmothers in Piruma village pointed out that if the weather does not permit them to travel to the health centre they have traditional birth attendants in the village who are knowledgeable in performing deliveries and so they would conduct them there. The need to travel by boat to the health facility in the case of the mentioned village, a 4 hour ride on a canoe or a 6 hour walk through thick jungle and rugged terrain and access to health services are as mentioned previously weather dependant or in the capacity of the mother to walk the distance required. It is usual practice that as the mother approaches the time of delivery she will move in with relatives or friends who live closer to the Health facilities.

The closer villages to Parego and the other major health centres such as Gupuna, Mwaruwarum Makurukuru and Waihaga are the ones that have the highest rates of institutional deliveries.

Grandmothers seem to agree that it is important for the woman to deliver their first child at the health facility but with the third or fourth child this is not so important if there have been no complications with the previous deliveries. Mothers can stay and deliver at home with the assistance of a relative or the traditional birth attendant if necessary.

Most grandmothers stated that the main decisions in the household are taken by men. This in some cases also relates to the place where delivery will take place as it depends upon what money is available for transport and medical fees. Grandmothers in Piruma said that the father is responsible for the welfare of the mother and he should accompany her to the antenatal care and be there for her during delivery however most don't. Men often do not get involved in decisions or practices that have to do with pregnancy and in many instances it is the mother and often the female family members that have a collective say on decisions around where the pregnant mother should deliver, what type of food she must eat and the amount of work she does. Mothers often dominate the decision making to ensure safe delivery and grandmothers also have a strong voice in these decisions. Some grandmothers pointed out that mothers sometimes choose to deliver at home because they are scolded at the Health Centres and treated badly for not completing all antenatal care checks required.

Birthing practices do not differ greatly between the villages. If the mother has the child in the village she is assisted by the traditional birth attendant or a relative. Immediately upon the expulsion of the child the umbilical cord is tied with a bush rope or cotton thread and cut with a piece of bamboo which grandmothers said it is often boiled in water before use. There seems to be no standardised basic public hygiene or hand washing prior to the delivery.

Immediately after delivery the baby is held vertically head down and tapped across the legs so it will start crying. While the baby is hanging head down it is examined for any abnormalities. It is believed that hanging the baby upside down will prepare the child, when it grows older not to be scared when faced with difficult situations.

The baby's mouth is wiped with the fingers to remove any mucus that might block the airway. Once this is completed the baby is taken away and given a bath. Some villages said that they use cold water to bath the child and others did not specify. Another practice which seems to be quite common is the squeeze a few drops of breast milk over the freshly cut umbilical cord.

The child is then taken back to the mother. If the mother is fit she starts breast feeding straight away after the bath and most grandmothers agree that starting breastfeeding soon after the delivery is beneficial. They said that they noted and have also been told by the nurses that there seems to be a correlation between immediate breastfeeding and the reduction of uterine haemorrhage, so they encourage immediate breastfeeding if the mother is up to it and does not feel too tired. Some grandmothers stated that they encourage the mother to breastfeed early as this will allow them to determine if the baby is well or not. If the child does not start breastfeeding when the breast is offered they take it as an indication that the child is not well and needs special attention.

The grandmothers and traditional birth attendants present during the interview agreed that the development of the delivery is what determines if the child is breastfeed straight after delivery (after it has been bathed and the placenta removed) or later on.

Some grandmothers said that in the case that the mother produces too little milk or not at all that other mothers in that community who are breastfeeding will take care of the nutritional needs of the baby.

It is frequently seen that newborns are given a pre-lacteal feed in the form of warm water or coconut water to drink if the mother feels there is not enough milk being produced, but this is discontinued as soon as milk production is adequate. It is also used to "*clean the child's stomach*"

After removal of the placenta the abdomen of the mother is rubbed with leaves that have been previously heated in boiling water. This traditional medication and the massages are believed to help increase uterus contraction and reduce haemorrhage.

The placenta needs to be buried immediately after it is expelled and a fire is built on top of the site where it was buried. It is believed that the placenta can be used by their enemies to harm the baby and mother through the practice of black magic and witchcraft.

Mother are also encouraged to sit close to the fire for several days after the delivery to prevent bleeding and the heat also helps to protect the mother against infection.

Most grandmothers seem to think that colostrum is good for the child, and this has been largely due to the work nurses are doing by advising their patients on the need to give the child colostrum. However there are some grandmothers, like those in Marunga, that compared colostrum to stale milk which has fermented. They believed that the colostrum needs to be taken out because it is old and will cause the baby to become sick. Most traditional birth attendants will advise the mothers to squeeze the colostrum out as it "*can cause yellow fever, if colostrum is not given then the child will not have yellow fever*" The yellow fever described by the grandmothers is associated to the child presenting yellow or pale colouring in the conjunctiva,

lips, palms and soles of feet. It seems to be related to jaundice or anaemia perhaps and is not a fever per se.

Despite isolated cases where it is thought to be bad most grandmothers think it is a good thing to give colostrum and beneficial to both the mother and the child but due to customs passed on by generations do not always encourage the use. However they understand it is good that the baby takes it as it stimulates the production of “white milk” quicker than when the mother squeezes the colostrum out herself. They also believe that *“It also contains all the nutrition that mothers consumed while pregnant and these will be passed to the baby through the milk. The colostrum will not harm the baby or cause it to get sick and die”*. Giving colostrum to the child early also avoids breast congestion and possible mastitis in the future so it is encouraged.

Some of the grandmothers indicated that they think that if the colostrum is not given the baby that the faeces of the baby will be black, however after the baby drinks colostrum that will ensure that the stomach is washed and the stools will be a normal colour.

After a lot of discussions grandmothers indicated they did not know what happened if the baby did not receive colostrum, most think probably nothing will happen.

Grandmothers are all aware that children only need to receive food after they are 6 months old, however they are not really convinced about this fact and don't seem to understand exactly what the benefits are. They comply with this because it is the message they receive from the nurse. After more discussion most grandmothers admitted that although they know the message this is not practiced and food is introduced on average at around 3 months. A grandmother said *“It's good to feed the child early as it supplements the breast milk. Some mothers don't produce enough milk. Therefore, it's good to breast feed to six months but it is also good to feed early as it will help the baby to grow strong and bigger”*. It is also believed that the mothers that work in the family gardens need to feed the child solid foods before 6 months. This will allow the child to pass more time without the need to breastfeed while the mother is in the field working. Most grandmothers agree that the old system of feeding early instead of six months is good as it gives mothers more time to spend in the garden. *“The current system of delaying the introduction of food to 6 months encourages women nowadays to be lazy. They spend more time breastfeeding and loafing at home and depending on the husband to do gardening and collect food which is women's duties”*

Complementing breast milk with other liquids such as plain water, coconut water, fruit juices (paw-paw, pineapple or mango) after the first months of life is common practice. Between the 3rd and 4th month of life complementary feeding with solid foods is started by most mothers. If the child responds positively to the food offered by attempting to swallow then solid food is incorporated daily. If the baby is small complementary feeding is started even earlier to help the child gain weight.

The most common foods given between 6 and 12 months of age are ripe mashed fruits such as bananas, paw-paws and mangoes depending on the season. Carbohydrates in the form of sweet potato, taro and yams and proteins in the form of fish, chicken (and rarely pork or beef if available) are provided to the child, no eggs or milk are consumed by children as these are not available.

Foods that are considered harmful for the baby include excessive consumption of meat (causes diarrhoea), or food that has been roasted or baked for a long time which can be *“too strong for the baby”* and may cause constipation. Rice, noodles and sweets are considered unhealthy food for children. Other foods that are harmful for children are large pieces of pork and fish (bonito and barracuda) as they are believed to cause oral and head sores and allergic reactions.

When the child is sick their regular diet does not change drastically. Fruits such as paw-paw, mango and coconut water have been identified as foods that help the child get better faster.

Grandmothers also said that mothers in many cases lack the knowledge of how and what to feed their children when they are sick. There was frequent mention of good foods but they did not elaborate on what was good food. The grandmothers said that they don't plant this good food because the ground is not fertile enough, and what little is available is sold at the market to bring in cash. They also said that husbands are lazy and don't help the mothers in the garden and that women have too many children. There seems to be a general consensus that there is enough food in the communities for all but that the community is not organised well and everyone should "pull their weight" to ensure enough food is available for all.

Some herbal medicines are prepared by grandmothers to treat coughs and fevers. Most grandmothers have knowledge on how to prepare traditional medicines for sick children and other potions to help mothers increase lactation.

Most grandmothers indicate that protein rich foods (meat) are usually hard to find and if available they can rarely purchase it due to their poor financial situation. Seasonal changes in food availability also condition what is consumed. Most of the food consumed is what the community can cultivate in their garden, food variety is season dependant.

Regarding immunization coverage there seemed to be good knowledge overall regarding what types of immunizations are available and which are given to children, except in Parego where grandmothers said they did not know much about immunisation. However, even here grandmothers said that they all believe that immunisations are good for the children.

Grandmothers said that in some of the health centres the mothers are charged for their child's vaccine and the cost of this associated to the expensive transport to get the health facility and back is just too costly for them so they don't go.

The grandmothers said that there are not enough mobile clinics to ensure immunization coverage in the area and therefore they need to go to the Health Centre to keep immunisations up to date.

For those that live close to the health centre the grandmothers said that some of the mothers were lazy and do not take their children to the Health Centre to get the vaccinated. Some husbands don't support them economically to pay for the vaccines or for transport to the Health Centre as required. The Health centres in the area often don't have vaccines in stock or the mothers can't make it to the health facility on vaccination day because they have market or gardening to do.

The difficulties described above in order to get the children immunized are also reflected in the low compliance to antenatal care received by most women who lived far away from the health services available. The grandmothers also stated that when the woman reaches the health centre if they have not been to antenatal checks previously (have not been booked) then they are treated very badly by the health worker and scolded. The absence of medical staff at the Health Centre, unfriendly service, high fees and unavailable medical stocks in some cases discourages women of going through the effort of another visit.

The quality of care is poor in most Health Centres. The health facilities are understocked, health workers are often away and there is no one to attend to the delivery. Despite all these issues most grandmothers think and support the idea that their daughters and/or daughters in law continue to attend antenatal care checks and deliver at the health centre.

Some of the main problems faced by mothers who do not want to go to antenatal care are: Teenage pregnancy out of wedlock and avoiding health services for delivery and antenatal checks because they are embarrassed of being attended by a male officer. Another issue that was brought to our attention during the FGD was the attitude of fathers (male partners). The males are not supportive during pregnancy and never discuss the issue of planning for the time of delivery so that the woman can access the health services provided. Having a pregnant wife is no concern to them as this is "women business"

4.4.2 Results of Focus Group Discussions with Mothers

A total of 116 mothers representing the villages of Waihaga, Mwakurokuro, Parego, Mage, Woua and Piruma took part in the focus group discussions.

Mothers reported that to keep their children healthy they consider it is very important to provide them with a balanced diet that contains a lot of fruits and vegetables, avoid snacks in the form of junk foods which are sold in the store and keep clean homes and surroundings. Keeping children clean by bathing them regularly and providing a loving environment was also mentioned by many mothers.

Most mothers had a good notion of what foods are healthy and which are not, but indicate that often they do not have access to the quality or quantity of food that they would like for their child. When the child falls ill most mothers will first treat the child at home with simple methods such as bathing the child, giving them extra breast milk or coconut water and if the child shows progressive deterioration then they will take them to the health centre for assistance.

After delivery the mother and child are cleaned and taken care of before the child is put to the breast. There are mixed responses among mothers, some feed their child within the first hour of delivery while others take longer. Sometimes mothers are very tired after a long labour period and complicated delivery, so they are left alone to rest for a few hours until the child is put to the breast. In Piruma the mothers said that they generally put the child to the breast after the child cries and they can observe the reflexes of the baby looking for the breast.

Most mothers in Piruma and Mwakorukoru said that warm water is given to the child immediately after birth and after giving the baby a bath. The mother uses the time employed in this to rest and only after this is all completed they are able to breastfeed their child. The use of warm water to clean the child's throat and stomach is only done once and then exclusive breastfeeding is generally practiced by all until around 4 months of age. However if not sufficient milk is being produced by the mother complementary feeding with liquids such as fruits juices and coconut water is introduced earlier.

For many children liquids such as water, coconut milk and fruit juices, mainly paw-paw, are introduced between the 3rd and 4th month of life and children start receiving complementary semi-solid feeds at around 4-5 months. Some mothers say that they start complementary feeding when the child's teeth cut through the gums. Other mothers said that they are told by the nurse to start feeding only after the 6th month but that even the nurses sometimes encourage early feeding if the child is not gaining enough weight during the growth monitoring checks. Many mothers believe their milk is not nutritious enough to feed the child until the 6th month and some say that they do not produce enough quantity to satisfy the child and that is why they start complementary feeding early. For those children that do not gain weight quickly complementary feeding is started early on the belief that it will help increase weight. In some cases, when the child is two to three months old and responds positively to food being offered (is able to swallow) the mother will start incorporating complementary feeding on a daily basis. The introduction of early feeding allows mothers to go to their family gardens to work, collect fire wood and water for the household and go to the markets while the child is at home with the grandparents or other relatives. Since the child feels full and the solid food takes longer to digest they do not cry for breast milk and sleep more while the mother is away.

Many mothers know their children have been immunised and have the cards to prove it. Most women can name a few of the vaccines their children received (polio, TB and measles) however they say the Health worker or nurse rarely explains to them what vaccination the child is receiving and what it is for. Most know that vaccines prevent diseases but cannot elaborate the concept further. The lack of compliance to complete immunisation schedules relates to the distance from the village to the Health Centre, transport costs, mothers being "lazy" and not taking their child for scheduled vaccinations, lack of vaccines or nurse being absent from the

health centre and lack of support from their husbands as they “leave the matters concerning the health of children to the women”.

Mothers said that their main source of health related information was obtained from the nurses or Health Workers at the Health Centre around the targeted communities. Some mothers also mentioned that their Churches and the older women in the community are a source of valuable information. All mothers concur that there is not enough awareness sessions conducted and acknowledge that they have limited understanding of nutrition and how to raise healthy children. They expressed a wish to know more about exclusive breast feeding practices and birth spacing. These are mostly new to them and they would like to hear more on these topics. They also acknowledged that it would be important to have more women groups within the community and the church where these new information could be discussed and plans to implement new activities at community level which would be beneficial to their children could be discussed among themselves.

Women are keen to have someone in their community to conduct awareness sessions for them so they can have a better understanding of what diseases do and how to prevent them.

The access to a Health Centre that is staffed with qualified health workers (or with any health workers at all) and has the basic equipment and an adequate stock of medications available is a challenge that most women face both during delivery or when their children are sick.

The cost of transportation and road conditions to the Health Centre for antenatal care or delivery often force the mothers to risk giving birth at home. The main transportation routes are by sea on a canoe. Sometimes travel is impossible due to weather conditions.

Family planning is only used by a few of the women interviewed. Most mothers have heard about family planning but do not understand how it works and what must be done in order to access this service. There are some that believe that once they receive repeated doses of Depo Provera injections over an extended period of time they will never be able to have children again. Many believe that the Intra Uterine Contraception Device can cause cancer and heavy vaginal bleeding. Other contraception methods such as Fallopian tube ligation are linked to women being unable to do heavy work as there might be ruptures in the operation site, this is believed could happen even years after the operation has been completed.

In places like Parego and Woua women have easy access to family planning but don't access these due to lack of knowledge.

The discussions indicated that women would like to have more awareness and information on the benefits of family planning and most of all that the health worker or a World Vision staff sit with them and explain in detail what will be achieved when using the different contraception methods, how these work and for how long they will be protected.

The most common contraception method was the Depo Provera injection followed by condoms and the calculation of the ovulation cycle. Birth spacing and the use of contraception is a topic that is not discussed openly. Some of these villages are predominantly Catholic and therefore do not encourage family planning. Many women rely on knowledge about the ovulation cycles as a means of contraception.

During the discussions most women acknowledge that they would like to have fewer children in order to be healthier and stronger for the next pregnancy, but that this decision needs to be supported by their husbands. From what was observed it seemed that many of the men in the community as well as the older women do not like family planning methods and believe that it can be harmful for the woman, making the women sick and encouraging them to be unfaithful to their partners. Men are not happy to talk about these issues openly.

4.4.3 Results of Focus Group Discussions with Health Worker

One health worker representing Parego Health Centre was interviewed at the mentioned location. A checklist of medical equipment and basic services within the health centres and Aid posts was also compiled during the time of the interviews at Bagarei, Narate, Parego, Aorigi and Gupuna. The nurses looking after the Namuga Health Centre was absent at the time of the visit to this location.

The observation list shed the following results:

- Antenatal care: Weight scales, measuring tape, stethoscope, Pinard stethoscope and sphygmomanometers are available in most Health Centres except in Bagarei which has no measuring tape and in Parego the adult weight scale was not functioning. Despite Parego being one the main Health Centres in the region it does not have STI screening available and most of the Health Centre had no de-worming tablets in stock. Iron folate tablets are available at all health centres, which was a surprise as the intake of iron folate and access to these seem to be quite low in the community. Antimalaria prevention treatments (chloroquine) are available in all health centres.
- Immunisations- Narate and have cold chain mechanisms functioning and adequate stock of vaccines at the time of the visit. Parego has a cold chain mechanism functioning but no stock of vaccines available. Vaccines are kept on gas powered fridges. The Provincial Health department is supposed to provide the gas and the vaccines as requested. Bagarei and Aorigi do not have EPI facilities.
- Birthing kits- All health centres except for Bagarei have birthing kits available, however in the case of Gupuna the kit is not complete and in several health centres there are no sterilization facilities for these once used.
- Antibiotics, antimalarials and ORS- all available at all Health Centres visited.
- Neonatal/infant check equipment- Only Gupuna Health Centre had the basic required equipment (weight scale, measuring board and child books) none of the other health centres have measuring boards available for growth monitoring and only Narate had children health books (Pikinini gele helth rekod buka) available.

The Health worker interviewed stated that women are poorly educated and therefore do not know how to take care of themselves and their child. However she said that nutritional practices are fairly good and that most children that come to the centre are above the 80% growth mark (above -2 SD on the Z-score) Women work hard in their gardens and at home and are not well prepared physically for delivery, most having too many children in a short space of time.

Often women will eat less while pregnant because they fear giving birth to large babies. They believe that a large baby is more prone to cause complications at birth. There is not enough awareness sessions in the community and the health workers are over worked and under staffed so cannot leave the clinic and interact with the community.

She said that often mothers will not take their advice during antenatal visits as cultural beliefs are stronger than the health messages they pass on. Immunisation rates around Parego are good (despite not having any stock in the Health Centre at the moment of the interview). Most children are vaccinated but usually not in the time frame that the Ministry of Health has recommended in country, this is due to the irregular supply or lack of vaccine stocks. In the other smaller health centres which are further away immunisation rates are low due to problems with the cold chain, vaccine stocks and rare immunisations campaigns in the communities that are further away. The main Health Centres have cold chain and adequate stocks most times but there are no regular outreach activities at community level so the children that don't go to the clinic on vaccination day miss out.

The main reasons for women and children not coming to the Health Centre are related to lack of transport (or money to pay for transport) and weather. Transport is costly for the average woman and the distances are long. Visiting the Health Centre means extra costs and time away from their gardens. The nurses also find it difficult to visit the communities as they have no transport and the terrain is rough. They cannot leave the health centre for a week unattended and so are forced to wait in the health centre for the mothers. They said they need more staff and reliable transport to be able to cater to the community in situ.

When stocks of medicines are adequate and there is enough staff available the Health Workers go out to do mobile clinics, but they believe it should be done more often. During the mobile clinics there is not too much awareness sessions done with the community on health issues due to lack of time. When doing outreach the activities all focus around treatment and little on education. Women have many questions, especially regarding family planning but often don't ask because of religious beliefs that go against the use or their husbands and other relatives do not want them to use these methods as they believe it can hurt the women.

The nurse interviewed in Parego believed that most women do exclusively feed their children until the age of six months as they teach them however she did acknowledge that in other areas of the target region most mothers do not practice exclusive breast feeding until the age of 6 months and start complementary feeding early, around 3-4 months. Many have no idea as to what a balanced diet entails and how to prepare a healthy meal for the child that will suit its age and nutritional needs in quantity and quality. The health worker said that sometimes mothers do not produce enough milk and therefore need to add complementary feeding for their child earlier than the 6th month, so they sometimes encourage early introduction of complementary feeding.

The nurse stated that although she think most mothers would prefer to deliver their children at the Health Centre sometimes this is not possible due to the distance and weather. This is not a problem in Parego for the people in that community, if the mother does not come to the health centre for delivery it is just out of laziness. The smaller Aid Posts are not equipped to handle deliveries.

It is normal practice for mothers to treat their children at home when these are sick using traditional medicine and only seek medical help if the child gets worse. Home treatments are usually based on the use of herbs to treat fevers and coughs. This is culturally acceptable and considered the norm among community members. The people only come to the health centre when they have big health problems which they could not deal with at home. Access to services such as antenatal care and immunisation are left as a last priority since their awareness level in terms of disease prevention is not good.

The nurse agrees that more awareness needs to be done as a group, which needs to include men and also individually to encourage mothers to seek help early on as the child develops symptoms instead of waiting until the illness has progressed. Lack of hygiene practices and lack of knowledge increases the risk of disease. Some of the water systems in these villages are non functional and the health workers feel this plays an important role in the lack of general hygiene observed among their patients.

Health workers feel that WV can support them by increasing their capacity through Community Health Workers workshop training to improve their management skills. World Vision can help the Health Workers to do awareness sessions on hygiene and sanitation, general health and nutrition and advocate to the Provincial Department of Health on their behalf to increase medical stocks, maintain clinics and provide transport for the nurses to be able to do mobile services.

The Health Worker interviewed think that there are high demands for awareness sessions in the community and that people are keen to learn more on health and prevention. They understand that the main reasons that people in the communities are not using their services are related to high costs and poor accessibility to transport and sometimes the attitude and poor treatment of health

workers towards the patients. When they do not have medicines on stock people will often not come back again for treatment.

The health Centre in Bagarei is run down and needs urgent repairs, other health centres have also not received maintenance in a long time and lack basic facilities to cater for the population.

Poverty for the Health system in South Makira means a high turn over of staff, lack of motivation, absences in work posts, under-staffed health facilities, shortages of drugs and basic equipment and lack of water and electricity at the health centres. For the people of South Makira it means limited access to under services health centres due to transport and medical costs which they cannot afford.

V. DISCUSSION AND ANALYSIS

5.1 General characteristics

The 170 children under five years of age surveyed account to approximately 20% of the estimated 870 children under the age of five that live in the 13 target villages and approximately 18% of the 955 households in the area were visited.

There are 1% (n=2) more girls than boys in the sample size, 84 boys and 86 girls. This does not coincide with the reported ratio of males to females in the population under 15 years which indicates there are slightly more boys than girls (ratio of 1.05 boys to 1 girl) throughout the country in the standard population (*CIA Facts book, Solomon Islands, 2006*) However the difference in sample size between the two sexes is not statistically significant. Female infanticide is not practiced in this region and there is no significant difference in the treatment received between boys and girls when they are born, therefore a higher mortality among children of a specific sex is not expected.

During the study every household that had a child under the age of five years identified on the day that the survey took place was visited and surveyed. The village was advised beforehand about the date of the visit and a common meeting place was also set up in each village for those mothers whose houses the survey team was not able to reach. The focus groups with mothers and grandmothers, separately, were also held in the mentioned common areas.

The largest age group was composed of those children between the ages of 24 to 59.99 months making up 38.2% of the population of all children under 5 years of age surveyed. The number of mothers interviewed was 170. There were only 26 pregnant women in 9 villages that were identified. Of these women 7 were in their first pregnancy. Haemoglobin levels in pregnant women were measured in order to assess their nutritional status and physical conditions prior to delivery. These results demonstrate that there is likely to be high levels of anaemia in women of reproductive age (15-45years) in the target area and the need for interventions targeting both women of reproductive age and pregnant women, which will make the largest impact on both maternal health and that of their unborn children, as well as impact in reducing their risk of mortality during labour, birth and in the neonatal period.

5.2 Nutritional status

Three commonly used anthropometrics indices are derived by comparing height and weight measurements with reference curve: height-for-age, weight-for-age and weight for height (*WHO, 2005*). Height-for-age is suitable for targeting a wide range of interventions because it reflects the cumulative effect of socioeconomic, health and nutrition problems. It reflects achieved linear growth and its deficits indicate long-term, cumulative inadequacies of health or nutrition (*Gibson, 1990*). Whereas weight-for-age is a condition reflecting both chronic and acute under-nutrition problems and weigh-for height reflects an acute under-nutrition problem. The problem of under-nutrition among children < 5 years in South Makira was moderate according to WHO standards. It was more of a concern when compared to other areas of the Solomon Islands (such as Malaita) and other countries in the Pacific such as Papua New Guinea. (*Papua New Guinea DHS, 2006. WVPDG, Madang Nutrition and Education Project. 2010.*)

The Health and WASH triggers for action document allow us to rate baseline data in 3 categories (acceptable, attention required and critical) according to the percentage obtained. The Health and WASH triggers for action document was created by World Vision International following WHO international guidelines. According to the Triggers for Action document the prevalence of

stunting in this study was categorized as “attention required” (<30%) as was underweight (20%). The prevalence of wasting was just under 9%, which also requires attention.

At National level wasting is reported at 4%, stunting at 32.8% and under-weight at 11.8% (*Solomon Islands Report on disease burden.HIS. 2011*) The figures that are registered in this baseline do not coincide with those found in the above mentioned report where stunting (reported at 30.6% in this report) and underweight rates (20.6% in this report) are higher than the national level as is the incidence of wasted children.

The rate of underweight and stunted children in this baseline was substantially higher than those recorded in Makira Province in May 2012 through a baseline conducted by the World Vision Solomon Islands team.

The malnutrition rates in all categories were higher for boys than girls in all areas. Boys are overall more malnourished. This is confirmed as one compares the malnutrition rates between sexes with diarrhoeal prevalence which is also significantly higher among boys. It was not clear why this is the case from the data obtained through focus groups discussions or observations during data collection. Possibly boys are allowed to wander around the village more than girls and their hygiene level is poorer than those of girls although this cannot be confirmed through this study.

Results from this survey showed that growth faltering starts from the age of 6 months and there is a tendency that nutritional status of children gets worse as they get older. The highest prevalence of chronic under-nutrition (underweight and stunting) was among the older children aged 24-60 months. The highest rate for wasting was recorded on the 12-23.99 month age group, however these were not statistically significant. This finding is in line with what UNICEF reported in 2000 indicating that growth faltering for children on average starts at around five months of age. The causes of this are related to the breast milk no longer meeting the total nutrition requirement of the child and the need to start implementing complementary feeding. Likewise, early introduction of complementary feeding increases the risk of contracting diarrhoeal related diseases and other infections which causes damage to the intestinal wall and mal-absorption.

Over the two years of life, the percentage of children who are underweight triples from about 10% at six months of age to 30% at two years of age. (*UNICEF, 2000*) Results from our study shows that the underweight children almost doubled between 6 months old age group and 2-5 year old group (14% to 23%).

If the nutritional status is poor in the under 6 months age group, as is the case in this study, then this indicates poor exclusive breastfeeding practice which we also found, and poor nutrition in pregnancy which was apparent when looking at the haemoglobin values reported in pregnant women. Women who are not prepared to produce a healthy child due to their pre-pregnancy health conditions generate a fetus that suffers from Intra-Uterine Growth Retardation (IUGR) and is born with Low Birth Weight (LBW) which conditions the child to start life already anaemic and prone to pathologies related to low haemoglobin values.

Severe malnutrition (Z-score <-3 SD) in the form of wasting at 4.1%, underweight at 7.6%, and stunting 10.6%, were recorded in this study. These are higher than the National averages reported which found that 8.5% of children suffer from severe stunting and 2.4% suffer from severe underweight. The National average for wasted children is 2.0%. The results for severe malnutrition among children in South Makira were also significantly higher than those found on our Malaita MCHN baseline.

The children that were identified as severely malnourished in this study need immediate referral to a Health facility that will be able to cater for their nutritional needs and provide the rehabilitation therapy needed. At this time the District Health Centres and Aid Posts that operate in the region targeted are not equipped with the capacity or equipment necessary to address severe malnutrition cases. Children need to be referred to the Hospital in Kira-Kira, or preferably

Honiara for specialised treatment, however even these centres does not have the facilities to cope with severely malnourished children due to lack of specialised staff and no existence of a feeding centre where the child can be rehabilitated. At this time the only treatment for severely malnourished children that make it to the Hospital is complementary feeding with powered milk and addition of multivitamins for the period that the child is at the Hospital. No follow up of the child after it has been discharged is performed at any level in the current health system.

In this study there was a significant difference between the regions (Mainland and Islands) in the prevalence of chronic malnutrition (stunted and underweight). Stunting is caused by long term under nutrition which is not only associated to low food intake but includes a lack of micro-nutrients in the diet and the presence of chronic underlying diseases such as intestinal worms and chronic anaemia. It is clearly observed that the Islands has the highest prevalence of malnutrition, several causes could be attributed to this result. The villages targeted in the Islands are further away from major health centres therefore they tend to have poorer health services then those in the Mainland. There also seems to be a lower awareness level related to hygiene and sanitation, especially among the older population which still strongly maintain traditional beliefs. Higher prevalence of diarrhoeal disease reported, low immunisation coverage and higher rates of skin infections are all more predominant in the Islands region.

It was also noteworthy the high rates of wasting in the Islands area compared to the Mainland which was very significant. Wasting is associated to acute under nutrition. Causes attributed to the number of children that are wasted in the Islands could include lack of knowledge among the mother associated to complementary feeding. The first year of life is a vulnerable time for a child as it needs to learn to eat and needs the support of the mother to achieve this. The quantity, quality and texture of the food introduced needs to be correct to achieve a smooth transition and acceptance of semi-solids into the child diet. Breastfeeding must continue in this period to supplement the complementary feeding provided. There was a high percentage of wasted children in the 0-6 month age group, this could be associated to early introduction of complementary feeding.

A lower income leads to lower food consumption and less food availability. Most of the villages are subsistence farmers growing their own fruits and vegetables. Access to red meat is difficult as they have no livestock except chickens and only some of the richer people have pigs. Fish is widely available as most of these are coastal villages with easy access to the sea, but possibly not consumed in enough quantity.

There is also problems and seemingly lack of capacity among the operational Health Centres to monitor the growth of the children. Most Health Centres are not equipped to do appropriate growth monitoring using the Z-score ratings introduced by the Ministry of Health and Medical Services a few years ago and health staff just relies on the weight and age measurements to track growth monitoring. The incapability to measure possible stunting prevalence among children might mean the health workers and mothers are unable to identify chronic malnutrition as this tends to be a hidden problem not easily identified if anthropometrical measurements are not taken periodically.

No study was conducted on the nutritional status of pregnant mothers. However, in this small cohort of pregnant women haemoglobin readings taken indicated that a significant number of pregnant women suffered from iron deficiency anaemia. Although, due to the small sample size we cannot state without a doubt that this is the case, we assume that similar results would be likely in all women of reproductive age in this area.

Iron deficiency anaemia during pregnancy has a significant impact on maternal mortality and on low birth weight of their children; it increases the risk of pre-term births and consequently high

anaemia prevalence observed among very young children, especially in infancy due to their poor iron storage reserves.

5.3 Micronutrient status

Anaemia prevalence among children under 5 years: During early childhood will affect growth, impair cognitive development and increase susceptibility to infection (*WHO. Iron deficiency anaemia. 2001*).

Anaemia was highly prevalent among children under five years in this study (76%), indicating a severe public health problem. Both the Triggers for Action document and international WHO guidelines determine critical levels of anaemia as those above 40% in children under 5 years. (*WHO. Iron deficiency anaemia. 2001*) This results was lower than those found in the WVPNG Madang 2010 baseline (86%) but higher than those found in the Malaita MCHN baseline survey conducted in May 2012 (64%) The reported prevalence of anaemia in Makira Province in children under 5 years of age is 50%. (*Solomon Islands DHS. 2007*)

There was no statistically significant difference among anaemia rates in relation to the area. Both the Islands and Mainland had an average of 75% of the children presenting some form of anaemia. More than half of these were mild cases (9.0 -10.9 g/dL). There was only one case of severe anaemia which was detected in the Island region, although it is acknowledged that the sample size of this study of 70 children was small.

Only 17 children (24.3%) in the study presented Hb values above 11 g/dL and out of those 17 children, 4 were neonates, which normally have very high levels of Hb in their blood for the first 14 days of life. The normal haemoglobin concentration in neonates ranges from 13.5 g/dL to 22.0 g/dL in the first weeks of life. This occurs in response to high fetal erythropoietin levels stimulated by the relative hypoxia experienced in utero. The haemoglobin concentration in normal infants declines after birth to reach the normal physiological levels at approximately eight weeks of age (normal range 11-16 g/dL). Adverse neonatal events, prematurity and haemolysis may impact significantly on the rate and extent of this decline (*Smith, H. Diagnosis in paediatric haematology. 1996*).

The high prevalence of anaemia in children in this study highlights the need to plan to improve pregnant women to access appropriate iron- folate supplementation and to begin monitoring birth weight across this area from all Health Centre births to give us an indication of low birth weight among this population compared to iron folate intake during pregnancy.

Anaemia rates among children under five years old were highest among children age 6-11.99 months for mild anaemia and among children 12-23.99 months for moderate anaemia. It is after the 6 months of life that iron stores have been depleted, breast milk no longer provides the necessary amount of iron needed and complementary feeding has not yet been well established.

Given the high prevalence of anaemia observed it is very likely that there is a serious shortage of micronutrients in the children's diet. There is a possible inadequacy of zinc, iron, niacin and folate. The possible high presence of intestinal parasites in children could also contribute to low levels of haemoglobin and it is recommended that Health staff in the Province address deworming activities with the Health Centre to ensure compliance every six months for all children under 5 years and older than 1 year. Although compliance in the use of mosquito nets was high malaria could be another leading cause in the high anaemia rates among these children (*Buttha S, Pediatrics, 2005*)

Anaemia among pregnant women: The high rates of anaemia were also observed among pregnant women (61.5%) where the anaemia prevalence was, as in the children, well above the rates considered a public health problem (> 40%). Nationally it is reported that 44.3% of women are anaemic, however among pregnant women the anaemia prevalence climbed to 60% (*Solomon*

Islands DHS, 2007) This coincides with the national statistics for pregnant women and what was found in this small study among 26 pregnant women in our targeted communities.

One of the possible reasons for the high prevalence of anaemia among pregnant mothers was the low consumption of iron tablets. Given these results we could assume that women may be entering pregnancy already anaemic. The provision of complementary iron for this population may also be an intervention worth considering in this area. Although 97% of the mothers interviewed received some iron folate tablets during their last pregnancy, and none consumed more than a 100 tablets which is the minimum amount needed to increase iron stores in the blood in order for it to be reflected in the haemoglobin values. (*Buttha Z. Lancet, 2008*) In this study most mothers consumed less than 50 iron tablets which were not enough to make any real impact on the haemoglobin levels or iron reserves.

Only 1 pregnant women in the first trimester were identified this is possibly because women do not seek care during pregnancy until the second trimester when there is no doubt that they are pregnant, or they cannot hide it as in the case of several unwanted teenage pregnancies reported. Evidence suggests that the earlier and longer the consumption of iron during pregnancy the better the mother and child will be prepared for the delivery and neonatal stage. (*Buttha Z. Lancet, 2008*) It is therefore important to seek medical advice and attend to antenatal checks when pregnancy is suspected. Pregnant women should be encouraged to seek antenatal care as soon as possible and not delay the first visit. The low consumption of iron may be due to the fact that the Health Centres control the prescription of iron folate tablets very strictly and often don't hand out more than one weeks supply to the mother when she comes to the antenatal check despite being well known that the women do not come for antenatal care every week. At the time of the survey the Health Centres of the area had enough iron folate tablets in stock and there seemed to be no shortage. Discussions with health workers revealed that the stock of iron folate tablets they receive in some cases are limited and they are reluctant to give large amounts to pregnant women. The health centre staff only give out a maximum of 1 month supply (30 tablets) to those women who live far away from the health centre and who they know will probably not return until delivery. In some cases although they had enough supply the custom and way that they have been trained is to only give 1-2 weeks supply to the women that come for antenatal care and live close by. The knowledge of the health workers as to the amount of iron folate tablets necessary to make a difference in haemoglobin levels was poor. Most believe that with a week supply it was enough to increase iron storage levels. Health workers do not understand the importance of iron folate consumption in order to increase haemoglobin levels and reduce anaemia, so therefore do not teach the mothers or encourage them to take more than the tablets they provide and to consume green leafy vegetables which is true are rich in iron but have poor absorption rates (less than 5%). Further if the green leaves are boiled most of the iron is lost in the process.

Anaemia prevalence based on gestational age showed that as the pregnancy progresses anaemia increased. This might indicate that anaemia among pregnant mothers in this area was due to physiological changes regarding their pregnancy. However the low levels of haemoglobin seen in early pregnant women indicate that the women in the study were probably anaemic before the pregnancy started.

Anaemia should be receive an early intervention since severely anaemic pregnant mothers have a greater risk of death during the peri-natal period, apart from the greater risk of delivering low weight and pre-term neonates who often also have low haemoglobin blood levels (*Viteri, 1997 and Ramakrishnan, 2001*) It is internationally recognised that iron folate supplementation can reduce anaemia rates and the risk of maternal deaths by up to 23% (*Buttha Z. Lancet. 2008*) Further, peri-conception folate supplementation reduces the risk of neural tube defects by 72% and may reduce low birth weight deliveries (*Buttha S. Pediatrics. 2005*) So not only would interventions supporting the intake among pregnant women of iron folate be advantageous, but could also be implemented among those women which are not pregnant but planning to become, in order to reduce anaemia prevalence in these high prone areas.

During delivery women with low haemoglobin values are physiologically disadvantaged to manage any blood loss during and immediately after the delivery and are more likely to die from even a small post partum haemorrhage. Women who are severely anaemic may die from other causes exacerbated by anaemia such as malaria, HIV or cardiac failure (valvular disease) during late pregnancy or in labour. Pregnant mothers' general knowledge on anaemia and its effects on their new born children were very poor. Insufficient knowledge may exacerbate the prevalence of anaemia as they are unaware of the importance of preparing themselves by taking the adequate iron folate tablets during the pregnancy.

The clinical care of pregnant women diagnosed with severe anaemia would be to urgently refer them to a maternity hospital and provide treatment such as blood transfusions and weekly iron injections. Moderate anaemic pregnant women would require double dosages of iron folate (2 tablets a day as per IMPAC WHO guidelines for normal pregnancy) Delivery should be performed in a referral hospital with blood transfusion ability.

Malaria: Malaria is widespread in South Makira (estimated at 174 cases per 1,000 population) and a possible contributor to the high rates of anaemia registered among pregnant women and children. Women who participate in antenatal care checks during pregnancy receive malaria prevention treatment (chloroquine) as part of their preparation to delivery, however not all attend to the antenatal checks scheduled. There had been studies that have identified chloroquine as an ineffective method of malaria prevention due to the high resistance rates it has developed over the years in the Pacific (*Yumi Rausim Malaria, 2011*) High anaemia rates could also be associated with a high prevalence of intestinal parasites.

Intestinal parasites: Antihelminth treatment may reduce maternal anaemia, low birth weight, pre-term births and perinatal mortality although studies are mixed (*Haider B. Cochrane database of Systematic reviews, 2009*) The possibility of conducting de-worming campaigns for both children and mothers could have a significant impact in the anaemia prevalence and nutritional status of the population targeted. De-worming is not widely practiced for those women who access antenatal care, in fact only 46% of those women under this study had received a dose of albendazol during their pregnancy.

5.4 Health conditions

The prevalence of symptoms related to infectious disease such Acute Respiratory Infections (19.4%) and diarrhoea (15.9%) among children under five years old was high, but significantly lower than those found in South Malaita MCHN baseline

Diarrhoeal related diseases: Boys were more prone to diarrhoeal diseases compared to girls. We could assume that there is a correlation between malnutrition and anaemia which contributes to reduced immunity. The lack of appropriate clean water sources and contamination of rivers and streams where water is drawn (especially during the dry season) contributes to the high prevalence of diarrhoea. The introduction of complementary feeding and giving untreated water to the child before the age of 6 months could also contribute to the high rates of diarrhoea observed.

Globally it has been demonstrated that treatment of diarrhoeal diseases with zinc and oral re-hydration salts (ORS) can reduce the incidence of dehydration by 40% and hospital admissions by 59%. (*Bhandari N, Pediatrics, 2008*) In the DHS Survey of 2011 diarrhoea prevalence for the Solomon Islands for all children under 5 years was 9.4%, being highest in the 6-12 month age group (21.1%) and decreasing as the child got older.

Within our study of 13 villages in South Makira of all the children under 5 with diarrhoea only 33% were treated with ORS. The most common treatment for diarrhoea was to increase the liquid intake by providing the child with coconut water or giving them extra water or breast milk.

Almost a quarter of the mothers who had children with diarrhoea did not give them anything to treat the pathology. The low use of ORS reported in this study has been a curious finding as oral re-hydration salts are widely available in all health centres and nurses seem to know how to use them although it is not often given to the mothers. The low use of ORS could also be due to the mother not going to the health centre with the child that had diarrhoea and trying to treat the child at home with the above mentioned methods before considering the diarrhoea as a symptom serious enough to have to consult with a health worker.

Further promotion and awareness sessions on the use of ORS and its preparation needs to be reinforced. ORS should be made available widely and mothers encouraged to use the solution at home as a viable method of preventing dehydration but equipped with the message of seeking medical care if the diarrhoea does not resolve itself in 24 hours or the symptoms worsen.

As mentioned above, high rates of diarrhoea as those observed in this population could be related to a significant lack of hygiene and sanitation. Education on the use of latrines and hand washing are vital in order to reduce cases of diarrhoea. Ensuring clean water supplies either by finding new sources or treating water is also important to the reduction of water borne diseases. The possibility of adding zinc as a standard treatment for children suffering from diarrhoea (which is now not commonly practiced in Health Centres) could make a difference to recurring diarrhoeal disease and improve the time of recovery. The village health volunteers could play a key role in this sort of messaging at community level. It was demonstrated in Papua New Guinea that of the approximately 9000 deaths of children aged 1 month to 5 years, 15-50% of these lives could be saved through 95% coverage with nutritional family and community based care combined with community based management of pneumonia and diarrhoea. (*Policy Report, Burnett/WV. 2011*)

Acute Respiratory Infections: The DHS survey of 2007 reported that between 2002 and 2011 the national average prevalence rate for ARI was 46.2% across the general population. However the prevalence of ARI among children under 5 years in the Solomon Islands for 2007 reports that less than 5% of children had symptoms of ARI in the two week prior to the survey. This is much lower than the results this study collected. Of the 19.4% of children that had positive symptoms for ARI 79% had been treated at a Health facility with antibiotics. Although possibly all the infections were not bacterial the lack of laboratory equipment does not allow the health worker to differentiate which pathogen has produced the infection and therefore all patients who come with respiratory symptoms are treated with antibiotics. The liberal use of antibiotics can contribute to antibiotic resistance, the same way as it has happened with the older malaria medications in the Solomon Islands and other countries in the Pacific such as Papua New Guinea. Antibiotics seem to be readily available and in stock in the Health Centres according to the information gathered during the focus groups discussions and through the observation list and discussions with health workers. The antibiotics most widely used include amoxicillin, penicillin, metronidazole and doxycycline.

The lack of knowledge of many mothers signifies that over 20% of them did not treat their children despite being able to recognise the symptoms related to acute respiratory infections. Some of the mothers stated that they bathed their children with cold water to reduce the fever. Others have used traditional medicines to treat respiratory infections (usually before taking the child to the health facility). The traditional medicines include several types of herbs and barks that are boiled and given to the child to reduce coughing and fever. Health Centre staff indicate that the women do not recognise danger signs and try herbal medicines first and then when these don't work bring the child to the health facility late, when the infections has already set in. Internationally it has been shown that community case management of pneumonia and associate respiratory infections with antibiotics can reduce mortality by up to 70% in 0-59 month olds

(Theodoratou E, *Int J Epidemiol.* 2010) However in Simbu (PNG), a study demonstrated that only 60% of health workers were able to manage ARI effectively (Brewster D, *PNG and New Guinea Medical Journal.* 1993)

Immunisation: The immunization status of children 12-60 months was assessed in this survey through the direct observation of the immunization cards. The standard vaccines given in the Solomon Islands as established by the Ministry of Health and Medical Services are BCG, pentavalent (which includes DTP, Hib and Hepatitis B), measles and polio. The vaccines are all administered between birth and the first 12 months of life. Tetanus Toxoide (TT) and the Oral Polio Vaccine are given after the age of 5 years. In our study we found that 96% of the children 12-60 months in these villages indicated that they had an immunization card at home, however only 44.3% of these had completed immunization, while 52.3% had been partially immunized, meaning that they had received some of the vaccines mentioned above but had no adequate protection as some doses or vaccines were missing. At National levels 82.7% of children 12-24 months are reported to be fully immunised in Solomon Islands (*Countdown to 2015, Maternal, newborn and Child survival, Solomon Islands 2012 Report*) which is significantly higher than the recorded percentage in this study. Nationally the immunisation coverage has improved and this could be attributed in part to past awareness and outreach activities focused on improving immunisation coverage particularly in urban areas. However in our particular target area immunisation coverage is low. In Malaita we found the same percentage of complete immunisation.

Some of the constraints faced by the target population in terms of accessing adequate immunisation are linked to poor access to Health facilities, as well as an inadequate supply of vaccines in the Health Centre and problems in the cold chain mechanism to keep the vaccines viable. These factors have contributed to the low percentage of children with complete immunization. During the focus group discussions there were no negative perceptions from mothers or grandmothers regarding immunization.

A high number of women indicated that they are often charged extra for the vaccines (two dollars for the application) and cannot afford the extra costs. This is something that will need to be discussed with the Provincial Health department as all vaccinations should be free of charge for all. Further during discussions with the health workers they indicated that mobile clinics are not done regularly, or as regularly as they should be due to lack of transport and equipment. It is during these mobile clinic visits when immunisation coverage, antenatal care and awareness sessions should take place in order to catch up to the National reported level of immunisation coverage.

Low compliance to immunization could be one of the main causes of the high acute respiratory infection rates that were observed. Immunisation is a key strategy towards healthier children and basic prevention for common diseases such as respiratory infections, polio and measles among others. Links between the health worker and community need to be strengthened to promote vaccination within the villages. Awareness sessions for mothers on vaccinations and its preventative capacity to protect against certain pathogens will encourage the mother's to seek these services. Good relationships between the medical services in the province and districts health centres needs to be cultivated in order to ensure good supply of medication, vaccines and proper storage of these (cold chain facilities) The very high rates of acute respiratory infections observed is a worrying sign and demand immediate action following the recommendation under the Triggers for Action document developed by World Vision. It is interesting to note that children between the ages of 6 and 11.99 months are the ones with the highest rates of symptoms associated to acute respiratory infections. ARI's can cause death in small children, especially newborn in a matter of hours if not treated appropriately.

Skin diseases: Almost 23% of households reported having at least one child in the family presenting skin disease. In the Solomon Islands in recent years, the incidence rate of skin disease rose from 108 cases per 1000 population in 2007 to 450 cases per 1000 population in 2011 (Solomon Islands DHS. 2007) It is likely that household crowding, access to inadequate quantities of water, hot weather and humidity, lack of education and poor implementation of personal hygiene are all important factors that contribute to the prevalence of skin infections (Connors C. 2001) The most important skin infestations and subsequent infections observed (although not recorded in detail in this study) are yaws (caused by *T. palidum*), scabies and streptococcal pyoderma (skin sores caused by *Streptococcus* bacteria). Scabies seems to be endemic in the Solomon Islands as is yaws. In some Pacific communities it underlies 50% to 70% of streptococcal pyoderma.

The anthropophilic (passed from human to human) dermatophytes (skin parasites that cause disease), *Trichophyton* spp., or ringworms, are very commonly observed in these villages, especially in children. The granular variant of *T. rubrum*, which causes a grainy rash, seems to be especially common as they are related to more humid and warmer weather. Pityriasis versicolor (tinea versicolor), usually called 'white spot' which is caused by *Malassezia furfur*, is another skin infection common observed. (Connors C. 2001)

Eye infections: These were also commonly seen. More than 18% of households surveyed indicated they had at least one person with manifestations of eye infection in their home. The incidence rate of red eye in Makira is 28.4% reported for 2011 (Solomon Islands Report on disease burden.HIS. 2011.)

According to studies those households that have latrines are less likely to have persons developing trachoma. It was found that the distance between the water source and the development of trachoma was proportional. Children with dirty faces were more prone to be infected, as those that used surface water as opposed to those that had access to public taps or covered wells and springs (Schémann. Risk factors for trachoma in Mali. 2002).

The Islands villages had significantly less cases of skin infections and eye infections compared to the Mainland. The main source of water for the Mainland are public taps, while in the Islands region rain water and surface water (in the dry season are predominant). Given these results we would imagine that the Mainland would have better access to water of higher quality and purity, however no water quality tests were performed on these sources to evaluate contamination. Possibly the main source of public tap water could be contaminated.

Therefore, we conclude that the causes of high prevalence of skin and eye infections seem to be more related to hygiene practices than the existing water sources. The Mainland practices more open defecation compared to the Islands. The knowledge level regarding modes of transmission of diarrhoeal diseases (oral-fecal routes) and the importance of hand washing was higher overall in the Islands compared to the Mainland which presented more cases of eye and skin infections overall.

5.5 Health seeking behaviour

Antenatal care: Although 95.3% of women surveyed indicated that they had undergone at least one antenatal check during their pregnancy, only 70% of these had completed the minimum 4 visits recommended by WHO during the whole pregnancy. At National level 95% of women have at least one antenatal check during their pregnancy and 64.4% had 4 or more antenatal care visits during the course of their pregnancy (Solomon Islands. DHS. 2007)

Long distances to the Health Centre, transport costs and the incapacity of the mother to leave the other children at home to travel the distance to the Health Centre may contribute to the low

compliance for antenatal checks. The women are also the main care takers of the vegetable gardens, which are the main source of food for the community. These gardens are often located up in the mountains and duties such as these and getting water for the household keeps them busy most of the day. Low knowledge on the importance of antenatal care and its advantages in order to produce a healthy baby also keep women uninterested in going to the Health Centre for their checks.

Delivery: Only 12.9% of deliveries reported for this survey took place at home. The remaining 87.1% of women all delivered in health facilities with the assistance of a trained health staff or doctor. This is slightly lower than the National reported data which reports 85% of institutional birth, being higher in urban areas, 94% (*Solomon Islands. DHS. 2007*) There seems to be traditional birth attendants that still practice deliveries in these communities. These are not formally health trained people, but the knowledge has been passed through generations and in case the mother is unable to make it to the health centre they can provide the service.

Tracking the traditional birth attendants in each community and identifying any Village Health Workers that have been formally trained by the government during the 1980's and early 1990's would be beneficial for this project. These community members possess some health knowledge already and with more training and support they could have a big impact at community level for improving maternal, newborn and child health. A recent report produced by Burnet Institute and World Vision has shown that of the estimated 5,300 newborn deaths each year in PNG, 30% could be prevented with a basic package of family and community health care and up to 70% or 3700 deaths could be prevented through maximum scale-up of family and community health care (*Policy Report, Burnett/WV. 2011*)

The most common reasons for home birthing related to distance to the health centre, transport costs, weather and the bad treatment the women reportedly receive from the nurse, which in most cases are male. Most deliveries are not planned in advance and the mother gives birth where she is at the time that the contractions start. If there is not enough time to get to the centre or no transport available she will have the child at home. Through the focus group discussions we also found that it is considered acceptable for the mother to have their second or third and successive children at home if there have been no complications with the first pregnancy and delivery.

Globally evidence suggested that access to clean birth kits that will ensure clean birth practices used by a trained health person can reduce deaths by sepsis by 15%, and tetanus by 30% if used in 90% of home births (*Blencowe H, Save the Children/ Impact. 2010*). This is a possibility in more remote areas that have difficulty in accessing health facilities, although it is always best to deliver in a health centre with qualified health staff and availability of medical equipment.

Other important interventions that can be practiced if the mother delivers at a health facility as opposed to home birthing with no trained health person is adequate care for low birth weight newborns. In Solomon Islands 10% of newborn are low weight which increases the mortality of the child two fold. Kangaroo mother care for low birth weight newborns can reduce the risk of neonatal death by 32-66% (*Sloan N. Pediatrics. 2008*)

Tetanus toxoide vaccination: Almost 49% of women surveyed had received a tetanus toxoide vaccination during pregnancy. In the Solomon Islands two doses of TT vaccination are required for full protection against Tetanus toxoide. In our study only 26% of women reported having received two doses. This coincides with the national reported percentage of 26% of women having at two doses of TT vaccines during pregnancy. (*Solomon Islands. DHS. 2007*) This simple yet effective preventive measure needs to be made known to mothers so they ensure that they are protected against tetanus while attending at least 4 antenatal care checks during their pregnancy.

Birth spacing: The use of contraception as part of family planning was acceptable with 36.5% of women using some form of contraception, the most common being Depo Provera provided by the major health centres of the area. This percentage is higher than the 27.6% of women who reportedly use modern contraception methods in the Solomon Islands. There has been a slow and steady decline in fertility levels over the past 20 years. However, it remains at an average of 4.6 live births per woman, and current contraceptive use is quite low, with intended future use not much higher. Eleven percent of women reported an unmet need for birth spacing or limiting. (*Solomon Islands. DHS. 2007*)

Discussions on Family planning with mothers lead us to believe that their husbands and partners generally do not oppose the use of family planning methods, however some men said that they think that family planning could contribute in their wives' being unfaithful to them so they did not like it. There was a lot of misinformation regarding family planning and birth spacing. Most of the village women have very little information on family planning and do not understand the concept and how it works. Some think that once they receive the Depo Provera injection they will no longer be able to have any children again. There is little awareness during antenatal care and the health workers do not promote the use possibly because the talk of things related to sex is taboo in these societies, even more so for a male nurse to talk about family planning with a woman.

In those villages where the population is Roman Catholic and modern birth spacing methods are not encouraged women are taught to calculate ovulation cycles as a method to prevent pregnancies but our observations show that women find the calculation method complicated and often are not able to follow it. Due to the general low compliance to family planning, stocks seemed to be available during our visit (depo provera, condoms and pills) The costs of these is low and affordable to most, however the knowledge of how they work and their availability are not made known to most women and so they lose out on the benefits of birth spacing.

The importance of family planning and birth spacing and its impact on their health and child's health and nutrition is something that most women are not aware of. The evidence is clear that family planning to space births will impact on child survival, reduce child mortality and improve nutrition. Evidence suggests women should space their pregnancies by at least 2 to 3 years in order to provide the optimum breastfeeding and nutrition support for the youngest child during its most needy period- the first 2 years of life (*Rutstein, 2008*). This action could reduce maternal mortality by 30% and pre-term birth by 40% (*Barros F. BMC Pregnancy Childbirth. 2010*) This also benefits the mother's health and recovery from each pregnancy. Also delaying the first birth until age 20 reduces anaemia and the risk of low birth weight in newborns (*Rutstein, 2008*). Thus Family Planning should be accessible and counselling around birth spacing available at all Health Clinics.

This action needs to be supported by working closely with the health workers and women in the community so they understand how the available contraceptive methods work and can make informed choices regarding their family size and general health. The inclusion of men on these discussions is of outmost importance so they too can understand the benefits that birth spacing can have on the health of their partner and children and learn more about the contraceptive methods to reduce misunderstandings. Birth spacing should also be a key message during awareness sessions while implementing mobile clinics and at the Health Centre during antenatal checks.

5.6 Access to Insecticide treated mosquito nets at home

Malaria is endemic in the Solomon islands although there has been some success in decreasing the incidence through the Global Fund Roll Back Malaria program currently being implemented. Over the last years the incidence was steady at around 300 cases per 1,000 population, however

this has decreased over the last 3 years to the current 153 cases per 1,000 population. (*Solomon Islands Report on disease burden.HIS. 2011*)

During the survey questions on access to Insecticide treated mosquito nets and use of the net on the night prior to the survey were asked to all mothers interviewed. Practically all the children under 5 years had mosquito nets at home. This is due to a campaign done by the government in 2010 which distributed mosquito nets free of charge in an effort to decrease the high prevalence of malaria in this part of the country through the mentioned Roll Back Malaria Program. The nets were all treated with permethrin and distributed to the target communities by the Health Centres. Mothers seem to be aware of the importance of using the mosquito nets, reporting that over 62% of children under the age of 5 years had used them over the previous night to the survey. The main complaint mothers presented was that it is very hot to sleep under mosquito nets and that sometimes discouraged them to use them.

Intermittent preventive treatment of malaria at 2-3 months of age reduces the risk of malaria by 25-48% and of anaemia by 23-46%. A 99% coverage with Intermittent preventive treatment for malaria reduces mortality rate in children under 1 year by 2.4%, 12-24 months by 2.1% and 24-36 months by 1.9% (*Bhutta Z. Lancet. 2008*) These type of interventions currently not being practiced in the Solomon Islands could be explored further to see the relevance of adopting these practices in the project site as a pilot project

The Focus Group discussions and survey for pregnant women showed that compliance to sleep under mosquito nets was even higher than among children with 73% of pregnant women reportedly sleeping under a mosquito net the night prior to the survey. Malaria during pregnancy is linked to maternal anaemia, preterm delivery, low birth weight and increased risk of neonatal death. Intermittent preventive treatment for malaria reduces intrauterine growth retardation by 43% and the first and second pregnancies. (*Bhutta Z. Lancet. 2008*)

Although there is a high use of mosquito nets for children under 5 years, most of these nets were not retreated again and are often used for other activities such as fishing which leaves holes in the nets and degrades the treatment process. Malaria is still one of the main diseases recorded at health centres in this region. Treatment of mosquito nets needs to take place and the eradication of mosquito breeding sites promoted as part of village activities towards a healthier community. Mothers need to identify early symptoms of malaria and seek immediate help at the health centre so that their child is treated immediately and avoid complications that can appear very quickly in young children. These complications can often be fatal or cause life long damage. Health centre staff need to be skilled, knowledgeable and supported with appropriate drugs and equipment to provide adequate malaria prophylaxis, diagnosis and treatment during pregnancy. Health Centre staff also need to ensure that women have knowledge and access to and use Insecticide-Treated mosquito nets to reduce the risk of infection during pregnancy when they are most at risk.

5.7 Infant feeding practices

Newborn and infant nutrition: Breastfeeding is a unique way of providing the ideal food for healthy growth and development of infants and has a unique biological and emotional influence on the health of both mother and child. Based on WHO/ UNICEF guidelines and the World Vision 7-11 Strategy, the current recommendations on breastfeeding include the following key behaviours: early initiation of breastfeeding within one hour of birth, feeding of colostrum to the newborn, exclusive breastfeeding for the first 0-6 months, introduction of complementary feeding at 6 months and continue breastfeeding up to 2 years old or beyond (*WHO/UNICEF, 2003*).

In the surveyed area breastfeeding was commonly practiced. The small percentage of children that were not breastfed were those that were adopted due to maternal mortality during delivery or the mother living elsewhere due to work. These children were mostly breastfed partly through relatives that had small children and could breastfeed them and given complementary feeding

such as bananas, sweet potato, coconut water and taro to supplement their diet. No milk formula was used in any of the non breastfeed children in this area.

Overall colostrum intake is low due to strong traditional beliefs that the colostrum is dirty or sour milk and can harm the baby. Colostrum is an important part of the child's dietary needs. It provides high amounts of immunoglobulin's, vitamins and minerals that are essential for the development of the newborn. It is also high in calories. Breastfeeding within the first hour of delivery is relatively low arguing that the mother is often tired to breastfeed straight away and needs to be cleaned before the baby is given to her. Breastfeeding within the first hour of birth reduces neonatal death by 8-19% and it also acts to stimulate the contraction of the uterus thus reducing haemorrhage after the placenta is expelled. (*Bhutta Z. Pediatrics. 2008*)

Exclusive breastfeeding: Only 52% of mothers interviewed reported having exclusively breastfeed their child until the age of 6 months. This is much lower than the 73.3% reported nation wide through the DHS 2007 report. Promotion and support of breastfeeding practices with adequate complementary feeding after 6 months reduces deaths of 0-12 months by 12%, 12-24 months by 10% and 24-36% by 9%. At the same time it was observed globally that complementary feeding support and education can reduce the odds of stunting by up to 75% if accompanied by counselling. (*Bhutta Z. Pediatrics. 2008*) In the highlands of Papua New Guinea a study that compared the early introduction of solids with pneumonia prevalence found a high association among the two. (*Anga G. Trop J Pediatr. 2008*)

Due to the high prevalence of anaemia observed among children, nutrient density of complementary food needs to be improved, especially for iron and zinc. The intake of protein rich foods is low and high protein plants such as legumes are rarely consumed. The staple diet consists of carbohydrate rich foods with little mineral and vitamin contents such as cassava, taro and sweet potato. The high intake of fruits in the general population does seem to partially compensate for the low content of vitamins of the staple diet. It is important to educate mothers on the importance of increasing the intake of protein and vitamins such as vitamin A to reduce anaemia prevalence and increase immune system development.

Although not a specific question in the focus group discussions, informally most mothers indicated that they did not know about milk formulas. In this respect, milk formula is not seen as a competitor for exclusive breast feeding and breast feeding in general. Efforts will need to focus in helping mothers understand and change behaviours around exclusive breastfeeding and this will require collecting information on the current barriers to providing exclusive breastfeeding and working with women to understand how important it is for them to maintain a strong supply of breast milk in the first 6 months of life. If adequately nourished and supported during lactation and if the mother breastfeeds the child frequently (12 breastfeeds a day for under 6 months) a woman will produce enough milk to supply the need of the infant.

5.8 Hygiene and sanitation

In the Solomon Islands according the figures from the last census of 1999, 70% of the population have water supply coverage and 18% have sanitation facilities. Proper personal hygiene is one of the 3 key strategic elements of sanitation. Other elements are clean water (safe treatment and storage of drinking water) and safe removal of excreta. Improved sanitation has a direct impact on the reduction of disease such as intestinal parasites, skin diseases and diarrhoea.

Safe drinking water is a basic need for good health. Unsafe drinking water can be a significant carrier of diseases such as trachoma, cholera, typhoid and schistosomiasis. Drinking water can also be tainted with chemical, physical and radiological contaminants that harmfully affect human

health. In addition to its association with diseases, access to safe drinking water may be particularly important for women and children especially in rural areas, where they often bear primary responsibility for carrying water from long distances.

Inadequate disposal of human excreta and poor personal hygiene are associated with different diseases such as diarrhoea, polio, intestinal parasites and others infectious diseases. Improved sanitation facilities for excreta disposal provide improved personal hygiene. Improved sanitation facilities include flush to piped sewerage system, septic tank or pit latrine, ventilated improved pit latrine and pit latrine with slab.

In this study we found that on average over 60% of the population did not have access to any type of latrine and practiced open defecation.

Despite this there was no statistically significant difference between type of toilet used and the number of reported diarrhoeal cases although generally it has been proven that improved sanitation facilities have strong positive correlation with the general health of the household and village.

Overall knowledge on hygiene and sanitation and main modes of disease transmission seems to be acceptable but this knowledge is clearly not put into practice regularly. Explaining the correlation between healthy babies and adequate hygiene practices in the household could motivate mothers to take these practices more seriously in the future. Globally it has been demonstrated that for every episode of diarrhoea averted stunting decreases by 4% (*Buttha Z. Lancet. 2008*)

Water sources: This survey showed that 40% of the population surveyed collect rain water during the rainy season, while during the dry season 31.8% continued to collect water from public taps and another 43% from surface sources such as streams and rivers. The main source of water is rain water and surface waters. Approximately a third of the population access water from public taps, however these water sources have not been tested so the water quality is unknown.

At least half of the targeted population consumes water which is potentially contaminated and increases the risk of water borne diseases such as diarrhoea. Bathing in unsafe water sources can also increase the possibility of acquiring eye and skin infections which are common among the study population (see section 5.4).

Water treatment: This survey found that 35% of the population treat water at home to make it safer to drink. Boiling and letting it stand and settle are some methods employed to treat water in the households but boiling water is predominant among all the methods. During the discussions it was apparent that the water treatment was not done consistently across the 35% of households and that this practice was sporadic and usually only implemented after heavy rains when the water obtained looked dirty. Most of the water collection is done by one of the adult females of the household (88%) Women in these communities are in charge of sourcing water for the whole family as well as tending to the children and the garden which is the main source of food for the household.

Disease associated to water and sanitation facilities: Sixteen percent of households with children under 5 years and 5.9% of older children and adults had at least one family member with diarrhoea during the two weeks prior to the survey, this is moderate and reflects that there is substantial lack of knowledge regarding the basic transmission cycles and oral faecal routes through which water borne diseases are spread. There was no significant difference between the reported cases of diarrhoea among children under 5 years and the type of toilet that they had at home. Possibly the number of children surveyed who had presented diarrhoea over the 2 week period prior to the survey were not enough (in number) to produce a significant difference. The other factor that might contribute to the lack of association between toilet use and cases of diarrhoea reported is that most children don't use the available latrines or toilet for defecation.

Mother stated that they fear the children might fall through the hole in the ground and therefore don't encourage the child to use the latrines. Children are therefore encouraged to defecate in the open and then the mother will sometimes cover the faeces with dirt. The other contributing factor could be that flies that live in communities that practice open defecation widely could be a source of food contamination for the food of those that do use latrines. The low compliance to hand washing after using the latrines, given that there is only a minimal percentage of people that have easy access to hand washing facilities, could also be a contributing factor to the reported cases of diarrhoea among children who had a toilet and those that practiced open defecation.

In this study there was no significant correlation between the availability of hand washing facilities and reported cases of diarrhoea in children under 5 years. This could be due to the fact that most of the soap used was associated to washing clothes and very few mothers (average less than 15%) actually reported having used soap for hand washing after toilet use, after changing their babies or before preparing food and feeding their children or eating themselves.

As previously mentioned high rates of skin diseases and eye diseases were observed. These are apparently, at least in part, linked to the poor quality of the water consumed. A careful analysis needs to be done on the water sources to identify bacteria in the water that might be linked to the infections that were detected in the eyes and skin of children under the age of 5. Obviously the presence of infections is also closely linked to the lack of hygiene and sanitation and low use of soap reported overall.

General hygiene and sanitation: Another finding that needs to be highlighted is the poor overall practices around sanitation and hygiene. Only 7.6% of the mothers could not mention at least one route of transmission when asked about the causes of diarrhoea. The consumption of dirty water as a cause of diarrhoea was mentioned by just under half of the mothers interviewed and 50% also mentioned dirty hands. Mothers seem to have an acceptable knowledge regarding the modes of water borne disease transmission however this knowledge does not seem to be practiced.

Likewise the knowledge of mothers regarding hand washing practices seems to be acceptable. 71% of mothers said it was important to wash hands before eating and over 79% mentioned it was important to wash hands after toilet use, however in the focus group discussions most admitted they did not practice this although they knew it was important. The project will need to take the most basic hygiene and sanitation concepts and encourage mothers to adopt these simple practices into their everyday lives. Hand washing alone could cut rates of diarrhoea by more than 40% in this population and acute respiratory infections by 25%. (*Curtis V. Lancet. 2003*) The critical times for hand washing are before cooking, before eating, before handling a baby and after using the toilet and disposing of faeces.

Almost 75% of those interviewed reported to have used soap in the day or the previous day to the interview, however most of the soap use was associated to washing clothes. Less than 15% of women had used soap for washing hands during the past 24 hours and 44% of the mothers had bathed their children with soap in the same period of time. Less than 15% reported using soap to wash their hands after using the toilet. This is significantly higher than expected and possibly over-reported as our finding show that only 0.6% of toilets have hand washing facilities such as a tippy tap right outside the latrine. Most of the hand washing locations are either in the kitchen or inside the yard of the household.

5.9 Knowledge on infants and child feeding

Infants in the Solomon Islands start receiving food supplementation early. Up to 6.5% of newborns receive some kind of pre-lacteal feed usually warm water or coconut water.

Complementary feeding is started on average at 4.2 months. Exclusive breast feeding is practiced by 73.3% of mothers as reported by the Solomon Islands DHS 2007. There are no figures for colostrum feeding at a National level.

Complementary feeding: Within this study exclusive breastfeeding by 6 months was at only 52%, breastfeeding within the first hour was practiced by 71% of mothers and colostrum feeding by 92%. Complementary feeding was started on average at 5.12 months. It was noted that most mothers gave their children home cooked food or fruits as initial complementary feeding during the first months. Banana, paw-paw and sweet potato were the foods mostly used for young children. Taro and cassava were also widely used and added to the child's diet at a very early stage of life, most often long before the 6 months of life. Complementary feeding at an early age when the child's intestine is not ready to process and absorb foods that are not breast milk can produce significant damage to the line walls of the intestines causing diarrhoea, bloating and increasing the risk of bowel damage.

The target area seems to have very rich volcanic soil and high rainfall. Fruits and vegetables are staple foods for most villages. The main protein sources are from fish and poultry. Rarely red meats are consumed as they have no livestock in the village besides pigs, and these are only consumed during very special celebrations. As most people are very poor, soft drinks and processed foods with high percentage of saturated fats and sugar are not consumed everyday.

In this area it will be very important to educate mothers on how to prepare food for their children in order to meet their nutritional requirements (in particular micronutrient requirements) Education on food groups, balanced meals and food consistency and quantity (specially for those children 6-24 months) all need to be taught and discussed with the family and community. It seems as there is enough food of adequate quality and quantity for all children however there needs to be a stronger focus on educating mothers and the community as a whole in regards to the preparation of these in order to obtain the highest benefit possible. Identification of protein rich foods and micronutrient rich foods needs to be discussed at length with the community so that they realise that all the food they need is right at their doorstep and there is no reason why there should be malnourished children in their community.

5.10 Health Centre activities

A weak cooperation was observed between the health workers and the community around it. As reported by mothers during the FGD, and acknowledged by the health workers interviewed, health workers rarely go out to the community to address health issues and conduct awareness and educational sessions on health. Nutrition and antenatal care awareness are not practiced by the health workers due to a perceived lack of interest, lack of knowledge, low wages and difficulty in accessing some of the more remote villages. Lack of medical stocks in the health centres also contributes to poor health care as observed in the low availability of some drugs such as iron folate tablets. Lack of capacity building related to health issues further impairs active and proper diagnosis and treatment of pathologies commonly observed in this region. The widespread indiscriminate use of antibiotics which are readily available over the counter from any pharmacy, and the inadequate adherence to malaria treatments, has started to create some resistance within the most common treatment drugs.

Lack of skilled birth assistants has also been a problem in the Solomon Islands over the past 10 years as is the lack of trained Community Health Workers to assist the nurses in the tasks of following up on patients within the community and passing on health messages to the community. Untrained traditional birth attendants acquired their knowledge through their mothers and grandmothers and usually adhere to culturally acceptable activities during births which may cause harm and have not demonstrated to save lives. However they may be much respected women in their communities and can be mobilised to support women to attend health clinics and

ensure services. In Papua New Guinea there has been a strong push and recommendations by the midwifery taskforce to do more training of registered midwives as well as produce community health workers who are up skilled in maternity knowledge to ensure every aid post has at least a Community Health Worker with maternity skills and a midwife at the health centre or district level to supervise and support them. These sort of activity would probably work well in a setting such as the one seeing in South Makira. Village Health Volunteers are key to doing community mobilisation, following up pregnant women and infants in their village, being able to recognise danger signs and creating awareness about feeding practices with mothers. This could be a model that could be promoted to be taken up by the Ministry of Health and Medical Services of the Solomon Islands nationally.

Health centres should be equipped with evidence-based guidelines and sufficient health and nutrition skills and knowledge in order to be able to deliver appropriate outreach care to mothers and children. World Vision could be the link between the existing health care services and the communities, supporting health workers and encouraging the communities to use the existing health facilities. Health workers in the surrounding health centres to the communities that were studied should be encouraged and supported to make frequent visits to the community (mobile clinic services) and identify and do a follow up of pregnant women in these villages with the help of the Village Health Volunteers. This could be done via a community engagement model that links community volunteers or groups with the Health Centre staff. Understanding and frequent reminders of the importance of antenatal care checks should be a key message in order to further reduce the rates of maternal and child mortality in the Solomon Islands. Encouraging and supporting health workers to be more active in the community and not waiting for pregnant women to be mobilised themselves for antenatal checks at the health centre will assist in the reduction of maternal mortality. Nutrition education and discussions by health workers and mothers in the community should be addressed at all levels of the community including grandmothers and men. Inviting other sectors such as agricultural, social, educational and women empowerment groups, as well as other informal sectors in the village to be involved in the promotion of a nutrition program will be essential. This type of activity can have a very positive impact on the community and can be a sustainable activity because once the community have the knowledge they are able to address their nutritional needs and identify their problems on their own. World Vision will aim to support the community's knowledge of nutrition through awareness sessions about health and nutrition to be conducted by the project team, training of Village Health Volunteers and supporting the Health Centre staff by advocating on their behalf with the Provincial Department of Health who will identify their own health needs. World Vision aims to work with Health workers and the community to follow up new born children; ensure growth monitoring and home visits to pregnant women to help plan for delivery and be able to identify danger signs. Nutrition extension, vitamin A supplementation and conducting de-worming campaigns for the whole surveyed area are other steps that need to be incorporated into the work of the health centre staff who will be assisted by the village health volunteers and World Vision staff.

VI. RECOMMENDATIONS

6.1 Anaemia

- The high levels of anaemia in children under 5 years of age and pregnant women require a rapid response developed and implemented soon. Focus on community empowerment for the improved nutrition of mothers and children must also be addressed.
- Develop a process with the health centre to identify patients (mothers, pregnant women and children under 5) who suffer from anaemia. These can be identified through clinical examinations and do not necessarily require Haemoglobin tests (although ideal but not available everywhere) Those women and children that present anaemia need to be treated by doubling the dosage of iron tablets, or in more severe cases use of iron injections or blood transfusions (referral to Hospital) as needed according to the level of anaemia presented. Facilitating the testing capacity and delivery of the patients to appropriate centres where they can be attended to needs to be further discussed with the Provincial Health Department in order to develop a plan that will address the problem.
- Identification of existing Village Health Volunteers in each village that would be willing to collaborate with World Vision in order to identify all pregnant women in each village and provide each woman with 100 days of iron folate tablets. At the same time implement appropriate Behaviour Change Communication within the communities to focus on education on the need for compliance on the need to ensure all women of reproductive age and particularly pregnant women take sufficient iron folate tablets.

6.2 Immunisation

- Support the implementation within the first 12 months of the project of an immunisation outreach service to the 15 villages in the project area, which includes Vitamin A and de-worming at least once for all children under 5, in order to catch up and completely update the immunisation status of all children. This has to be accompanied by communication with the community members in order for them to understand the importance of this intervention. Permission and collaboration from the Health Department is imperative in order to achieve this objective. In order to make this sustainable a schedule needs to be discussed with the Health Department for the repetition of these mobile clinics on a regular basis.
- TT immunisation for mothers (and child) needs to be encouraged and understood as an important step towards prevention by the community members. WV project staff can contribute to increasing the awareness level of this practice. Advocacy at National levels needs to be done to encourage the Ministry of Health to ensure there is a constant and fluid stock of vaccines, facilities for cold storage systems, regular maintenance and access to gas.

6.3 Outreach activities

- Coordinate and support the local health centre to conduct quarterly outreach growth monitoring services to all 15 villages for the next 12 months. If this is not feasible the World Vision staff have the capacity to do this and should help out at least during the first months until the village health volunteers are identified and trained to do this. This activity includes collection of birth weight data as part of our monitoring process from all births in Health Centres in the project area and those home births that can be identified upon the visits to the villages.

- Develop a plan with the Health Centre to provide outreach antenatal care to pregnant women in the 15 villages ensuring iron folate, malaria prevention and de-worming treatments are provided and immunise all pregnant women against tetanus.
- Support Health centre staff to learn about and record the MUAC and/or Body Mass Index at the first antenatal visit to the HC for all pregnant women in the project area. Investigate and develop a partnership with other community women's group or village health volunteers who could be trained to help World Vision staff follow these women up within the community to ensure they continue to receive special nutritional care. This care should include at least one extra meal a day, iron folate tablets or injections according to the Haemoglobin values registered, full immunization and a plan for delivery in an appropriate Health facility in order to avoid unnecessary complications.
- In partnership with the health centre introduce suitable family planning model such as healthy timing and spacing of pregnancy (HTSP) messaging into the project area. Work with the health centre to support family planning education, commodities availability and outreach activities to the project area and messages to the whole community. This activity has to be conducted with care ensuring the community do not feel offended as the practice might clash with religious beliefs. Explore the possibility and interest of the different churches to be involved in this process if suitable.

6.4 Village Health Volunteers and health workers

- Explore possibilities of strengthening the ties between the communities and the health workers. This could be achieved by World Vision working as a link in order to increase the communities trust on the health workers, appointing female birth attendants were possible as these are preferred by the women who deliver at the health centre, and find ways to keep the health workers motivated and willing to visit the communities and bring their services to the homes of those reluctant to visit them. Before a counselling model can be implemented there needs to be trust between the expectant mother and the health provider.
- Develop a project model, such as the timed and targeted counselling model, which will ensure that all pregnant women and children under 2 are registered and tracked in the community and shared with the health staff (responsibility to be decided by community with project staff but could be by a Community Health Worker or Village health committee) This model is currently being piloted in Madang and we will have a better understanding of it's value in the following months.
- Discuss with the Department of Health, Village Health Committee, village chiefs and churches on an effective system to support the work of the Village Health Volunteers through provision of economical support or gifts in kind. This will help the Village Health Volunteer maintain his/her interest in the work and feel valued.

6.5 Nutrition

- Investigate the possibility of incorporating some immediate implementation of practices through the Trials of Improved Practice (TIPS) model currently being used in the WV Madang Nutrition Project (PNG) Using TIPS, program planners pretest the actual practices that a program will promote. In essence the procedure consists of a series of visits in which the interviewer and the participant analyze current practices, discuss what could be improved, and together reach an agreement on one or a few solutions to try over a trial period; and then assess the trial experience together at the end of the trial period.
- Work with the communities to develop an inventory of available nutritionally rich foods (especially those with high iron and zinc contents) which will optimise complementary

- feeding. World Vision staff should be trained to use the Health kaikai kit produced by the Ministry of Health for the Solomon Islands as one of the start up tools to encourage discussions among community members on nutrition.
- Involve partners such as Kastom Garden and the Ministry of Agriculture and explore ways in which they could support the project by teaching the community to grow legumes and other iron rich foods and support on how to look after their poultry in a more orderly manner in order to be able to access eggs.
 - Educate and support mothers and the whole community on the importance of colostrum feeding, exclusive breast feeding until the age of 6 months and appropriate complementary feeding practices after 6 months. The World Vision staff are responsible for supporting this. They need to visit the villages frequently and at the same time train the Village Health Volunteers identified to continue the monitoring and teaching process in site.

6.6 Infectious diseases

- Mothers must be able to identify danger signs such as symptoms of dehydration and acute respiratory infections and ensure that their child is treated by a health worker who will be able to medicate accordingly if necessary.
- Develop a plan to provide all households in the project area with pregnant women and children under 5 with Insecticide Treated Mosquito Nets and household education around prevention and treatment of malaria and care of the nets.
- Further investigate the high rates of diarrhoea, acute respiratory infections, eye and skin infections to determine the main causes of these. Work closely with the community members to understand the importance of seeking qualified medical help when these infections occur, work with mothers to be able to identify signs and symptoms of acute respiratory infections and severe cases of diarrhoea and underline the importance of completing the medicine dosage indicated by the health worker in order to reduce resistance. Start immediate health promotion activities around preventing and treating eye and skin diseases.

6.7 Relationships and advocacy

- Develop strong project relationships with the Provincial Health Department by engaging with them to discuss barriers to antenatal care and delivery in health centres, such as addressing the need for female birth attendants and antenatal care provided by a female nurse and cultural barriers that might put the mother and baby at risk. Work together with the community to address difficulties that do not allow them to access antenatal care and find solutions to address this through discussions that need to include all family members and the community as a whole together with the health centre staff.
- Increased cooperation and interaction between the health workers and the mothers need to be encouraged. World Vision is respected at both community and health worker levels and could use the volunteers and project staff in the project to act as a link between these two groups. Awareness sessions need to be implemented frequently and repeatedly by WV project staff with both the community and health workers. Health workers should be encouraged and invited by project staff to accompany them on village visits to follow up new born children, conduct growth monitoring and do home visits to pregnant women.
- Support the HC staff to develop a data set of birth weights recorded for facility births across the project area in order to begin an analysis of low birth weight babies born and to use to raise awareness of this issue.

6.8 Hygiene and Sanitation

- Promote hygiene and sanitation practices specially hand washing frequently and explain to mothers the importance of this simple preventive measure. Encourage the use (and building) of latrines and explain the dangers of open defecation. Work closely with the community using PHAST or CLTS to upgrade the toilet facilities in the village. This will need to be done through the WASH team if there are any planned projects for the future but supported by the MCHN team. Within the MCHN project the promotion of hygiene and sanitation practices could be done by using simple manuals like the WVPDG Training Manual (Basic Hygiene and Sanitation practices for WASH Projects)
- Increase the knowledge of mother, children and the community as a whole on routes of transmission of water borne diseases, skin (scabies, ringworm) and eye infections (trachoma), malaria and other diseases common to the area which are caused by the use of contaminated water and lack of hygiene.

VII. LIMITATIONS AND CHALLENGES

There were several limitations to this study. The study size is small (but adequate in terms of population) and therefore caution should be taken in interpreting results which may not be representative of the whole of the Province of Makira, this is especially so for the very small numbers of pregnant women who were screened for anaemia..

The focus group discussions were conducted at the same time as the quantitative data was collected. The FGD did not include any consultation with men, which would have given a broader and richer analysis to the study. The evaluation team had no opportunity to discuss the FGD outcomes or themes as a group with the team leader before the results were sent for analysis and more detail could of being collected if more time had been allowed for this exercise. Due to time constraints and problems with transport there were no focus group discussions done in all villages and only one health workers was interviewed in Parego (although all health centres in the area were visited). Having more results from the missed focus group discussions could have enriched our understanding of the challenges faced by these villages.

We missed the opportunity to measure the Middle Upper Arm Circumference of pregnant women and taking the Haemoglobin levels of all the mothers of children which would have given us a far better picture on the nutritional status of women of reproductive age. However within this baseline survey this was not possible economically. Taking anthropometrical measurements of all subjects would of being a costly and time consuming exercise that might of not contributed much more towards what information we have already collected.

There were delays in accessing the hemocues so the blood samples were collected several weeks after the survey was completed. The team tried to track all the children and pregnant women previously interviewed, however they were not able to reach some of the more heavily populated villages due to weather conditions and a lot of the people previously interviewed were missed.

Overall this baseline has helped recognise that WV Makira team would benefit from more training on nutrition and maternal and child health. However this baseline process has already contributed towards a first step in their capacity building.

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WORLD VISION PTL

QUANTITATIVE NEEDS ASSESSMENT SURVEY

INFORMED CONSENT (to be obtained from Household Head/other responsible adult)

Good morning, my name is -----, and I am working with an organization called World Vision. We are conducting a Nutritional Base line survey and would appreciate your participation. I would like to ask you about the members of your family, living conditions, health and education. The information we will gather will be put together to make a picture of the current health situation of the village. This information will help World Vision to plan programs to meet the needs of this area.

We will visit you and teach you ways to improve the health status of the mother and children in this village. We will do these same questions and tests later on and be able to see the progress the village has made on the health status of women and children.

This World Vision staffs who works with me will interview one lady of your house about their health and about the health of her small children. After we complete the questions we will ask your permission to weigh and measure your child. We will also like to take a small sample of blood which will involve pricking his finger (like when you do a malaria test)

The survey usually takes about 45 minutes to complete.

If you have any questions about the survey, you can ask me, my survey field supervisor who is here with the survey team, or one of the development workers at World Vision.

At this time do you have any questions about the survey?

All the information that you provide will be kept strictly confidential and will not be shown to/discussed with other persons. Your name will not appear in any of the documents that will be used.

Name and Signature of interviewer:

Respondent agreed to be interviewed

1. Yes

2. No

The questions in this survey are for the **PRINCIPAL CAREGIVER** in the household, normally the mother. If there is more than one mother in a household, choose the mother of the youngest under 5 child in the house.

I. HOUSEHOLD IDENTIFICATION

This section is to be completed for each household visited.

I01. Program Area Name.			
I02. District, LLG and Village or community name.			
I03. Household number.			
I04. Date of interview.	Day:	Month:	Year:
I05. Time interview commenced.			
I06. Time interview ended.			

I07. Record number, for database program

Interviewers Refer at **ALL** times to your survey manual for instructions. Remember to obtain consent from each household.

Field Supervisors Check **ALL** answers recorded in each section, ensuring gaps or missing answers are obtained **BEFORE** leaving the cluster. Fill in the right hand results column

Please complete this part of the form

	Field supervisor	Office editor	Data entry clerk
Name			
Date			

SECTION 2: MATERNAL & NEWBORN CARE

201. Sampled child

Name : _____

Date of Birth : _____

Age In months : _____

Sex : Male (1) . Female (2)

202. During your pregnancy did you receive Tetanus toxoid injection?

1		Yes
2		No (go to 204)
3		Do not know (go to 204)

203. How many tetanus injections did you get?

1		One
2		Two
3		More than two
4		Do not know

204. Do you have your Mama bel book or clinic book with you? (For checking TT documentation)

1		Yes, seen by the interviewer
2		Lost, misplaced, not at home
3		Never had a card
4		Do not know

205. Before you gave birth to (Child) did you receive marasin bilong blut (Iron-folate) tablets?

1		Yes
2		No (go to 207)
3		Do not know (go to 207)

206. How many marasin bilong blut (iron) tablets did you consume during pregnancy?

1		Less than 50 tablets
2		50-100 tablets
3		More than 100 tablets

207. When you were pregnant did you receive de-worming tablets (hookworm)?

1		Yes
2		No
3		Do not know

208. When you were pregnant how much food did you eat every day?

1		Less than before (sick, morning sickness)
2		The same as before
3		One extra meal
4		More than one extra meal

209. What foods did you consume yesterday?
 ___ Carbohydrates (sweet potato, cassava, taro, rice, bread)
 ___ Protein (red meat, chicken, fish, other sea food)
 ___ Fats (butter, oil, animal fat)
 ___ Fruits (banana, pineapple, paw-paw, mango)
 ___ Vegetables (pumpkin, green leave vegetables, tomatoes)

1		Balanced diet
2		Unbalanced diet

210. Did you go to a Hospital or Clinic for your pregnancy checkups?

1		Yes
2		No (go to 212)
3		Do not remember

211. How many times did you get yourself checked?

___ times 99. Do not remember

212. Where did you give birth to

1		Health Centre, Aid Post
2		Hospital
3		Home
4		Other

213. Who assisted you during the birth?

1		Doctor
2		Nurse/trained Birth attendant
3		Untrained Birth attendant
4		Relatives, neighbour
5		None
6		Do not remember

214. Do you have a baby book? (Immunization)

1		Yes, seen by the interviewer
2		Lost, displaced, not at home
3		Never had a card
4		Do not know

215. Verify the card or based on verbal check the immunization status. **Ask This Question only to mothers with 12-24 months children** (Circle the below table for each given dose)

	Immunization	DPT	BCG	Polio	Measles
1	On Birth		BCG	0 Polio	
2	1 and ½ months	DPT1		1 Polio	
3	2 and ½ months	DPT2		2 Polio	
4	3 and ½ months	DPT3		3 Polio	
5	9 months				Measles

1		Complete immunisation
2		Partial immunisation
3		No immunisation

216. Did child get vitamin A? (Children 6 months - 24 months)

1		Yes
2		No (go to 218)
3		Do not remember (go to 218)

217. How many months ago was the last Vitamin A dose given?
 ___ Month(s) Do not remember

218. Did your child receive de-worming tablets (hookworm)? 12+ months

1		Yes
2		No
3		Do not know

219. Are you familiar with family planning methods? How did you find out about them?

1		No
2		Nurse
3		Health Worker
4		Family member
5		Spouse

220. Are you using some form of modern family planning method?

1		Yes
2		No (go to section 3)

221. What type of family planning method do you use?

1		Condoms
2		Depo
3		Pills
4		Mother sterilised
5		Father sterilised
6		Ovulation cycle
7		Coitus interruptus (withdrawal)
8		IUCD

SECTION 3: BREASTFEEDING/NUTRITION

301. Did you ever breastfeed this child?

1		Yes
2		No (go to 308)

302. How long after birth did you first put child to the breast?

1		Immediately, within the first hour
---	--	------------------------------------

2		After the first hour
---	--	----------------------

303. Did you give the first milk (colostrum or yellow milk) to the child?

1		Yes
2		No
3		Do not remember (go to 305)

304. If not, why did you not give him/her colostrum?

1		Not accepted culturally
2		Person doing delivery does not encourage
3		Other:

305. Did you exclusively breastfeed this child between 0 and 6 months?

1		Yes (go to 307)
2		No

306. At what age did you first give your baby anything to eat or drink apart from breast milk? Record answer in months

___ Months

Do not remember

307. What types of liquid and food did the child consumed yesterday?

1		Breast milk
2		Plain water
3		Other liquids – other milk, drinks
4		Mashed vegetables/ fruits
5		Biscuits, Bread, rice, sweet potato, taro, cassava
6		Egg, Fish, chicken, meat
7		Others

Mark one

1		Exclusive breastfeeding
2		Balanced meal
3		Not balanced meal

308. Height and weight of the child

Height of child (CM):.....

Weight of child (KG):.....

309. Hemoglobin value of the child (in g/dL)

SECTION 4: CARE OF THE SICK CHILD

401. Did child have loose stools in the past 2 weeks? (Children 0-24 months)

1		Yes
2		No (if no go to 403)
3		Do not remember

402. What did you give your child to drink when he/she had loose stools?

1		ORS
2		Water
3		Water with salt and sugar (home made ORS)
4		Breast milk
5		Coconut water
6		Other

403. Do you have a bed net/mosquito net in your home?

1		Yes
2		No
3		Do not know

404. Did the child sleep under a mosquito net last night?

1		Yes
2		No

405. Has the child had a fever, shortness of breath and cough in the last 2 weeks?

1		Yes
2		No

406. If yes to questions 405, did you or anyone else give the child any of these medications?

1		Antibiotics
2		Traditional remedies
3		Other:

SECTION 5: WATER AND SANITATION

501. How many of your children under 5 yrs old have had diarrhoea in the past month?

1		None
2		One
3		Two
4		3 or more

502. How long did the diarrhoea last?

1		1-2 days
2		3-5 days
3		> 5 days

503. How many members of your family over 5 years have had diarrhoea in the past month?

1		None
2		One
3		Two
4		3 or more

504. How many members of your family have had skin infections in the past month?

1		None
2		One
3		Two
4		3 or more

505. How many members of your family have had eye infections in the past month?

1		None
2		One
3		Two
4		3 or more

506. What do you think causes diarrhoea? CHECK ALL THAT APPLY.

1		Drinking dirty water
2		Eating not properly washed food
3		Eating with dirty hands
4		Playing in areas filled with waste and faeces
5		Not washing hands before eating
6		Not washing hands after going to toilet
7		Flies
8		Don't know
9		Other, please specify:

507. What kind of toilet facility does this household use?

1		Flush/Pour-Flush Toilet
2		Ventilated Improved Pit Latrine (VIP)
3		Bush Latrine With Cover
4		Bush Latrine With No Cover (Open Pit)
5		No Latrine: Field, Bush

508. When is it important to wash hands? (CHECK ALL THAT APPLY. DON'T READ ANSWERS OUT LOUD)

1		After going to the toilet
2		Before and after cleaning infant faeces
3		Before and after feeding an infant
4		Before and after cooking
5		Before and after eating
6		After dealing with animals
7		Don't know

509. During wet season what is the main source of drinking water for members of this household? (CHECK ONE)

1		Public Tap/Standpipe
2		Tubewell/Borehole
3		Unprotected Dug Well
4		Unprotected Spring
5		Rain Water Collection
6		Surface Water (River /Pond/Lake/Dam/ Stream/Canal/Irrigation Channels)

510. During dry season what is the main source of drinking water for members of this household? (CHECK ONE)

1		Public Tap/Standpipe
2		Tubewell/Borehole
3		Unprotected Dug Well
4		Unprotected Spring
5		Rain Water Collection
6		Surface Water (River /Pond/Lake/Dam/ Stream/Canal/Irrigation Channels)

511. Who usually goes to this source to fetch the water for this household? (CHECK ONLY ONE)

1		Adult Woman (Age 15 Or Older)
2		Adult Man (Age 15 Or Older)
3		Female Child (Under 15 Years Old)
4		Male Child (Under 15 Years Old)

512. Do you treat your water in any way to make it safer for drinking?

1		Yes
2		No

513. Who in your household drinks the treated water – adults/ children/ all

1		Adults only
2		Children only
3		Everyone in the household

514. IF YES, what do you usually do to the water to make it safer to drink? (CHECK ALL THAT APPLY)

1		Let It Stand And Settle/Sedimentation
2		Strain It Through Cloth
3		Boil
4		Add Bleach/Chlorine

515. Have you used soap today or yesterday?

1		Yes
2		No

516. When you used soap today or yesterday, what did you use it for?

If they say it was for washing my hands or my children's hands probe when they washed and why. No not read the answers. Encourage and ask, what else? Mark all mentioned

1		Washing Clothes
2		Washing My Body
3		Washing My Children
4		Washing Child's Bottoms
5		Washing My Children's Hands
6		Washing Hands After Defecating
7		Washing Hands After Cleaning Child
8		Washing Hands Before Feeding Child
9		Washing Hands Before Preparing Food
10		Washing Hands Before Eating
11		Other

517. Can you show me where you usually wash your hands and what you use to wash hands?

1		Inside/Near Toilet Facility
2		Inside/Near Kitchen/Cooking Place
3		Elsewhere In Yard
4		Outside Yard
5		Others

SECTION 5.2: WASH observation checklist

5.2.1. Cover on containers. Are the water containers covered?

1		All are
2		Some are
3		None are

5.2.2. Is there soap, detergent or any other locally used cleaning agent?

1		Soap
2		Ash
3		None
4		Other:

5.2.3. Is there a hand washing device such as a tap, basin, bucket, sink or tippy tap?

1		Yes
2		No

APPENDIX B: Pregnant women identification form

SECTION 6: COMMUNITY OBSERVATION CHECKLIST

Village name: _____

SECTION 6.1: Pregnant women

Name	Age	Trimester of pregnancy	Number of children (excluding current)	Date of last child born (month/year)	Use of mosquito net last night	Haemoglobin levels
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APPENDIX C:

SECTION 6.2: HEALTH CENTRE OBSERVATION CHECKLIST

6.2.1 Antenatal care:

- Adult weight scales
- Measuring tape
- Regular Stethoscope
- Pinard stethoscope
- Stock of Iron folate tablets
- Stock of de-worming medication
- Stock of malaria prevention medicine for pregnant women
- STI screening

6.2.2 Vaccination:

- Tetanus vaccination
- BCG (TB vaccination)
- Pentavalent (DPT, HepB, Hib)
- OPV
- MV
- Cold chain mechanism

6.2.3 Basic Birthing equipment

- Birthing kits
-
-

6.2.4 Medication

- Antibiotics
- Antimalarials
- ORS

6.2.5 Neonate/ infant checks

- Children health booklets given to mothers
- Infant weight scales
- Measuring board/tape
- Other: _____

WORLD VISION PTL QUALITATIVE NEEDS ASSESSMENT SURVEY

1. FGD with Grand Mothers-

Focus Group Characteristics

Location:

Number of Participants:

Age Range:

To begin with let us discuss about the customs and practices related to childbirth and breastfeeding.

1. Let us suppose that 10 women in this village had deliveries in the past one month. Of these, how many would have been assisted by a non medical person, how many by the mother in law or other family member, and how many have gone to the Health Clinic/hospital.

Village Birth Attendant

Family Member

Clinic/Hospital

Others

2. Who in the family decides about this, and what factors/reasons are considered while making this decision?
3. After the birth of the baby, can you describe what is done to the child? (*Probe: What do you do to the child right after birth, who does this, what next, who does that, ect,*)
4. What are the reasons behind these practices? (*Probe: How are these practices supposed to benefit the health of the mother/child?*)
5. How long after birth do mothers put the baby to the breast?
6. When you assist deliveries, what do you advice mothers in this regard?
7. What are the reasons why you advice mothers to put the child to the breast?
8. What advice do you give mothers regarding colostrums?
9. What are the reasons behind doing so?
10. What do you think will happen to the mother or to the child if the colostrums are given to the baby?
11. What do you think might happen to the mother or the child if the colostrums is not given to the baby?
12. Are any other fluids given to the baby after birth?
13. What are the reasons why these are given? What benefits?

14. In all the above advice you give to the mothers after child birth and in all things that are done to the baby soon after birth, is there any difference in what you would do to a baby girl from what you would do to a boy baby?
15. At what age are children given fluids other than breast milk? What are the reasons for giving these?
16. At what age are children given semi-solid foods?
17. Do you think this is right or does this practice need to be changed?
18. What are the common foods given to the children between six months and one year of age?
19. What food are considered harmful for children, and why
20. What foods are given to children when they are sick?
21. What do you think is the connection between the giving of these foods and the health of the child?
22. What are the difficulties that mothers and other family members face in giving these foods to their children
23. How do they overcome these difficulties?

Immunization

24. What immunization do children in this village receive? (If she/he has not received all due vaccines, ask why not)
25. Do you think vaccinations are good for the child? Why?

Access/Utilization issues

26. How often has your daughter or daughter in-law gone for antenatal care at the clinic?
27. How far is it from your home? What do they go there for?
28. Describe any difficulties you have faced in getting to the clinic or while at the clinic.
29. How can your visit to the clinic be made easier and more useful for you?
30. What all vaccination did your daughter or daughter in-law received during her pregnancy? (If not received ask why not)

2. FGD with Mothers

Location:

Number of Participants:

Age Range:

Guide Questions

Current Practices related to child health.

1. What would you like to start by asking about what all you do to ensure the health of your child?
2. How long after (---) was born did you put him/her want to the breast?

3. Before or after beginning to breastfeed, did you also give him/her other liquids like water, tea or coconut?
4. Have you begun to give (---) other foods or fluids?
5. When did you begin to give these to (--)?
6. What immunization has (...) received?
7. If he/she has not received all due vaccines, ask why not?

Behavior Change Communication

8. How and from whom did you learn about all these practices and their benefits?
9. What could have been done so that more and more mothers like you will also be able to hear about these good practices and change their behavior?

Access/Utilization issues

10. How often have you gone to the health centre in your village? How far is it from your home? What do you go there for? Describe any difficulties you have faced in getting to the centre or while at the centre? How can your visits to the Centre be made easier and more useful for you?

Family Planning

11. Is information related to FP (family planning) and the methods available to all families in your community?
12. Describe some changes that you have seen in the perception of your family and community members towards FP

3. KII with Health Worker

Guiding Questions

Location:

Name:

Years on the job:

Overall experiences:

Challenges:

Utilization of Health Services and behaviors

1. Describe the health of mothers and children (like feeding behaviors, immunization, and family planning use)-ask one after the other.
2. Please provide examples specific to immunization, vitamin A supplementation, care during pregnancy and delivery, FP use ect.
3. What are the main reasons for families to use family planning?

4. Are the community members using appropriate feeding practices for their children? *(like giving only breast milk up to 6 months of age, giving semi solid food from 6 months of age ect)*
5. Is the community using services like immunization and institutional delivery?
6. Not seeking care promptly for illness?
7. What are some challenges in your work? How can an agency like WV help you serve your people to avoid diseases?

Community Mobilization

8. How is the demand from communities for health services?
9. What is your opinion of their awareness levels?
10. What do you think are the major barriers that keep people from using services?
11. What better role can the Government play in the health of mothers and children?
12. Are there any particular groups of people, or villages or hamlets that are particularly in need of better health and health services?
13. To what extent does poverty play a role in the use of health services and appropriate practices?
14. Apart from poverty, what are other factors that affect people using health services?